Interactive CardioVascular and Thoracic Surgery

INTERACTIVE CARDIOVASCULAR AND THORACIC SURGERY

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Abstracts

May 18, 2007 2nd Congress Day
14:30-16:00
1st Cardiac Scientific Session - Coronary 1

C1-1

RESULTS OF BEATING HEART SURGERY WITH DOUBLE ITA IN ELDERLY PATIENTS

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Objective: As life expectancy increases, more elderly patients are referred for CABG. Higher patency rate of internal thoracic arteries, lack of adequate venous material and low incidence of stroke can make off-pump bilateral internal thoracic arteries grafting attractive for elderly patients.
Methods: Between October 1999 and July 2005, 358 patients aged 70 years or older underwent off-pump CABG using double pedicled internal thoracic arteries. 7.3% of patients (*n*=26) were 80 years or older, 10.1% (*n*=36) had emergent surgery. Twenty four percent of patients (*n*=85) were obese and 8.9% (*n*=32) were diabetics. Mean number of distal anastomoses was 2.4±0.6 per patient. Mean follow-up was 3.4±1.6 years and completed for all patients but six.
Results: Hospital mortality rate was 2.8% (*n*=10). Survival rate was 94.3, 88.4 and 67.6% at respectively 1, 3 and 6 years. Mediastinitis rate was 1.95% (*n*=7). Postoperative infarction was 3.6% (*n*=13). Peri-operative intra-aortic balloon contra-pulsation was required in 2% (*n*=7). During the postoperative time, 19 patients (5%) required inotropic support. Postoperative stroke was 0.3% (*n*=1). Mean bleeding rate was 496.95 ml. Atrial fibrillation occurred in 84 patients (23.4%) after surgery persisting in 13 patients at discharge. Two patients required hemodialysis. Freedom from cardiac death was 99.7, 99 and 95% at respectively 1, 3 and 6 years. Eight patients (2.2%) required control coronarography for remaining angina. We found two thrombosed graft and one significant stenosis.
Conclusions: Off-pump CABG using double internal thoracic arteries for elderly patients carries relatively low mortality and morbidity rate that can be compared with on-pump surgery with the advantage of very low incidence of neurological events in this series.

C1-2

INFLUENCE OF DIABETES ON LONG-TERM SURVIVAL IN SYSTEMATIC OFF-PUMP CORONARY ARTERY BYPASS SURGERY

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Objective: Off-pump coronary artery bypass surgery (OPCAB) is currently used as an alternative to conventional 'on-pump' surgery, especially on higher-risk patients such as diabetic patients. The aim of this study was to compare long-term results of OPCAB surgery in diabetic and non-diabetic patients.
Methods: This is a retrospective analysis of prospectively gathered data over an 8-year period of 1000 consecutive and systematic OPCAB patients operated on between September 1996 to April 2004. Average follow-up period was 57±26 months and was 97% complete.
Results: Two hundred and seventy eight procedures were performed in diabetic patients (DM) and 722 in non diabetic patients (NDM). Prevalence of hypertension (*P*<0.0001), obesity (*P*<0.0001), chronic renal failure (*P*<0.0001), pulmonary hypertension (*P*<0.0001), peripheral vascular disease (*P*=0.009), congestive heart failure (CHF) (*P*<0.0001), emergent surgery (*P*=0.03), and triple vessel disease (*P*=0.01) were more frequent in diabetics. Redo surgery (*P*=0.005) and bilateral internal thoracic artery bypass (<0.0001) were more frequent done in the non diabetic group. The 'no touch' technique was more frequent in diabetics (*P*=0.01). There was no difference in 30 day mortality between the two groups. Univariate study determined that age (*P*=0.005), carotid vascular disease (*P*=0.057), and chronic renal failure (*P*=0.005) were determinant for operative mortality for the entire cohort, while preoperative chronic atrial fibrillation (*P*=0.004), chronic renal failure (*P*=0.044) and emergent surgical revascularization (*P*<0.0001) were more specifically determinant of operative mortality in the diabetic population. Eight year survival (*P*=0.01) and survival free of major cardiac adverse event (MACE) (*P*=0.02) was decreased in the diabetic group. Cox regression analysis model revealed that age (RR=1.07), peripheral vascular disease (RR=1.9), carotid disease (RR=1.6), CHF (RR=1.97), incomplete revascularization (RR=2.02), and LVEF (RR=0.17), but not diabetes (*P*=0.13) were significant determinants of long-term survival. Similarly, CHF (RR=1.74), PVD (RR=1.98), chronic renal insufficiency (RR=2.45), emergent operation (RR=2.04), and previous percutaneous coronary intervention (RR=1.6) were determinant of MACE-free survival but not diabetes (*P*=0.3). Breaking down the MACE, diabetes was found a borderline independent predictive factor of CHF (*P*=0.06) and cardiac death (0.07).
Conclusions: In our series OPCAB was as safe and effective in diabetic than non-diabetic patients. Long-term survival was comparable in both populations. However diabetes was a potential risk factor for long-term CHF and cardiac death.

C1-3

ANGIOGRAPHIC RESULTS IN A COMPARATIVE RANDOMISED STUDY OPCAB VS. ON PUMP CABG

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Objective: The aim of the study is to evaluate angiographic results in a prospective randomised study comparing off pump coronary bypass surgery (Group I) and conventional technique (Group II).
Methods: Three hundred and forty five patients were prospectively included (183 in group I, 163 in group II). Exclusion criterias were: severe ventricular arrythmia, associate mitral or aortic insufficiency and extensive coronary calcifications. There was no significant difference in age, gender, risk factors, ventricular function between the two groups. 86.1% of the patients suffered triple or double vessel disease and they received 2.2–2.4 conduits per patient with no difference in the two groups. Death (0.6%) and complications rates were comparable and we observed as published in other papers less blood transfusion, less bleeding, less myocardial damage (Troponine and CPKmB) in group I.
Results: Two hundred and thirteen patients finally accepted post operative angiography (62.3% in group I, 61.1% in group II) with 470 bypass grafts controlled.
Early patency rates were 92% (group I) vs. 95.7% (group II) for the LAD revascularisation (*n*=206), 76.2% vs. 100% in the Diagonal branches (*n*=43 *P*=0.021), 76.6% vs. 93.3% on the marginal branches (*n*=124, *P*=0.010), 67.4% vs. 86.1% on the right coronary artery (*n*=79, *P*=0.053) and 85.7% vs. 90.9% on the retroventricular branches (*n*=18, *P*=0.73).
Conclusions: Beating heart surgery offers a valuable alternative to conventional CABG in terms of clinical results and complications rates. Quality of surgical revascularisation is equal on the LAD and right coronary artery but is significantly lower on the marginal and diagonal branches. These results suggest more selective indications for OPCAB and further controlled studies with evaluation of the quality of the technical results using angiograms or coro CT scan.

C1-4

COMPARISON OF TWO SURGICAL TECHNIQUES: OFF-PUMP VS. ON-PUMP CORONARY BYPASS SURGERY IN THE ELDERLY – RESULTS AND MID-TERM OUTCOMES

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Objective: The incidence of coronary bypass surgery in elderly patients has been increasing. Clinical outcomes and problems following coronary artery bypass surgery in elderly patients have not been clarified. This retrospective study was aimed at assessing the results and rate of complications following bypass surgery using two surgical techniques in elderly patients.
Methods: We analyzed 1128 consecutive patients over 65 years of age who underwent myocardial revascularization with (*n*-669, group CABG) and without (*n*-459, group OPCAB) extracorporeal circulation from January 2003 to December 2005. After matching age, gender, extent of coronary artery disease, EF, NYHA, and diabetes the two groups were compared in two revascularization modalities. The number of patients with carotid disease in the CABG group was lower: 7.5% (50/669) vs. 12.2% (56/459) $P<0.01$ in the OPCAB group. Preoperative and postoperative variables were analyzed such as reoperation, MI inotropic support, IABP, wound infection, neurological complications. Time-related events were described using the Kaplan-Meier estimate.
Results: The mortality rate was 2.8% (19/669) vs. 2.6% (12/459) in the OPCAB group. The incidence of complications (CABG vs. OPCAB) such as low cardiac output were 36.2% (242/669) vs. 22.2% (102/459) $P<0.001$, IABP6, 7% (45/669) vs. 3.3% (15/459) ($P<0.05$), MI 3.9% (26/669) vs. 3.5% (16/459), reoperations 4.2% (28/669) vs. 1.5% (7/459) $P<0.05$, neurological complications 12.3% (82/669) vs. 6.3% (29/459) $P<0.001$. Postoperative intensive care unit and hospital stays were lower in OPCAB group, 7.29 vs. 6.84 days <0.001. The frequency of blood transfusion was significantly higher in the CABG group, 334 (49.9%) vs. 121 (26.4%) $P<0.001$. The Kaplan-Meier estimate revealed a similar 36-month survival rate: 92.5% vs. 91% and cardiac event-free rate 78% vs. 77% in the CABG vs. the OPCAB technique.
Conclusions: Off-pump technique used in coronary bypass surgery in elderly patients provides better results in terms of inotropic and IABP support, reoperations, time of ICU and hospital stay compared to the results of the CABG technique. Furthermore, the rate of neurological complications were lower in the OPCAB group despite the higher number of patients with carotid disease.

C1-5

PROSPECTIVE RANDOMIZED COMPARISON OF CORONARY BYPASS GRAFTING WITH MINI-EXTRACORPOREAL CIRCULATION SYSTEM (MECC) VS. OFF-PUMP CABG

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Objective: To evaluate the clinical results and the biocompatibility of the mini-extracorporeal circulation system (MECC) in comparison to off-pump coronary revascularization (OPCABG).
Methods: In a prospective, randomized study 161 patients underwent coronary surgery with the use of the mini-extracorporeal circulation system and 159 patients underwent OPCABG. Endpoints were: a) circulating markers of inflammation and organ injury; b) hemostatic activation indices; c) operative results; d) outcome at one-year follow-up.
Results: Operative mortality and complications rates were comparable among groups. Release of inflammatory markers was similar between groups at all timepoints (peak IL-6 169.0±113.5 vs. 181±5.9, in the OPCABG vs. mini-extracorporeal circulation system group, respectively, $P=0.15$). Peak creatine kinase was 422.4±100.1 vs. 325±74.3 ($P=0.30$), and peak S100 protein 0.13±0.09 vs. 0.29±0.2 ($P=0.059$). Length of hospital stay was similar for both groups. Three cases of angina recurrence at one year in mini-extracorporeal circulation system group vs. five cases in OPCABG group could be observed ($P=0.50$). Residual perfusion defect at myocardial nuclear scan was less frequent among individuals operated on with the mini-extracorporeal circulation system (4 vs. 10 cases; $P=0.16$). There were seven (OPCABG group) vs. four (mini-extracorporeal circulation system group) occluded or severely stenotic coronary grafts at one year ($P=0.52$, OR 0.55, 95% CI 0.13-2.16).
Conclusions: The clinical results of coronary revascularization with the mini-extracorporeal circulation system are optimal when performed by experienced teams. The one-year outcome is comparable to OPCABG. The mini-extracorporeal circulation system is associated to little pump-related systemic and organ injury. It may achieve the benefits of OPCABG (less morbidity in high-risk patients) while facilitating complete revascularization in case of complex lesions unsuitable for OPCABG.

C1-6

ON-PUMP BEATING HEART CORONARY SURGERY IN HIGH-RISK PATIENTS UNDERGOING URGENT CABG

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Objective: Cardiopulmonary bypass (CPB) with aortic cross-clamping and cardioplegic arrest remains the method of choice for patients requiring myocardial revascularization. Very high risk patients suffering of instable angina and acute cardiac decompensation, can have a poor outcome after CPB and cardioplegic arrest. On-pump beating heart surgery seems to be the valid solution for these patients. We describe our clinical experience.
Methods: From December 2004 to January 2006, 25 patients (mean age 69±7 years) requiring emergency myocardial revascularization were operated in our hospital. The mean left ventricle ejection fraction (LVEF) was 27±8%. Nine patients (35%) suffering of acute cardiac decompensation needed a preoperative intra-aortic balloon pump. The majority of them (88%) suffered of tri-vessel coronary disease and only six (25%) had a left main stump disease. Thirteen patients (53%) had a EuroSCORE above 9.
Results: Mean number of graft/patient was 2.9±0.6 and LIMA was used in 21 patients (88%). Mean CPB time was 84±19 min. The in-hospital mortality was 11% and there were no postoperative myocardial infarctions. Eight patients had transitorily kidney insufficiency and one patient developed a sternal wound infection. The mean hospital stay was 12±6.7 days. Twenty two patients survived at surgery were followed-up (mean time: 20±5.5 months). One patient died for cardiac arrest. The LVEF grew to 38±6% at the echocardiogram. All patients have a good quality of life.
Conclusions: In our clinical experience, patients undergoing urgent on-pump beating heart coronary revascularization have a better outcome compared to the standard procedure. For this reason we strictly recommend this technique in this group of patients.

C1-7

ROUTINE IMMEDIATE EXTUBATION AFTER CORONARY ARTERY REVASCULARIZATION ON THE BEATING HEART

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Objective: Coronary artery by-pass surgery on the beating heart without extracorporeal circulation is a milder aggravation for the patient compared to on pump surgery, allowing immediate extubation of the patient in the operating room. The benefits of this technique are reduced intensity of postoperative care, shorter stay in the ICU and fewer complications from shorter mechanical ventilation and ICU length of stay.
Methods: We present our experience in 192 unselected patients that underwent coronary artery by-pass on the beating heart under general anesthesia using an ultra short acting opiate (remiphentanyl) without epidural analgesia.
Results: One hundred and eighty patients of the total 192 were extubated in the operating room (177 in <20 min), while 12 cases were converted to standard fast track anesthesia during the operation. Two patients died, four stayed in the ICU for more than 20 h, five had longer overall hospital stay and 13 experienced major complications (myocardial damage 6, transient cerebral ischemia 1, worsening of the renal function 3, psychosis 3).
Conclusions: Immediate termination of the mechanical ventilation after coronary artery by-pass grafting on the beating heart is applicable and safe even in high risk patients and adds to the advantages of avoiding the cardiopulmonary by-pass.

C1-8

BEATING HEART SURGERY - THE SHUNT ISSUE

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Objective: The overall benefit of intracoronary shunts in OPCAB procedures is not yet fully realised. Due to constant coronary bloodflow shunts reduce myocardial ischemia and allow longer time spans for performing distal anastomoses.

On the other hand it is believed that shunts cause significant damage to the endothelial cell layer of the respective coronary arteries. Our experiences from previous postoperative angiographies indicated that the use of a shunt may lead to vasoconstriction of the respective coronary arteries.
Methods: Ten vein graft anastomoses were performed by use of an intracoronary shunt (group 1). The first two patients received 10000 IE Heparin, the latter seven patients additionally diltiazem i.v. throughout the whole procedure. Ten anastomoses were performed without use of a shunt in different patients (group 2). Intraoperative bypass-angiography was performed prior to the central anastomoses and at the end of the operation. Additionally, bypass blood flow measurements were done at the end of the operation.
Results: Group 1: All anastomosed coronary arteries showed stenotic areas immediately adjacent to the anastomoses. In two cases we performed a revision of all anastomoses although intraoperativ bypass blood flow was sufficient. When diltiazem was administered the stenotic lesions were either less impressive or not detectable. Group 2: There were no stenotic areas detectable.
Conclusions: We conclude that the use of an intracoronary shunt may cause a vasoconstriction of the respective coronary artery. When diltiazem is administered vasoconstriction is reduced. Therefore diltiazem should be administered whenever possible in order to exclude vasospasms.

C1-9
INFLUENCE OF OPCABG PROCEDURE VOLUME ON EARLY AND MID-TERM RESULTS IN A SINGLE CENTRE
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Objective: Quality of revascularization and incidence of early and late adverse events have been examined for two different indication strategies of off-pump coronary artery bypass (OPCABG) in a single centre.
Methods: From June 2000 to January 2005 three-hundred patients underwent OPCABG in S. Croce Hospital, Cuneo, Italy. One hundred-twenty patients (group A) were selected for co-morbidities considered high-risk for cardio-pulmonary bypass by four surgeons (14% of their CABG, low volume procedure surgeons). One-hundred eighty unselected patients (group B) were operated by a single surgeon (90.9% of his CABG, high volume procedure surgeon). Mean follow-up of 42 months was 98.4% complete.
Results: All-causes hospital mortality was 1.3%.
Six-years actuarial freedom from recurrence of ischemia, all-causes death, cardiac death, target vessel revascularization and revascularization for failure of OPCABG was respectively 88.4%±2.9%, 84.6%±3.3%, 93.0%±2.7%, 94.2%±1.9%, 93.8%±2.0%.
Patients of group A had older age (mean 71 vs. 67.7), higher mean risk predicted by EuroSCORE (6.18 vs. 4.56), less diffuse coronary disease (three-vessel disease 38.3% vs. 77.7%), less complete numeric revascularization (44.1% vs. 80.5%) and less complete lateral wall revascularization (45.9% vs. 96.5%) than patients of group B.
At follow-up 11/16 repeat revascularizations were in group A.
Conclusions: Repeat revascularization was principally caused by graft failure and was more frequent in the group of selected patients. This finding suggests a benefit of high OPCABG procedure volume on mid-term outcome.

C1-10
Y-SHAPED BILATERAL MAMMARY ARTERY GRAFTING: RESULTS OF ON-PUMP VS. OFF-PUMP CORONARY REVASCULARIZATION
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Objective: We report our experience of on-pump (Group ON) and off-pump (Group OFF) full arterial coronary artery bypass grafting (CABG) using both internal mammary arteries anastomosed as a Y-shaped mounting.
Methods: A prospective single center non randomized clinical study was conducted between January 2003 and November 2006. It compared the short-term clinical outcomes of ON- and OFF-pump arterial revascularization where the LIMA was anastomosed to the LAD while the free RIMA graft taking off from the LIMA was used to bypass different coronary targets.
Results: One hundred and twenty three patients were divided into 51 on-pump and 72 off-pump procedures based on the intention to treat. The mean age in both groups was 59.5±11 and 69±11 year old respectively (P<0.05). Mean predictive logistic EuroSCORE was 2.4% for the ON-pump group and 7% for the OFF-pump group (P<0.0001). Operating times were 223±39 min (group ON) and 175±48 min (group OFF) (P<0.001). Mean number of distal anastomoses were 2.7±0.6 (group ON) and 2.5±0.6 (group OFF) (P=0.11). Postoperative mortality was four patients (5.5%) in the off-pump group and three patients (6%) in the on-pump group (P=0.86). No major adverse coronary event and no late death were reported during the follow-up that averaged 20.5±13.8 months.
Conclusions: The use of a free RIMA as Y-graft from the LIMA is a valuable option to enable total arterial revascularization. In off-pump CABG it eradicates aortic manipulations and provides a mortality similar to the one achieved in a lower risk population operated ON-pump.

May 18, 2007 2nd Congress Day
14:30-16:00
2nd Cardiac Scientific Session - Aorta 1

C2-1
FLANGED BENTALL TECHNIQUE: TEN YEARS EXPERIENCE
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Objective: Surgical technique for aortic root replacement is replacement of aortic root with a composite graft integrated with prosthetic mechanical valve. The aim of our study was to evaluate the 10-year results of aortic root replacement with our new modified Bentall technique.
Methods: Between January 1996 and December 2006, 200 patients underwent aortic root replacement. Aortic root was replaced with a new modified flanged composite graft. Operation indications were the ascending aortic aneurysm, acute aortic dissection, the ascending aortic dilatation with severe calcified aortic stenosis or severe aortic insufficiency and combinations of all. One hundred and sixty four patients were male (82%), 36 were female (18%) and mean age was 49.5. Forty two patients (21%) underwent more than one cardiac procedure.
Results: Mean aortic cross clamp time was 91.2 min and cardiopulmonary bypass time was 147.3 min. Retrograde cerebral perfusion was used in 37 patients. Mean operation time was 4.8 h. Operative mortality was 8% with 16 patients. There were no patient mortality by the complications of flanged technique and no patient was re-operated. Late mortality was observed only in eight patients (4%).
Conclusions: Flanged composite graft has favorable late results with the fewer complication percentages due to prosthetic materials. Newly reconstructed sinuses by the help of flanged technique are useful especially to remain the physiologic of aortic root.

C2-2
MINIMALLY INVASIVE APPROACH USING THE BENTALL DE-BONO PROCEDURE FOR THE TREATMENT OF THE ASCENDING AORTA DISEASES
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Objective: The use of minimally invasive approach for the treatment of the cardiac diseases is increasing and is obtaining a wide consensus but is it still challenging for many surgeons.
We report our experience of the treatment of the ascending aortic diseases using the Bentall-de Bono procedure through a minimally invasive approach.
Methods: Between September 1997 and June 2005 at Policlinico San Matteo, Pavia, we treated 40 patients affected by ascending aortic diseases using a Bentall-DeBono procedure through a minimally invasive approach, by the mean of a reversed T or J ministernotomy. Data were analysed retrospectively. Thirty patients were male (75%). All of the patients had ascending aortic diseases with aortic valvular regurgitation. Moreover three patients had Stanford Type A aortic dissection, one had chronic dissection, Stanford type B, one a concomitant prosthetic endocarditis on aortic valve prosthesis, one an associated aortic coarctation and one an aortic valve stenosis-insufficiency. Short and mid-term mortality, perioperative complications were analyzed.
Results: None died during the 30-day after surgery. The mean ICU and LOS time were 3.3±8.2 and 9.3±7.2 days. Six patients (15%) had one or more postoperative complications. One patients (2.5%) underwent early reoperation

for bleeding. None underwent a reoperation related to the Bentall-De Bono procedure. Mechanical ventilation was longer than 48 h in five patients (12.5%). The mean follow-up was 38.4±31, the total follow-up was 93 months. Survival at 1, 3 and 5 year was respectively 94.1%, 90.6%, and 90.6%. At the end of the follow-up there were 37 survivors. Twenty seven patients (73%) were in NYHA I, six (16%) in NYHA II, and four (11%) were in NYHA III.
Conclusions: Reversed T or J ministernotomy is a feasible and secure alternative to full sternotomy. The short incision may enhances the outcome and does not affect the survival, offering proper access to the anatomic structures.

C2-3
IS IT JUSTIFIED TO USE XENOPERICARDIAL CONDUIT IN THE SURGERY OF ASCENDING AORTIC ANEURYSMS (16-YEAR EXPERIENCE)?
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Objective: The purpose of this presentation was to analyse the 16-year experience with clinical use of biological conduit in the surgery of ascending aortic aneurysms according to Bentall-DeBono technique.
Methods: From 1990 to December 2006 xenopericardial conduit was implanted in 415 patients, in 28 (6.7%) of them the conduit contained biological valve made of the same tissue, in 387–different mechanical prostheses. Main causes of aneurysm formation were cystic media necrosis in 41.9% (174 patients) and atherosclerosis in 34.5% (143 patients). Two hundred and eight (50.2%) patients were re-operated for dissecting aortic aneurysms. Dissection of DeBakey type I was diagnosed in 67 (15.7%) patients. In all cases bioconduit was implanted according to Bentall-DeBono technique, ten patients underwent simultaneous intervention on the aortic arch. In 46 cases (11.2%) the surgery on the ascending aorta was combined with the correction of associated pathology (CABG, interventions on AV valves, resection of aortic coarctation).
Results: Total hospital mortality was 9.2%. The causes of death were not conduit-related. Three patients underwent successful re-operation within 1.5 months in connection with prosthetic endocarditis. All of them received a new xenopericardial conduit. Mean follow-up period was 7.6±1.4 years (6 months – 16 years). Seven patients were re-operated: three for mechanical valve thrombosis; two for conduit rupture. Microscopic study of the conduit's wall revealed the thinning of xenopericardial tissue with calcification foci in both cases. Two patients were re-operated after 12 and 13 years due to biodegeneration of the valvular prosthesis and the conduit's wall. There were 21 late deaths: three patients died from AHF after re-operations; one death was caused by biological valve dysfunction; two–by late prosthetic endocarditis of the mechanical prosthesis and two–by thromboembolism; in 13 cases the death was not conduit-related. Biodegeneration of the xenopericardial conduit's wall with calcification, without clinical manifestations, was revealed in 15 patients more than 12 years after the implantation. Late freedom from conduit biodegeneration was 71.6%, and the survival by the 16th year after surgery–64%.
Conclusions: Sixteen-year experience with the use of xenopericardial conduit in the surgery of the ascending aortic aneurysms showed good late survival and low morbidity. However, after 12 years we noticed a significant incidence of xenopericadium biodegeneration, especially after conduit implantation in young patients.

C2-4
CANNULATION OF BILATERAL AXILLARY ARTERY FOR SURGERY OF ACUTE TYPE A AORTIC DISSECTION
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Objective: The aim of the study is to assess whether cannulation of bilateral axillary artery may be optimal perfusion technique for acute type A aortic dissection.
Methods: Fifty-one consecutive patients were operated on because of acute type A aortic dissection from September 2003 to December 2006. During this interval, cannulation of bilateral axillary artery was attempted for all patients. All patients had aortic surgery with open distal anastomosis during deep hypothermic arrest with selective cerebral perfusion (three arch vessels). Replacement of ascending aorta was done in 25 (49%) patients, and extended total arch replacement with individual arch-vessel reconstruction with a modified elephant trunk procedure at the distal anastomosis was in 26 (51%). Concomitant aortic root surgery was carried out in six (11.7%) patients, and coronary artery bypass grafting in three (5.8%).
Results: Attempted cannulation of bilateral axillary artery was successful in all patients but two (3.9%) patients, in whom inflow from the pump had to be shifted to femoral artery from right axillary artery in which the dissection had involved. Three patients died (early mortality rate: 5.8%), one from low cardiac output syndrome due to coronary malperfusion and two from intestinal necrosis. Two (3.9%) patients suffered from postoperative permanent stroke. No complication regarding cannulation occurred.
Conclusions: Our results suggest that cannulation of bilateral axillary artery followed by selective cerebral perfusion, successful in 96% of patients, may be the optimal technique for providing stable outcome in emergency surgery for acute type A aortic dissection.

C2-5
SURGERY FOR ACUTE AORTIC DISSECTION: REMODELLING THE AORTIC ROOT BY RESECTING THE ASCENDING AORTA AND THE NON-CORONARY SINUS: A 16-YEAR EXPERIENCE
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Objective: Retrospective assessment of perioperative and mid-term effectiveness of the conservatory management of aortic root in the type-A acute aortic dissection.
Methods: Between January 1990 and December 2005, 22 patients (20 males and two female aged 62±9 years) underwent surgical procedure for type-A aortic dissection with complete resection of the non-coronary sinus, associated with a replacement of the ascending aorta with or without aortic arch replacement. Two patients came to the operating theatre in bad hemodynamic conditions. Fourteen patients had aortic valve regurgitation, which in 13 cases was due to the dissection of the non-coronary sinus and the two adjacent aortic commissures, and in one case to calcification of the aortic valve. Twelve patients were operated for ascending aorta replacement; extended to the aortic arch in nine patients; in one patient, the ascendant aorta, the aortic arch and the aortic valve were replaced. In all patients, the complete resection of the non coronary sinus removed the totally-dissected layer of the aortic root.
Results: Five patients died perioperatively (22.7%), three of them from multi-organ failure, one patient from digestive ischaemia, and one patient for pneumonia. Four patients (18.1%) had a prolonged postoperative neurological dysfunction with complete recover in two of them. One patient (4.5%) needed surgical procedure for sternal infection. Two patients (9%) need reoperation for bleeding.
The mean stay in ICU was 16±8 days. Postoperative echocardiography did not show any significant aortic regurgitation at discharge. The mean follow-up time was 90±45 months. During the follow-up, one patient died for pulmonary cancer, one patient for pulmonary embolism and no patient needed further surgery.
Conclusions: Surgical remodelling the aortic root by resecting the non-coronary sinus is a safe procedure with an acceptable rate of morbidity and mortality. This technique can achieve a durable restoration of the diameter of the aortic root and a favourable valve competence.

C2-6
SUBCLAVIAN ARTERY CANNULATION FOR REPAIRING ACUTE TYPE-A DISSECTION: A RETROSPECTIVE ANALYSIS OF 259 CONSECUTIVE PATIENTS
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Objective: Arterial perfusion through the right subclavian artery is considered to avoid intra-operative malperfusion during surgical repairing of acute type A dissection. This retrospective study examined mortality and neurological outcomes following subclavian arterial cannulation of patients who underwent surgery for acute aortic type A dissection in a greater patient group to approve a recent study.
Methods: A total of 259 patients have been retrospectively analysed. One hundred and sixty nine patients were recruited consecutively with surgery for acute type A aortic dissection from 2/2000–7/05 and in all the technique of subclavian cannulation was performed. Mean age was 61 years (S.D.±14 years, 77% male). Patient outcomes were measured by prevalence of clinical complications, especially neurological deficits, mortality after 30 days, perioperative morbidity and time of body temperature cooling. A comparison has been performed to 90 patients with the femoral cannulation technique, consecutively observed in the period of 1996 to 2000.
Results: The consecutive group undergoing subclavian cannulation demonstrated significantly improved neurological outcomes (P=0.002) compared

to patients following femoral cannulation (90 patients). Re-exploration rate for postoperative bleeding was significantly reduced in the subclavian group ($P<0.0001$), as well as occurrence of renal insufficiency ($P<0.023$), and duration for body temperature cooling ($P=0.0083$). 30-day mortality was 8.7%.
Conclusions: Arterial perfusion through the right subclavian artery still remains to provide an excellent approach for repairing acute type A dissection with optimized arterial body perfusion. These results are confirming data to a former study in our institute.
This technique allows for antegrade selective cerebral perfusion during circulatory arrest. It is safe and results in a significantly reduced early mortality rate and improved neurological outcomes.

C2-7
POSTSURGICAL FALSE ANEURYSMS OF ASCENDING AORTA
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Objective: The postsurgical false aneurysms of ascending aorta (PSFA) are very rare and only case reports have been published. The natural risk of rupture is important and also at surgery. The surgical technique can be complex. We study our experience and their causes, prevention, diagnosis, extracorporeal circulation and surgery technique and results.
Methods: We review 12 cases of PSFA after seven aortic replacement (one combinated with Robiseck's technique), one mitral and tricuspid valve replacement, three heart transplantations and one coronary bypass. In six cases the diagnosis was done before three months and in the rest until 12 years after surgery. Seven cases was presented as mediastinal mass, four as infection, two as bleeding and one was a surgical finding.
In four cases with a big anterior aneurysm we did a femoro-femoral bypass, deep hypothermia and circulatory arrest before sternotomy.
Results: The site of the PSFA was in the aortic anastomoses in six cases, in the aortic canulation in four, in the ostium of the coronary bypass in one and in the upper limit of the Robiseck's graft. We did five sutures of the orifice, three grafts, two patches and one Bentall-Bono procedure.
One patient died before surgery. The rest were operated. Only one patient (9%) died due to oclussion of the right coronary artery.
Conclusions: For the diagnosis is necessary a high degree of suspicion in aortic patients with mediastinal masses, bleeding or infection. Is convenient avoid to leave dilated ascending aorta not treated or a disproportion between the aorta of the donor and the recepient in heart tranasplantation. In cases of a big PSFA is necessary a femoro-femoral bypass, deep hypothermia and circulatory arrest to avoid the non controlled rupture. Although the high risk, the mortality can be low.

C2-8
MID-TERM FOLLOW-UP OF THE 'BUTTON INSIDE' TECHNIQUE FOR REIMPLANTATION OF THE CORONARY OSTIA IN AORTIC ROOT REPLACEMENT
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Objective: To analyse the 24-months clinical and instrumental results of the modified button technique for reimplantation of the coronary ostia in aortic root replacement.
Methods: We analyzed the first twenty patients operated on consecutively for aortic root replacement (16 for annulo-aortic ectasia and four for type A aortic dissection) who received reimplantation of the coronary ostia in the aortic prostheses by the 'button-inside' technique. The coronary buttons are applied on the internal aspect of the composite valve graft and the anastomosis is performed from the inside of the graft. The patients were followed-up both clinically and instrumentally (echocardiography and contrast-enhanced angio-magnetic resonance nuclear scan, angio-MRI).
Results: The button-inside technique allowed little tension at the site of anastomosis between the coronary arteries and the graft, and the aortic graft wall directly reinforced the coronary buttons. No bleeding from the suture line of the coronary buttons occurred intraoperatively. There were no deaths in the study population at the 24-months follow-up. All patients were in NYHA class I-II. There were no cases of myocardial infarction. One case occurred of pericardial effusion at six months; it was drained and the presence of pericardial blood was excluded. Angio-MRI detected no coronary ostial leakages at 24 months. There were no cases of pseudoaneurysm at the site of coronary anastomosis and no cases of aneurysm of the coronary buttons. Proximal and distal graft leakages were excluded in all patients with the same technique.
Conclusions: The 'button-inside' technique is easy to perform, and is safe and reliable at the early surgical/clinical evaluation. The Angio-MRI follow-up at 24 months indicates that the technique achieves complete surgical control of the entire circumference of the coronary button and avoids distorsion/tearing at the site of coronary anastomosis. The clinical results are optimal and larger patients series operated on with this technique are being evaluated.

C2-9
BENTALL-BONO SURGERY DOES NOT INCREASE SURGICAL MORTALITY COMPARED TO SIMPLE AORTIC VALVE REPLACEMENT IN AORTIC REGURGITATION
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Objective: Severe aortic regurgitation is sometimes related to aortic root dilatation with or without ascending aortic dilatation. The need of aortic root replacement requires a more complex surgery increasing thus the surgical mortality. But in the last years new advances in surgical techniques and heart protections have raised. Our policy in our centre has changed in the last years and more and more patients are being referred to aortic surgery. Thus all patients with aortic regurgitation and ascending aortic dilatation over 45 mm received Bentall-Bono surgery because we thought that we could offer similar results to simple aortic valve replacement even in high risk patients. Our objective is to analyze our results comparing those patients undergoing simple aortic valve replacement and those patients undergoing Bentall-Bono surgery due to severe aortic regurgitation.
Methods: All patients with severe aortic regurgitation were included. Bentall-Bono was group A ($n=59$) whereas simple aortic valve replacement was group B ($n=116$). Emergency patients, aortic dissection and patients needing mitral or tricuspid valve surgery were excluded. Baseline clinical characteristics, operative outcomes and surgical mortality were compared.
Results: Mean age was 61.8±16.5 years in group A and 59.7±14.8 in group B. We found no differences between both groups regarding sex, cardiovascular risk factors, BCNO or peripheral disease. More patients with ejection fraction <30% were found in group B (60.2% vs. 0%; $P=0.05$). We found no differences regarding pulmonary hypertension or NYHA class. Cardiopulmonary bypass time and crossclamp time was significantly longer in group A (152 vs. 82 and 113 vs. 52 min; $P<0.001$). Hours of intubation, 24 h bleeding, ICU length of stay and incidence of complications were similar in both groups. Surgical mortality in group A was 7.1% and 5.7% in group B ($P=0.74$).
Conclusions: In our population similar results were obtained comparing patients undergoing simple aortic valve replacement or Bentall-Bono surgery due to severe aortic regurgitation. A higher proportion of patients with poor ejection fraction were found in group B. Surgical mortality and morbidity was similar in both groups. These results suggest that aortic surgery may be offered in patients with severe aortic regurgitation without increasing surgical mortality. This must be in account especially in patients with moderate aortic dilatation.

May 18, 2007 2nd Congress Day
14:30-16:00
1st Cardiovascular Scientific Session

CV-1
OUTCOMES AFTER REPAIR OF ACUTE AND CHRONIC TRAUMATIC THORACIC AORTIC INJURIES
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Objective: Thoracic aortic injuries are a major cause of trauma related morbidity and mortality. Injuries may be repaired early or in a delayed fashion depending on associated injuries. If repair is delayed or the injury is not diagnosed, a chronic pseudoaneurysm develops that may complicate repair. Outcomes after acute and chronic repair of traumatic aortic injuries have not previously been directly compared.
Methods: Trauma and surgical data bases at the University of Texas Southwestern Medical Center were searched to identify traumatic injuries

from 1991-2006. All injuries that were surgically repaired either by open or endovascular techniques were included in this analysis. Acute repairs were defined as injuries that were corrected <14 days after the injury. Injuries were considered chronic when 14 or more days had elapsed prior to repair. The chronic group included known injuries that underwent delayed repair due to the patient's clinical condition and injuries that went undiagnosed during the initial trauma. Patient demographics, surgical technique, perfusion strategy and outcomes were recorded.
Results: A total of 107 injuries were identified. Eighty eight patients (56 Acute, 32 Chronic) were included in the analysis. Sixteen patients were not repaired either due to minor injuries or prohibitive associated comorbidities. Four of these died - all unrelated to the aortic disruption. Three undiagnosed patients exsanguinated from aortic rupture. Eighty two patients underwent open and six patients endovascular repair. Five patients in the surgical cohort died (3/56 Acute, 2/32 Chronic - NS). Cardiopulmonary bypass times were significantly longer (102±56 min vs. 66.4±28 min) and hypothermic circulatory arrest was utilized more frequently (9/32 vs. 2/56) in the Chronic group (P<0.05). Aortic repair related complications per patient were lower in the Chronic group (0.84±0.9 vs. 1.94±1.6) (P<0.01). Postoperative cardiac complications (Acute 6/56, Chronic 3/32), stroke (Acute 4/56, Chronic 1/32), and paraplegia (Acute 2/56, Chronic 1/32) were not different between the two groups. Patients undergoing repair of Chronic injuries recovered more quickly after surgery compared to the early repair strategy (13.3±8.8 days vs. 26.7±21.7 days) (P<0.01).
Conclusions: Repair of acute and chronic traumatic aortic injuries can be performed with low mortality. Chronic repairs require longer CPB times and more frequent hypothermic circulatory arrest, consistent with the greater technical challenge presented by these injuries. Despite the greater complexity of chronic injury repairs, postoperative complications are lower and recovery is more rapid after surgery.

CV-2
IMMEDIATE ENDOVASCULAR TREATMENT OF BLUNT AORTIC INJURY: MID-TERM RESULTS
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Objective: Post-traumatic aortic rupture is a potentially lethal injury. Stent-graft repair has recently proved to be a valid option for these patients. Timing of the treatment, anyway, is still a debated issue. We here report mid-term results of our experience with immediate stent graft repair.
Methods: From 1998 to 2006 17 patients (12 males, five females) with blunt aortic injury were submitted to immediate endovascular repair. In ten patients with clinical and radiological signs of impending rupture stent grafting was performed on an emergency setting. In the remaining seven patients aortic lesion was treated urgently after clinical management. When present, immediate life-threatening non-aortic lesions were treated before endovascular treatment (seven cases). In one case emergent laparotomy and stent positioning were performed simultaneously. Endovascular procedure was carried out in a cardiac surgery operating theatre and monitored by trans-oesophageal echocardiography in all cases.
Results: Stent grafting was successful in 100% of the patients. Two patients died perioperatively as a consequence of a multi-organ failure. Both patients were in ASA class V and presented severe intractable hemorrhagic shock before procedure. CT scan performed before discharge showed correct positioning of the stent-graft and absence of endoleaks in all cases. At a mean follow-up of 36 months (range 1–72) all patients are alive and no intervention related complication occurred.
Conclusions: Immediate endovascular repair of blunt aortic injury is a feasible and safe procedure. Mid-term results are promising. Longer follow-up and larger series are mandatory to definitively validate this approach.

CV-3
CLINICAL SIGNIFICANCE OF RIGHT AORTIC ARCH IN ADULTS: A REPORT OF TEN CASES
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Objective: Symptomatic right aortic arch in adults is rare and usually reported as case reports. We present our experience with ten patients (pts).
Methods: From 1979 to 2005 we have operated 10 adult patients with a right aortic arch that was symptomatic or associated with an aortic aneurysm. There were six women and four men with a mean age of 47.1 years. In nine patients with an abnormal left subclavian artery (SA) revascularization of the upper extremity was routinely performed (seven subclavian-carotid transposition, two aorto-subclavian bypasses).
Three patients had vertebrobasilar insufficiency and upper extremity ischemia due to occlusive lesions of the SA (stenosis or hypoplasia of an aberrant left SA in two, isolation of the left SA in one). They had isolated revascularization of the upper extremity.
Three patients had dysphagia. One patient with an aneurysm of an aberrant left SA was treated by transaortic patch angioplasty via right thoracotomy. The other two patients were treated by section of a left ligamentum arteriosus via mid sternotomy.
Three patients had an aberrant left SA and a thoracic aortic aneurysm. They had aortic resection and grafting via right thoracotomy.
One patient with an aberrant left SA and an aortoesophageal fistula (AEF) due to prolonged nasogastric intubation was treated by allograft aortic replacement and subtotal esophagectomy via mid-sternotomy.
Results: One patient with dysphagia died at D7 of a ruptured esophagus due to transesophageal echography. The patient with AEF died at 4 months from herpetic encephilitis. All other patients are alive and well with a mean follow-up of 154.9 months (16–285).
Conclusions: Routine left upper extremity revascularization in patients with abnormal SAs, right thoracotomy approach in patients with associated aortic aneurysms and precise postoperative care allow optimal and durable results in these complex patients.

CV-4
SIX-YEAR EXPERIENCE IN THE ENDOVASCULAR TREATMENT OF THORACIC AORTIC ANEURYSMS AND TYPE B DISSECTIONS: RESULTS AND TECHNICAL EVALUATION
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Objective: To report our 6-year experience in the endovascular treatment of type-B aortic dissections and thoracic aortic aneurysms.
Methods: From November 2000 to January 2007, 47 patients with type B dissections (24 acute and 23 chronic) and 26 patients with thoracic aneurysms (diameter ranging from 41 to 83 mm–Mean 58.8 mm) were treated using different commercially available stent-grafts: Thoracic Excluder-TAG (WL Gore) n=53, Talent-Valiant (Medtronic) n=19, Zenith TX (Cook) n=1. Four cases of acute dissections were complicated by renal ischemia requiring a renal stenting. In 37 cases (26 dissections and 11 aneurysms), due to a short proximal neck (<2 cm) the origin of the left subclavian artery (LSA) was covered in 36, while in the other case a transposition of the left carotid artery was performed.
Results: After a mean follow-up of 25.1±16.8 months (range 1–72 months) no patients experienced paraplegia and no complications correlate to the LSA exclusion were recorded.
Aneurysms: Immediate aneurysmal exclusion was achieved in all cases with average sac reducion from 67 mm to 43 mm. Two patients (7.6%) died after 4–10 days for cardiovascular disease, while the other 24 patients (92.3%) are in good clinical conditions. A 30-day mortality rate of 7.6% was recorded. Endoleak occurred in two patients (7.6%) originating from the excluded left subclavian artery.
Dissections: Technical success was achieved in 45/47 cases. Intraoperative complications occurred in 2/47 cases (4.2%): retrograde extension of the dissection into the ascending aorta which required surgery. Forty two patients (89.3%) are alive and in good health conditions. Intraoperative mortality was 2.1%, 30-day mortality rate 2.1% and 6.3% of late mortality. Progressive reduction of the false lumen from 2.41 to 0.9 cm and an increase of the true lumen from 1.68 to 4 cm was observed. Endoleak occurred in nine patients (19.1%): one type I treated with a proximal cuff and the other eight from the excluded left subclavian artery treated with coil embolization (n=1), Onyx injection (n=2), injection of both coils and Onyx (n=4). Only in one case the leak sealed spontaneously after 9 months.
Conclusions: Endovascular treatment of type B aortic dissection and aneurysms seems to be a feasible and safe technique however technical improvement is required to improve the long-term results. However on the basis of our experience some important technical doubt are still unsolved: management of the left subclavian artery in patients with short proximal neck and stent-graft length selection.

CV-5

CARDIOVASCULAR INTERVENTIONS IN MARFAN SYNDROME: EARLY AND LATE RESULTS

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Objective: The main purpose of surgical therapy is to detect the cardiovascular involvement as early as possible and to avoid fatal complications in Marfan syndrome. We made an analysis on the Marfan patients operated in our clinic to find the risk factors for early and late outcome.
Methods: We operated 55 Marfan patients between February 1987 and August 2005. Forty-one were male (74.5%) and 14 were female (25.5%). The average age of the patients was 31.64±10 (11–56) years. Sixty-eight surgical interventions were performed on these 55 patients. One or more reoperations were made for nine patients (16.4%). The most frequently performed procedure was aortic root replacement on 39 patients (70.9%).
Results: Early mortality was 3.6% with two patients. Survival rates for 1, 5 and 11 years were 91.9%±3.9%, 88%±5.3% and 66%±19.5%. Risk factors were analyzed for their effect on survival by means of univariate and multivariate analyses. Emergency operation (P=0.0001) and reoperation (P=0.0001) were found to be significant risk factors with univariate analysis whereas multivariate analysis showed emergency operation (P=0.0001) as the only risk factor significantly effecting long-term survival. The most frequently encountered complication was arrhythmia in ten patients (18.2%). Two patients were undertaken revision operations for bleeding. Two patients, who had normal renal functions preoperatively, developed renal dysfunction.
Conclusions: Marfan syndrome patients must be followed carefully for cardiovascular involvement. Although surgery is associated with improved survival, emergency operations may decrease life expectancy in long-term follow-up.

CV-6

DEGENERATIVE AND POSTTRAUMATIC ANEURYSMS: ANALYSIS OF PATIENT POPULATIONS AND RESULTS OF ENDOVASCULAR TREATMENT

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Objective: Endovascular procedures are becoming an established part of cardiovascular methodology. The aim of the study was to compare two homogenous groups of patients treated with stentgraft implantation due to: (1) degenerative and (2) posttraumatic aneurysm.
Methods: In our centre we treated endovascularly 69 patients (1999–2006) with various diseases of the thoracic aorta. All of these procedures were performed by the same team, and all the patients were under general anesthesia in the cath lab, apart from six hybrid cases treated in the operating theatre. From this material we chose patients with proven posttraumatic (n=14) and degenerative (n=15) etiology of aneurysm and compared retrospectively their preoperative, intraprocedural and postoperative data.
Results: All patients in both groups survived the procedure and hospital mortality rate was 0%. The mean age of patients was 39±10.7 (posttraumatic–P) and 68±7.6 (degenerative-D) (P<0.01 Wald-Wolfowitz test). There were three women in group D (20%) and two in group P (14%) (P=ns χ^2 Pearson test); since there is no risk stratification scale for endovascular procedures, preoperative risk assessment was made with the EuroSCORE risk stratification scale as the patients would have been operated on using open surgical technique and was significantly higher in group D both in additive (P<0.01) and logistic (P<0.01) EuroSCORE. There were five emergent cases in group P and two in group D (P=ns). Comorbidities (CAD, hypertension, peripheral vascular disease, abdominal aneurysm) were more frequent in group D (P<0.01). Mean aneurysm diameter was significantly higher in group D (P<0.05). The number of implanted elements, diameters of prostheses, covered length of the prosthesis and time required to complete the procedure were significantly higher in group D (P<0.05). Postoperatively we compared between the groups the rates of endoleaks (P=D), strokes (D>P, P=ns), postimplantation syndrome (P>D, P=ns), new discomfort in lumbar or thoracic area (P=D), vascular access site complication (D>P, P=ns), and serum creatinine level increase (D>P, P=ns).
Conclusions: In our material patients with degenerative true aneurysm had significantly more comorbidities, higher preoperative risk and their procedure was longer and more complicated than in the posttraumatic aneurysm group. Patients with degenerative true aneurysm were prone to have more complications, although these differences were not significant.

CV-7

DOES THE DISTAL AORTIC ARCH CLAMP INCREASE THE CEREBRAL COMPLICATION RATE IN TYPE B AORTIC DISSECTION SURGERY PERFORMED WITH PARTIAL CARDIOPULMONARY BYPASS?

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Objective: Surgical treatment of Type B aortic dissection can be performed with hypothermic circulatory arrest, partial cardiopulmonary bypass or left atriofemoral bypass methods. The distal aortic arch clamp can lead to cerebral complications more frequently in atherosclerotic descending aortic aneuryms than Type B dissections. Thus some authors prefer hypothermic circulatory arrest during proximal anastomosis to minimize cerebral complications.
Methods: Thirty-one patients with acute or chronic Type B aortic dissections underwent descending aortic replacement with partial cardiopulmonary bypass and clamping the aortic arch between the left common carotid artery and left subclavian artery. In 18 patients proximal 1/3 of the descending aorta was replaced, in ten patients proximal 2/3 of descending aorta was replaced and in three patients near total descending aorta replacement was performed. Proximal graft anastomosis was performed between the left common carotid artery and left subclavian artery in five patients.
Results: In the early postoperative period cerebral comlication ensued in three patients due to proximal clamp. Minor left hemispheric infarct resolving spontaneously occured in two patients. In one patient massive left hemispheric infarct occured and this patient died due to decerbration.
Conclusions: Although the incidence of cerebral complications in Type B aortic dissections is lower than atherosclerotic descending aortic aneurysms, in patients with enlarged and/or calcified aortic arch, in order to minimize the cerebral complications, clamping of the aortic arch should be avoided. However, aortic arch clamp can safely be used in normal and uncalcified aortic arch during the replacement of the descending aorta.

CV-8

AORTIC SURGERY IN PATIENTS WITH MARFAN SYNDROME: LONG-TERM RESULTS OVER TEN YEARS

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Objective: The aim of this study is to analyze the long-term outcomes of aortic surgery in patients with Marfan syndrome.
Methods: From 1979 to 1996, 87 patients with Marfan syndrome have undergone aortic surgery (mean age 37±10, 55 male). Eighty-three cases were the first operation and the rest four patients had undergone the first operation before. The operations were aortic root replacements in 49 cases, arch replacements with aortic root replacements in 14, ascending replacements in five, descending replacements in 14, and thoracoabdominal replacements in four. Emergent operations were performed in 14 cases and the major reason of the emergency was acute aortic dissections.
Results: The mortality rate of the first operation was 14.9% (13/87). Among the seventy-four survivors, 38 patients had other operations. Eighteen patients had second operations, 13 had third operations, four had fourth operations, and three had fifth operations. The reasons of the other operations after the first operations were mainly the aortic dilatations due to chronic aortic dissection. Post operative survival rate (Kaplan-Meier) after the first operations were 89.1% in 5 years, 83.2% in 10 years, and 76.1% in 15 years. Eighteen patients died in the follow-up period, and the reasons were operative death in seven patients, rupture of aortic aneurysm in three, other reasons in four, and unknown in four.
Conclusions: The surgical result of aortic surgery in patients with Marfan syndrome who survived the first operations was acceptable. To improve the results in the follow-up periods, refinement of the strategy of the multiple operations and careful observations are supposed to be essential.

CV-9

COMBINED CAROTID AND CORONARY REVASCULARIZATION: IS IT A SAFE AND COST EFFECTIVE TECHNIQUE?

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Objective: Stroke is a major complication of coronary operation. The risk of stroke after isolated CABG has been estimated at <2% in patients with no significant carotid artery stenosis, 3% in case of significant unilateral stenosis in asymptomatic patients, 5% if a high grade bilateral stenosis exists and in 7–11% in case of occlusion of a carotid artery. The presence of carotid and coronary disease at the same time is assessed around 10–12% of patients requiring myocardial revascularization.
Thirty-five years after the first publication of combined surgical revascularization the timing of carotid endarterectomy (CEA) and coronary revascularization (CABG) for concomitant disease is controversial.
The aim of this study is the assessment of clinical outcome and the evaluation of costs reduction in the combined treatment of coronary and carotid revascularization.
Methods: From February 2003 to March 2006 all patients with coronary disease or carotid stenosis presented at the department of Cardiac Thoracic and Vascular Sciences of the University of Padova underwent first level diagnostic screening to demonstrate the simultaneous presence of both disease. All patients with simultaneous presence of carotid and coronary disease were treated with combined surgical operation with CEA, performed in general anaesthetic and constant EEG monitoring, using delayed shunt inserction technique preceding CABG.
Results: We observed three group of patients. Six hundred and fifty-one patients underwent isolated CEA (group A), 676 patients underwent isolated CABG (group B), and 67 patients underwent combined procedure (group C). There was no difference among the three groups with respect to permanent stroke (0.6%, 1.2%, and 2.7%, respectively). Hospital cost was 2839.75€ for group A, 8659.10€ for group B, 9918.85€ for group C. National health service cost was 4503.63€ group A, 11789.68€ group B, 11789.68€ group C.
Conclusions: Combined surgical operation does not increase surgical risk compared with single myocardial revascularization. Moreover, this surgical approach reduces hospital costs of 13.7% and National Health Service costs of 27.6%.

CV-10

SURGICAL REPAIR OF THORACOABDOMINAL AORTIC ANEURYSM± DISSECTION WITH DISTAL FEMORO-FEMORAL PERFUSION TECHNIQUE

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Objective: Distal vital organ damage is an important problem during the surgical management of thoraco-abdominal aortic aneurysm. Surgical repair of thoraco-abdominal aortic aneurysm with/without dissection with femoro-femoral perfusion technique was retrospectively evaluated.
Methods: Between 2000 and February 2007, 15 patients (aged between 29 and 80) years whit thoraco-abdominal aortic aneurysm±dissection underwent seventeen surgical interventions with femoro-femoral perfusion technique. Three patients were female (20%). Fourteen operations (82.35%) were elective and three (17.64%) were emergencies. Distal perfusion was carried out at 60–70 mmHg and 1000–1500 ml/min. Rectal temperature was kept over 32 °C. Mean follow-up period was 3.35 years (0.1–6 year).
Results: Four patients (23.5%) died at early postoperative period. Respiratory problems were seen in three patients (17.6%), acute renal failure was seen in three patients (17.6%), paraplegia was seen in one patient (5.8%) and temporary paraparesis was seen in one patient (5.8%).
Conclusions: Surgical treatment of thoracoabdominal aortic aneurysms is still a dilemma in the world. We believe that surgical repair with femoro-femoral perfusion technique would decrease the mortality and morbidity with preventative measures from visceral organs and spinal cord ischemia.

CV-11

PERIOPERATIVE RENAL FUNCTION PRESERVATION DURING TYPE IV THORACO-ABDOMINAL ANEURYSM SURGERY

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Objective: To prevent kidney injury in tipe IV thoraco-abdominal aortic aneurysm surgery.
Using standard hypotermic solutions for kindey perfusion, postoperative renal failure represents an important mortality and morbidity risk factor after thoraco-abdominal aneurysm surgery. It is more frequent in type IV (11.9%) than in type II, III and I whereas paraplegic and paraparetic complications are significantly less (1.5%).
Two independent predictive factors for renal failure are more significant: renal total ischemic time, related to the surgical procedure, and preoperative renal disfunction (serum creatinine 1.3–1.5 mg/dl) or renal failure (mild 1.5–2.5 mg/dl, severe >2.5 mg/dl).
Renal protection from prolonged ischemia (average 52′, range 45′–100′) is obtained by splitting the renal total ischemic time in two or three partial ischemic times (<30′), performing a temporary reperfusion (3′) of the renal arteries using a Pruitt-Inahara shunt. This short-term arterial blood reperfusion of normothermic kidney permits repeated periods of safe ischemic time.
Methods: Twenty-one patients were treated for type IV thoraco-abdominal aneurysms and underwent kidney short-term (3′) arterial blood reperfusion obtained by Pruitt-Inahara shunt. The reperfusion was repeated every 30 min of ischemia, whenever necessary. Patients were assessed by serum creatinine, CT scan, digital angiography, and radioisotope renography using technetium 99M.
Results: The post-op mortality was 2/21 patients (emorragic shock and ARDS). Post-op renal function was preserved in all patients. A moderate and temporary decline in renal funcion was observed in the first post-op days, returning to normal values after one week.
Conclusions: The results of this study indicate that kidney short-term reperfusion may protect renal tissue from prolonged cross-clamping ischaemia (up to 180–200 min), also in patient considered at high risk for acute renal failure.
It is a low cost and easy tecnique, showing very good and reproducible results. It seems possible to propose this method also in patients with preoperative renal insufficiency.

May 18, 2007 2nd Congress Day
14:30-16:00
1st Vascular Scientific Session - EVAR

V1-1

INFLAMMATORY ROLE OF SERUM CREATININE AND INTRAMURAL THROMBUS AFTER ENDOVASCULAR TREATMENT OF AORTIC ANEURYSMS

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Objective: To evaluate the relation between intramural thrombus, serum levels of creatinine and expression of inflammatory markers in patients underwent endovascular treatment of aortic aneurysms.
Methods: From March to December 2005, 25 patients were followed from preoperative time up to 3rd month postoperatively (1, 6, 24 and 48 h; 7 days; 1–3 months). The variables were intramural thrombus and serum levels of creatinine. The inflammatory markers were: C reactive protein, sedimentation velocity, interleukins (IL-6, IL-8), tumor necrosis factor alpha (TNF-α), L-selectin and intercellular adhesion molecule (ICAM-1).
Results: There was relation of parallelism between presence of intramural thrombus and marked expression of IL-6, IL-8 and TNF-α, without correlation with others markers. TNF-α presented correlation with intramural thrombus in all times, whereas IL-8 presented correlation up to 48 h and IL-6 demonstrated correlation in early and late phases of follow-up. There was relation of opposition between serum levels of creatinine and serum values of ICAM-1, without statistic siginificance in all times. There was relation of opposition between serum levels of creatinine and serum values of L-selectin, with statistic significance in all times, except 24, 48 h and 1 month.
Conclusions: Endovascular treatment of aortic aneurysms may reveal correlation between intramural thrombus and IL-8, IL-6 and TNF-α, which cause several inflammatory repercussions. Modifications in serum levels of creatinine, after prosthesis implantation, may promote reduction in leukocyte migration as a consequence of reduced expression of adhesion molecules, mainly selectins.

V1-2

COMPARISON OF ENDOVASCULAR VS. OPEN SURGICAL REPAIR OF ABDOMINAL AORTIC ANEURYSM: A 7-YEAR SINGLE-CENTER EXPERIENCE WITH 3RD GENERATION ENDOGRAFTS

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Objective: Endovascular Aneurysm Repair (EVAR) is a relatively new technology to treat patients with Abdominal Aortic Aneurysm (AAA). Uncertainty exists about how endovascular compares with conventional open repair (OR). The objective of this prospective study was to compare postoperative and follow-up results of EVAR vs. OR concerning mortality, major and minor complications, need for reintervention and quality of life in patients undergoing elective AAA repair by open or endovascular repair with 3rd generation endografts.
Methods: From 1999 to 2006, 784 consecutive patients underwent 499 (63.6%) OR and 285 (36.4%) EVAR of AAAs. Bias was evident in patient allocation due to different comorbidities and anatomical complexity. Patients were regularly followed-up at 1, 6, 12 and every 6 months thereafter.
Results: EVAR patients were older (70 vs. 73 years) with a statistically significant increase of coronary/pulmonary diseases and ASA III-IV score rates. Postoperative EVAR vs. OR results showed a mortality of 0.35% vs. 2.2% (P=0.04), a major morbidity of 5.9% vs. 8.6% (P=0.17) and secondary procedures of 5% vs. 1% (P<0.0001) respectively. Mean postoperative hospital stay was 4 vs. 7 days in EVAR vs. OR respectively. Mean follow-up was 32 months (range 3–84) with a mortality of 7% vs. 4.3% (P=0.68.) and secondary procedures 6% vs. 3.5% (P=0.10) in the EVAR vs. OR group respectively. 96.5% of EVAR patients showed a full recovery at six months compared with 87% of OR patients (P<0.0001). After six months functional outcome was similar to the preoperative level in both groups.
Conclusions: EVAR patients show a lower perioperative mortality and complication rate compared to the younger and healthier OR group. Need for secondary open or endovascular procedures was increased in the EVAR group mainly due to endoleaks. EVAR was more appealing to patients due to the shorter hospital stay and acceptance of the procedure.

V1-3

ENDOVASCULAR TREATMENT OF 500 PATIENTS WITH ABDOMINAL AORTIC ANEURYSM

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Objective: Introduction of endovascular treatment of abdominal aortic aneurysm was a breakthrough in treatment of abdominal aortic aneurysm. It is responsible for extension of inclusion criteria for treatment of this disease in patients with different comorbidities.
The aim of our study was to present our experience and results of endovascular treatment of abdominal aortic aneurysms based on over 500 consecutive cases.
Methods: From April 1998 to December 2006 endovascular abdominal aneurysm exclusion was performed in 505 patients. In this group 409 (81%) were assessed to be in high risk in the ASA scale (grade III and IV). Diagnosis was made by: Doppler ultrasonography, spiral computed tomography and digital subtraction angiography in uncertain cases. Using these investigations the following aneurysm morphologies were determined: maximum AAA diameter (42–110 mm, mean 62 mm), AAA neck diameter (18–30 mm, mean 24 mm), AAA neck length (10–45 mm, mean 22 mm). Early and late results were evaluated based on the Eurostar registry protocol.
Results: In 492 (97.4%) patients successful exclusion of the AAA was achieved. In 13 patients (2.6%) conversion to open surgery was necessary because of migration of the stentgraft into the aneurysm sac (eight patients) and in five patients because of the inability to remove the introducer device from the iliac artery. In the early postoperative period 13: patients died from myocardial infarction, three from a pulmonary embolism and one from mesenteric artery embolism. Endoleaks were observed in 83 (16.8%) patients postoperatively which were treated by either extension, balloon angioplasty or left for observation. In three patients late rupture occurred in 23-rd, 29-th and 32-nd postoperative month, which was successfully treated by open aneurysmectomy. Other complications included: stentgraft limb thrombosis–28 (5.7%) cases, stentgraft limb stenosis–35 (7.1%) cases. The mean observation period was 35 months (range 1–109 months).
Conclusions: Based on our experience with preciously followed-up 500 consecutive patients treated endovasculary we conclude that this method is particularly valuable for high-risk patients. However, due to the necessity of postoperative scrutiny and possibility of complications, open aneurysmectomy remains the method of choice for patients not burdened with comorbidities.

V1-4

ABDOMINAL AORTIC ANEURYSM REPAIR IN OCTOGENARIANS

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Objective: The aim of this study was to retrospectively compare early and late results of open (OR) and endovascular repair (EVAR) of abdominal aortic aneurysm (AAA) in older (>80 years) patients.
Methods: From January 2002 to June 2006, 631 patients with AAA were electively operated on with OR or EVAR; whose 96 were octogenarians. All these patients underwent preoperative assessment to evaluate the feasibility of EVAR. In 42 cases patients were unfit for EVAR and underwent OR (group 1); in 54 cases EVAR was performed (group 2) Early (χ^2 Fisher's test) and long-term results (Kaplan–Meier curves) were compared in the two groups.
Results: The two groups were homogeneous with respect to risk factors and comorbidities, except fro a slight prevalence of coronary artery disease in group 2. Thirty-day mortality was similar in the two groups (two deaths in group 1 and no death in group 2, P=n.s.); major complication and reintervention rates were significantly higher in group 1 (five cases -11.8% and four cases -9.5%, respectively) than in group 2 (one major complication -2% and no reintervention, P<0.001 for both parameters).
Median duration of follow-up was 21 months (S.D. 15); estimated 36-month survival rates were 68.8% in group 1 and 59.4% in group 2 (P=n.s.; log-rank 0.32); 36-month AAA-related mortality rates were 3.5% in group 1 and 7.7% in group 2 (P=n.s.; log-rank 0.11); in group 1 there was a significantly lower rate of reinterventions than in group 2 at 36 months (9.1% and 33.2%, respectively; P=0.03; log rank 4.6).
Conclusions: Older patients anatomically unfit for EVAR can undergo OR with early and long-term results comparable to those obtained with EVAR. These results should be considered when advocating nonoperative management or enlarging the indications for EVAR in this subset of high risk patients.

V1-5

HOW DID THE INTRODUCTION OF EVAR ACCORDING TO THE FRENCH SANITARY HIGH AUTHORITY RECOMMENDATIONS CHANGE OUR SURGICAL PRACTICE OF AAA ELECTIVE REPAIR?

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Objective: To evaluate the changes in matter of activity and immediate outcomes induced by the introduction of endovascular aortic repair (EVAR) in our surgical practice of abdominal aortic aneurysms (AAA) elective repair, according to the French Sanitary High Authority (FSHA) recommendations.
Methods: We reviewed our experience with AAA elective repair from 2001 to 2006 in a single university hospital, performing EVAR as a common practice since January 2004. Group I included consecutive patients operated on for elective AAA repair during the early three years period of practice (January 2001 - December 2003) using conventional open repair as the single surgical treatment. Group II included consecutive patients operated on for elective AAA repair during the late three years period of practice (January 2004 - December 2006) using whether conventional open repair or EVAR indicated by FSHA recommendations.
FSHA recommends the use of EVAR for asymptomatic AAA >50 mm in high risk patients (High risk patients should present one of the following factors: age=80-year-old, history of myocardial infarction or angina with positive functional test and untreatable coronary lesions, cardiac insufficiency with clinical manifestations, untreatable aortic valve stenosis, LVEF <40%, COPD with O_2 at home or FEF 25–75 <20% of normal, renal failure with serum creatinine=3.5 mg/l or patient on chronic haemodialysis).
Primary endpoints were demographic data (volume of patients, age, gender, AAA size, and ASA score), and immediate outcome measures (in-hospital mortality, major complications, time to discharge). Proportions and categoric data were compared with a χ^2 test. Continuous data were compared with a Student t-test.

Results: The volume of patient has significantly increased between the early (group I: n=49) and the late period (group II: n=88; with 38 EVAR, P<0.001), with respectively similar age (70 vs. 72-year-old), gender (93.7% vs. 95.5% male), and AAA size (57.8 vs. 56 mm) in both groups. ASA score were significantly lower in group I compared to group II (ASA 3 and 4: 20.4% vs. 55.7%; P<0.0001), while in-hospital mortality rates (4.1% vs. 3.4%, NS), and major complication rates (16.3% vs. 11%, NS) staid stable in both groups. Time to discharge (19 vs. 10 days, P<0.001) decreased significantly during the late period.
Conclusions: In our experience, introduction of EVAR according to the FSHA recommendations allowed to propose AAA elective repair to a larger and a higher risk population, without worsening immediate outcomes.

V1-6
THE ENDOVASCULAR MANAGEMENT OF COMPLICATIONS OF OPEN AORTIC SURGERY
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Objective: Aorto-enteric fistulae and Para-anastomotic aneurysms are uncommon complications of open aortic surgery (0.5–2.5%) and (0.2–15%) respectively. Aorto-enteric fistulae if untreated is often fatal and surgical management is associated with a mortality up to 90%. Similarly, para-anastomotic aneurysm rupture carries a mortality of over 50%. The authors present their experience in the endovascular treatment of these complex situations.
Methods: A retrospective review of case notes and images was performed. From December 2002 to April 2006, 10 patients, all males with a mean age of 73 years are presented. Five patients presented with secondary aorto-enteric fistulae, three with para-anastomotic aneurysms, one with a secondary mycotic thoracic aneurysm and one with a femoral pseudoaneurysm. The mean time from the original procedure to the onset of complications was 50 months. All ten patients were assessed with contrast enhanced CT and underwent endovascular repair with Zenith (Cook, Europe) grafts.
Results: No intra-procedural complications were recorded. There was one peri-operative death due to multi-organ failure. Another patient died six months later due to an unrelated event. In the aorto-enteric fistulae group, mean hospital stay was 5.4 days, mean follow-up period was 14.5 months. All patients in the aorto-enteric fistulae group have presented with at least one septic episode that responded to antibiotics. Repeated blood cultures were only positive on four occasions.
Conclusions: Endovascular stent graft repair of aorto-enteric fistulae and para-anastomotic aneurysms is a viable alternative to open surgery especially in the high risk surgical patient. This technique is associated with less peri-operative mortality and morbidity. Recurrent sepsis however remains a problem however, this can be controlled by long-term antimicrobial treatment.

V1-7
ENDOVASCULAR REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSMS: AN EARLY SINGLE-CENTRE EXPERIENCE
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Objective: The experience with endovascular treatment of patients with ruptured abdominal aortic aneurysms (RAAAs) is reported.
Methods: Between March 2004 and December 2006, 43 consecutive patients with a RAAA were presented to our unit; two died on arrival before any assessment and treatment were possible. Since July 2005, seventeen patients (four females and thirteen males, average age: 78 years), all haemodinamically stable, were judged suitable for stent grafting after CT scan evaluation. Of these, 11 underwent operation with local anaesthesia, two did so under general anaesthesia, and a further four procedures were started under local anaesthesia and converted to general anaesthesia. A total of 18 aorto-uniliac stent grafts were implanted: in one patient, one week after the earlier endovascular repair a relining procedure was performed due to a type I endoleak.
Results: Stent-graft deployment without a type I or III endoleak was technically successful in 16 of the 17 patients. No conversions to open surgery have been performed. The 30-day mortality was 41.1% (7/17 patients). Two patients (ASA Physical Status Classification System P4) died soon after the procedure; five (three patients with ASA Physical Status Classification System P4 and two patients with ASA Physical Status Classification System P3) died within 30 days because of cardiac causes (two patients) or multiple organ dysfunction syndrome. In one patient a relining has been successfully performed, one week after the earlier procedure, because of a type I endoleak. One patient required an unsuccessful decompressive laparotomy because of a multiple organ dysfunction syndrome due to acute IV grade intra-abdominal hypertension (>25 mmHg). Remaining patients had uneventful postoperative recovery: they required a short monitored care unit stay (medium: 48 h), without intensive care unit stay.
Conclusions: Endovascular treatment of RAAAs appeared feasible, without significant complications, observing an agreed protocol that entails: 1) hemodynamically stable aged patients or hemodynamically stable patients with recognized major co-morbidity; 2) 'hypotensive haemostasis'; 3) preoperative CT scan evaluation, which allows safe planning of endovascular procedures, and appears not to be time consuming; 4) implant of aorto-uniliac devices, which enable standardization of an effective reproducible procedure. Endovascular repair of RAAA allowed a significant reduction in hospital stay and the stock of relative necessary devices appeared easily supplied. The early experience is promising, more experience and evidence from randomized trials are needed to determine whether the RAAA in haemodinamically stable and anatomically suitable aged patients is one of the best indications for EVAR.

May 18, 2007 2nd Congress Day
14:30-16:00
2nd Vascular Scientific Session - Cerebrovascular Insufficiency

V2-1
RING STRIPPING RETROGRADE COMMON CAROTID ENDARTERECTOMY: A RETROSPECTIVE STUDY
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Objective: Total occlusion or stenosis of the common carotid artery is rare and the indications and techniques of surgical treatment are still a matter of controversy.
Objective: We demonstrate the feasibility of retrograde common carotid endarterectomy.
Design: Retrospective case report study.
Methods: In a period of fifteen years thirty-nine patients underwent retrograde endarterectomy of the common carotid artery. Twenty-nine patients were males, middle age 71 (min. 50, max. 86). Ten patients were females, middle age 75 (min. 51, max. 89). Symptoms of brain ischemia were present in fifteen patients.
Retrograde endarterectomy of the common carotid artery and endarterectomy of the internal carotid artery were done together in all patients. Indication for retrograde TEA was a verified stenosis >70% or occlusion of the common carotid artery diagnosed by duplex ultrasound and arteriography. In three patients iatrogenically dissection of the common carotid artery was seen as indication for that procedure.
Results: Postoperative early mortality, stroke rate, medium and long-term endarterectomy patency.
Results: In all patients who underwent that procedure there was no occurence of major complications or statistically increased mortality. The 30 day mortality was 5.1% (two patients). One of them died in cause of a heart attack and one because of a cerebral bleeding. There was one ipsilateral stroke (2.56%) eight month after the procedure. Three patients were lost to follow-up. Mean follow-up was 50 months (1–180). There were 12 (30.7%) late deaths caused by cardiovascular related problems, pneumonia and cancer. In all living patients, controlled by duplex ultrasound, no occlusion or stenosis was found.
Conclusions: Retrograde TEA can be done through only one cervical incision for common carotid artery stenosis/occlusion, for tandem lesions of the carotid arteries as well as for iatrogenic dissections of the common carotid artery. Compaired to bypass grafting this technique is a faster and easier method. Our retrospective study indicates a long-term patency and freedom from neurologic events.

V2-2
DIFFERENTIATED APPROACH TO ANEURYSMS OF THE SUBCLAVIAN ARTERY
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Objective: True aneurysms of the subclavian artery are rare and atherosclerosis is the most common cause. False aneurysms may occur after blunt trauma or with degenerative diseases. These aneurysms carry the risk of rupture, thrombosis, embolisation, or may cause symptoms by local compression.

Methods: Retrospective analysis of 18 patients with aneurysms of the subclavian artery treated between November 1996 and December 2004 18 patients (7 females, median 55.4 years). The etiology was atherosclerotic in ten cases, three aneurysms were posttraumatic, four patients suffered from a thoracic outlet syndrom and one patient had Behçet's disease. Six patients were symptom-free; neurologial symptoms were observed in five, and four experienced embolisation into the peripheral arteries. We treated 14 isolated aneurysms of the subclavian artery, two patients had an additional aneurysm of the thoracic aorta, and in two cases the innominate artery was involved.
Results: Fifteen patients were treated surgically, one of them had additional endoluminal intervention thereafter. In three patients a transluminal intervention was performed. In four cases direct repair was possible; in nine cases Dacron graft interposition, and in two patients carotido-subcalvian PTFE-bypass were performed. Transposition of the vertebral artery was carried through in four patients, additional carotid endarterectomy in two. In five cases sternotomy was nescessary, in two cases the clavicle has to be divided, and in four patients the first rip was resected. The 30 day mortality was 1/16 (6.25%) due to right-heart-failure. We observed one asymptomatic occlusion after 3 months. After a median follow-up of 50 months fourteen patients are free from symptoms, two patients suffer from late sequelae of peripheral embolisation and two patients died.
Conclusions: A differentiated elective surgical and/or interventional approach for aneurysms of the subclavian artery is associated with low risk to the patient and avoids the need for emergency operations.

V2-3

OUR EXPERIENCE IN SURGICAL TREATMENT OF VERTEBRAL ARTERIES LESIONS

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Objective: From February 1993 to December 2006 194 patients with vertebral arteries lesions were operated on. All patients were symptomatic (125 patients underwent stroke, 69 had repeated TIA). Sixty five patients had VA stenosis, two patients had occlusion of the first portion of VA, 108 patiens had VA elongation (coiling and kinking), 19 patients had extravasal compression of the first potion of VA. Combined procedures on ICA and VA were performed in 36 cases.
Methods: The examination program included a thorough neurologic examination, ultrasound examination, cerebral CT and angiography of the aorta arch branches. Since 1998 the MRA has been introduced in common clinical practice for revealing of elongated vertebral arteries. All operations were performed under general anesthesia. Intraoperative cerebral protection was realized with barbiturates, dexamethasone, intravenous injection of 1000 mg of gliathiline just before the artery cross-clamping and by inducing a moderate arterial hypertension.
Transsubclavian VA endarterectomy was performed in 21 cases. Istmoplastic was performed in 11 cases. VA transposition to CCA was performed in 54 cases, VA transposition to subclavian artery was performed in 11 cases. Power's procedure was performed in 36 cases and modified Power's procedure in 58 cases. ECA-VA shunting to the third portion of VA was performed in three cases.
Results: The analysis of the surgical treatment results has shown no cases of intraoperative lethality or stroke. Intraoperative complications included one case of subclavian artery injury. Craniocerebral nerve injury was observed in two patients, Horner's syndrom in ten cases. The symptoms have regressed totally within 6 months.
One hundred and seventy five patients were followed-up from 24 to 96 month (at an average 68 months). Twelve patients died (6.9%). Nobody had stroke as a cause of death. Stroke and TIA in the basin of the reconstructed artery occurred in five patients (2.9%). One hundred and eight patients (78.9%) had a distinct regression of neurological symptoms. The most bed results were occurred in the patients, who underwent Powers procedure.
Conclusions: So, the patients with manifested lesions of vertebral arteries are subject to the surgical treatment, which seems to be a very effective method to decrease neurological symptoms and to prevent stroke.

V2-4

IDENTIFICATION OF METABOLICALLY ACTIVE *CHLAMYDIA PNEUMONIAE* IN SYMPTOMATIC CAROTID ATHEROSCLEROTIC PLAQUES

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Objective: Recent reports suggest a causative role of *Chlamydophila pneumoniae* (CP) in the development of atherosclerosis and its complications. The aim of this study was to investigate the presence of metabolically active *C. pneumoniae* in human carotid artery plaques retrieved at surgery, by means of tissue culture and PCR and RT-PCR.
Methods: Carotid endarterectomy (CE) specimens were obtained at time of surgery from ten patients (six males, four females; mean age: 74 years; five symptomatic) with hemodynamically significant carotid artery stenosis. Under aseptic conditions each CE specimen was divided and cut into three parts, namely: a proximal part (the common carotid artery at the upstream end, that appeared to contain diffuse atherosclerosis or fatty streaks, as well as plaque free segments), a medial part (the carotid bulb, containing raised plaque), and a distal part (the internal carotid artery, at the downstream end, i.e. above the raised plaque). The pieces obtained were immediately homogenized by freezing at -80 °C and grinding with a scalpel. DNA and total RNA extraction from homogenate aliquots was performed. *C. pneumoniae* 16S rRNA (coding for the small subunit of bacterial ribosomes), MOMP (major outer membrane protein) and Hsp 60 (60 kDa heat shock protein) gene expression was investigated by means of PCR and RT-PCR.
Results: Detection of *C. pneumoniae* Hsp-60 and 16s rRNA gene expression was positive in only two samples, corresponding to the proximal part of CE specimens retrieved at surgery from two patients with recent symptoms of cerebral ischemia (<8 weeks before surgical intervention). Interestingly PCR and RT-PCR analysis of the specimens of other three patients with a previous, but not recent history of cerebral ischemia, resulted negative. Analysis of *C. pneumoniae* MOMP gene expression was negative in all samples, regardless of severity and onset of symptomaticity.
Conclusions: DNA and RNA amplification from different portions of carotid atherosclerotic plaques proved to be a useful tool to investigate *C. pneumoniae* localization and metabolic activity within carotid atheromatous tissue. The evidence of the gene expression of *C. pneumoniae* Hsp60 and 16-s rRNA only in the C.E. specimen of two patients with recent ischemic symptoms (i.e. 'retinal artery embolism' and transient hemiparesis) may suggest an implication of metabolically active *C. pneumoniae* in unstabilization of carotid atheromatous plaque.

V2-5

CAROTID ENDARTERECTOMY: LOCO-REGIONAL ANAESTHESIA VS. REMIFENTANIL CONSCIOUS SEDATION

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Objective: To retrospectively evaluate and compare the safety and efficacy of two different anaesthetic techniques Remifentanil conscious sedation vs. loco-regional anaesthesia (LA) in carotid endarterectomy (CEA).
Methods: Two hundred patients (M/F 128/72, age 74±9, ASA II/III) were collected in two groups: (A) Remifentanil conscious sedation and (B) LA. Group A: induction with propofol 1% 1.5 mg/kg iv and transmucosal topic application of lidocaine 2% 10 ml during tracheal intubation; continuous intravenous 0.12–0.25 $\mu g/kg^{-1}$ min^{-1} Remifentanil infusion during anaesthesia in controlled mechanical ventilation (Vt 8–12 ml/kg, RR 11±2, O_2/air 40/60%). At the carotid clamping, we stopped Remifentanil infusion and thereafter we evaluated the clinical neurological status utilizing a 5-point scale: awake (1) to asleep (5). Group B: combined superficial and deep cervical plexus block with Naropine 0.5% 25±5 ml. At time (T0=skin incision, T1=3 min, T2=carotid clamping, T3=end of surgery) mean arterial pressure and heart rate were collected. We also assessed the clamping time, intraoperative complications, postoperative morbidity and mortality, shunt insertion and patient compliance. Anova test for repeated measures and P values <0.05 was considered significant.
Results: Hemodynamics variables significant differences were found in group B at basal time (P<0.05). No significant differences in the frequency of postoperative complications were observed between the two groups (A 2.3%, B 2.8% P=0.944). No major strokes in both groups and only one death in the group A (6th day for MI). Significant shunt usage was associated with group B 19% vs. group A 22% (P<0.05). Clamping time group A was 27+/+17 min vs. group B 32+/+24 min (P=0.14).
Conclusions: Remifentanil conscious sedation is most suitable technique, monitoring neurological status as it gives greater assurances of cerebral protection during arterial clamping, better control of the airway and good compliance both surgeon and patient.

V2-6

CAROTID ENDARTERECTOMY IN PATIENTS WITH CONTRALATERAL CAROTID OCCLUSION

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Objective: Several Authors consider contralateral carotid occlusion a risk factor for increased mortality and morbidity in carotid endarterectomy (CEA). The aim of this study is to evaluate CEA results in patients with contralateral carotid occlusion and compare them with a number of patients with patent contralateral carotid.
Methods: We analyzed retrospectively 1236 CEA operations performed in the last two years and selected two groups:
Group 1: Forty one patients with carotid stenosis and contralateral carotid occlusion (30 males and 11 females, mean age 66.1). In all patients diagnosis was made with duplex scan; in four cases (9.75%) a preoperative angiography was performed and in ten (24.3%) Magnetic Resonance Angiography (MRA). All the patients had a CT-scan before the operation. Surgery (35 parch sutures and six eversion CEA) was performed under local anesthesia in 39 cases (95.1%) and general anesthesia, with EEG monitoring, in two (4.9%) cases. It was necessary to employ a carotid shunt in 22 (53.6%) patients.
Group 2: Nine hundred and eighteen patients patients with carotid stenosis and contralateral without significant lesion (748 males and 170 females, mean age 67.2). In all the patients diagnosis was made with duplex scan; preoperative angiography was made in three (0.32%) cases and MRA in 20 (2.17%). Preoperative CT scan was made selectively in 257 (28%) cases. Surgical operation (168 patch sutures and 750 eversion CEA) was performed under loco-regional anesthesia in 915 (99.7%) cases and general anesthesia in three cases (0.3%).
Results: Multivariate analysis showed risk factors distribution higher in group 1 for coronary diseases, neurological symptoms and CT scan positive for ischemia (P<0.05). In Group 1 shunt and patch were used more frequently. Neurological morbidity and operative mortality were not statistically different in both groups (in Group 1 and 2 of 1.3% vs. 0.9%, and 0.41% vs. 0.29%, P>0.05). In the mean follow-up of 11.4 months mortality was 0.1% in the Group 1 and 0.3% in the Group 2 (P>0.05) and neurological morbidity was 0% in Group 1 and 0.87% in Group 2 (P>0.05).
Conclusions: A careful cerebral intra-operative monitoring with a selective shunt use, gives possibility to make CEA without increasing mortality or neurological morbidity even in patients with contralateral internal carotid occlusion.

V2-7

SHUNT NECESSITY IS NOT SUFFICIENTLY PREDICTABLE IN CAROTID SURGERY USING AN ARTIFICIAL NEURONAL NETWORK

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Objective: In carotid surgery, it is useful to know which patient will tolerate carotid cross-clamping in order to minimize the risks for perioperative strokes. In this study the value of an Artificial Neuronal Network (ANN) as a self-learning mathematical method to identify predictive factors for shunt necessity is evaluated.
Methods: A total number of 850 patients who all underwent CEA in local anaesthesia were analysed regarding shunt necessity using a standard feed-forward, back propagation ANN (NeuroSolutions® by NeuroDimensions, Inc, Gainesville, USA) with three layers (one input, one hidden, one output layer). Among the input neurons preoperative clinical parameters (age, sex, ASA-classification, timing of surgery, degree of ipsilateral ICA stenosis, presence of contralateral ICA occlusion, clinical presentation, cerebral ischemia, transhemispheric cross-flow) and intraoperative parameters (ICA flow, ICA stump pressure, pressure gradient over stenosis) were separately examined. The patient records were randomly split into training, cross-validation and test sets in ratios of 300:300:250.
Results: In 173 patients (20%) a shunt was used because hemispheric deficits or unconsciousness occurred during carotid cross-clamping.
Not needing a shunt could be predicted rather precisely by both preoperative and intraoprative parameters (96% resp. 91%). Those patients who did not tolerate carotid cross-clamping, however, were poorly identified by preoperative parameters (9%). Intraoperative parameters predicted shunt use correctly in 56% leaving a considerable amount of patients unprotected from cerebral ischemia during carotid surgery.
Conclusions: With the application of an ANN, shunt necessity in carotid surgery still cannot be predicted sufficiently. Therefore, perioperative neuromonitoring as provided by local anaesthesia remains mandatory.

V2-8

INFLUENCE OF CAROTID SURGERY ON FUNCTIONAL ACTIVITY OF OPTIC ANALYZER AND OCULAR BLOOD FLOW IN PATIENTS WITH ISCHEMIC DISEASE OF EYE

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Objective: To study the influence of carotid reconstructive surgery on ocular functions and ocular blood-flow in patients with ocular ischemic syndrome (OIS) in late postoperative period.
Methods: One hundred and eighty patients with OIS have been examined; 104 of them suffered from acute forms of the ischemic disease, 76 patients had chronic type. They had different forms of internal carotid artery (ICA) pathology: in 103 cases monolateral and in 56 cases–bilateral stenosis, in 21 patients ICA was abnormally meandered. Before surgery and in course of 1–2 years after it all the patients were examined on visual acuity, electrophysiological investigations (the threshold of electrical sensitivity, the level of electrical liability of optic nerve), contrast sensitivity of the optical analyser and blood-flow in carotid arteries, orbital vessels. Methods of investigation of the blood flow included high frequency duplex ultrasonography, Color Doppler Imaging (CDI), spectral Doppler analysis, 3D-mode sonography.
Results: After surgery the visual acuity reliably increased in patients with the acute forms of the disease (before surgery: 0.37±0.05; after surgery: 0.52±0.07, P<0.05), there also were the positive dynamics of threshold of electrical sensitivity (TES) and electrical liability (EL) of optic nerve, (before surgery: TES=276.8±38.1 mcA, EL=28.5±2.1 Hz; after surgery: TES=200.8±26.1 mcA, EL=34.9±1.2 Hz, P<0.01). The increase of contrast sensitivity of optical analyser was found in 28.8% patients with the acute forms and 10.5% patients with the chronic form of OIS. There was blood-flow acceleration in orbital arteries and decrease of vasoresistance in both groups of patients.
Conclusions: Reconstructive surgery on carotid arteries is the most effective method in management of the acute form of OIS.

May 18, 2007 2nd Congress Day
16:30-18:30
3rd Cardiac Scientific Session - Arrhythmia

C3-1

SUCCESSFUL OFF-PUMP PULMONARY VEIN ISOLATION FOR PAROXYSMAL ATRIAL FIBRILLATION PROTECTS AGAINST AUTONOMIC NERVOUS SYSTEM IMBALANCE

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Objective: Imbalance between sympathetic and parasympathetic cardiac systems may induce atrial fibrillation. This study describes dynamic changes in heart rate varability (HRV) and autonomic activity (AA) after successful bipolar radiofrequency PVI in short and long-term follow-up.
Methods: Twenty seven patients who underwent coronary artery bypass grafting and successful (stable sinus rhythm for one year) off-pump bipolar radiofrequency PVI for PAF were prospectively followed 3, 6 and 12 months after surgery including 24 h Holter ECG. At each time HRV and AA parameters were calculated: mean NN-interval (mRR), standard deviation of NN-intervals (SDNN), standard deviation of averaged NN-intervals (SDANN), root mean square of successive differences (rMSSD), low frequency power (0.04–0.15 Hz; specific parameter fo sympathetic activity), high frequency

power (0.15–0.4 Hz; specific parameter for parasympathetic activity) and LF:HF ratio.
Results: Before surgery there were high HRV and AA parameters recorded. In 3, 6 and 12 months time points there was progresive reduction of HRV and AA observed reaching statistical signifficance at 6 and 12 months after surgery (P<0.05). Respective rates before and 3, 6, 12 months after surgery were: for mRR (945.3±160; 870±122; 902.1±171; 902±217 ms), for SDANN (122.4±113; 95.8±47; 91.8±31; 80.5±42 ms), for rMSSD (79.2±93; 68.9±49; 60.2±41; 45±20 ms). Graph shows dynamic changes in sympaphetic and parasympaphetic activity. LF:HF ratios were 0.98 (±0.7); 0.91 (±0.6); 0.8 (±0.6); 0.67 (±0.3) before, 3, 6, 12 months after surgery, respectively. Statisticaly signifficant consecutive reduction in LF:HF ratio (P<0.05) is observed due to oncoming parasympathetic dominace 12 months after ablation.
Conclusions: Successful PVI for PAF changes cardiac response to autonomic nervous system activity and may protect against autonomic imbalace.

C3-2

MID-TERM OUTCOME FOLLOWING SURGICAL ABLATION OF ATRIAL FIBRILLATION WITH IRRIGATED RADIOFREQUENCY: MAINTENANCE OF SINUS RHYTHM AND RECOVERY OF ATRIAL CONTRACTILITY

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Objective: Radiofrequency mini-maze procedure during cardiac surgery ha been estabilished as safe and effective method for treatment of atrial fibrillation (AF).
Methods: The rate of stable SR and the atrial contractility were investigated in 126 (55 males, 65±8.5 years old) consecutive patients with permanent (82.5%) or paroxymal (17.5%) AF. Concomitant to open heart surgery traditional minmize was performed with nonpolar (67.5%), bipolar (27.8%) or combined (4.7%) irrigated RF devices. Pulmonary veins (PV) isolation was assessed by electrophysiological evaluation (EE) at the end of operation and then on the 2nd and 4th postoperative day. Holter Ekg and Echocardiography was performed on 3rd, 6th and then every six postoperative months.
Results: Permanent pacemaker was implanted in 11 patients. At 33±8 month follow-up 98/126 (77.7%) patiens are in stable SR. Stable SR was present in 71/86 (82.5%) patients with isolation of both groups of PVs and in 27/40 (67.5%) in patients in whom only one group of PVs or none of them were isolated.
Recovery of left atrial contractility was observed in 68% and 94% of patients in SR at 3rd and 6th postoperative month respectively. Quantitative Doppler flow mitral analysis showed a trend toward progressive recovery (3.45 and 2.21 at 3rd and 6th postoperative month, respectively).
Conclusions: The isolation of all PVs is related to the long-term maintenance of SR. Quantitative analysis suggests a late recovery of left atrium conctractility, and the term of six months is appropriate to evaluate the extent of recovery.

C3-3

FULL ENDOSCOPIC SURGICAL TREATMENT OF ATRIAL FIBRILLATION: TECHNIQUES AND RESULTS

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Objective: Minimally invasive surgical treatment of atrial fibrillation (AF) seems to offer significant advantages in terms of success rates and procedural morbidity and duration when compared to the percutaneous approach.
Methods: Study population included 31 patients with lone AF refractory to medical treatment undergoing closed-chest surgical ablation. Mean age (±S.D.) was 62±10.6 years, AF was paroxysmal in 23 patients (74.1%) and permanent in eight patients (25.9%). Previous electrical CVs had been performed in 11 patients (35.4%). Mean LA dimension (range) (mm) was 46.1 (30–63). Mean AF duration (range) (months) was 45.3 (3–240); mean EuroSCORE (range) was 2.1 (0–6). Via a monolateral closed-chest, endoscopic approach the right pleural space was entered, the pericardial cavity opened and a continuous linear epicardial encircling of the pulmonary veins performed using a microwave endoscopic device (Flex 10, Guidant, Fresno, USA). In patients receiving high-thoracic epidural anesthesia, a catheter was placed at the level of T1–T2 and a solution of ropivacaine and sufentanyl was administered.
Results: All procedures were successfully performed in all patients, either with general anesthesia (13 patients) or with high-thoracic epidural anesthesia (18 patients). Conversion to ministernotomy was required in six patients due to the presence of pericardial or pleural adhesions. In ten patients of the epidural group, consciousness and spontaneous breathing was maintained throughout the operation and no conversion to endotracheal intubation or general anesthesia was required. Mean ablation time was 18.3±3.5 min and mean procedural time was 78±18 min. In patients receiving endotracheal intubation (either with general anesthesia or with high-thoracic epidural analgesia) extubation was carried out in all cases in the OR. There was no need for ICU stay nor any postoperative complications occurred among any patients. Patients were discharged after 3.8±2.9 days. At a mean follow-up of 21.4±9.4 months, 26/31 patients (83.8%) are in sinus rhythm.
Conclusions: Total endoscopic epicardial pulmonary veins isolation proved to be a feasible and effective technique for the treatment of AF. The use of high-thoracic epidural anesthesia allowed a prompt patients' recovery; moreover, endoscopic surgical ablation of AF can be safely and successfully performed in awake patients.

C3-4

ARE STATINS REALLY ABLE TO PREVENT ATRIAL FIBRILLATION FOLLOWING CORONARY ARTERY BYPASS GRAFTING?

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Objective: Atrial fibrillation (AF) is the most common and disabling complication following on-pump and off-pump coronary artery surgery. The influence of statins on postoperative incidence of tachiarrhythmias after coronary artery bypass grafting (CABG) is not well established. The aim of the present study was to correlate AF with preoperative statin therapy in patients undergoing this operation.
Methods: A retrospective review was undertaken of 4249 consecutive patients (3468 males, middle age 64±9 years) who had elective first-time CABG (3401 on-pump) from 1995 to 2001. According to preoperative medical treatment, patients were divided into two groups: standard therapy including statins (group A, n=612) and standard therapy without statin (group B, n=3637).
Results: Patients in group B were, on average, older and more likely to have a slightly worse ejection fraction. There was no significant difference in the preoperative use of antiarrhytmic drugs and left atrial diameter. AF developed in 42 out of 612 (6.9%) in group A vs. 400 out of 3637 (11%) patients in group B (P=0.002). After having performed logistic regression analysis, previous AF, left atrial size and increasing age, but not cardiopulmonary bypass use and female sex, were identified as a significant risk factors for developing AF after CABG.
Conclusions: These results indicate that preoperative use of statin in patients undergoing both on-pump of off-pump CABG can significantly decrease the incidence of postoperative AF.

C3-5

RELATION BETWEEN EARLY AND LONG-TERM POSTOPERATIVE MORTALITY AND ATRIAL FIBRILLATION BEFORE SURGICAL REVASCULARIZATION. 4 YEAR FOLLOW-UP

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Objective: Atrial fibrillation (AF) is the most common complications after cardiac surgery, occurring in 20–60% of patients depending on definition and diagnostic methods. Usually appears between 2 and 4 day after operation and often turns back during first 30 days in postoperative time. Treatment of this complication is often protracted, requiring increased monitoring and hospital resources, and extending hospital length of stay. Clinical consequences can be significant and include hemodynamic instability and stroke. It has been also proved that preoperative AF can essentially worsen the postoperative prognosis. The aim of the study was to determine whether atrial fibrillation is a marker only for high-risk patients or an independent risk factor for time-related mortality.
Methods: Three thousand patients, involved to the study, underwent isolated coronary artery bypass grafting (CABG). Almost 5.8% (174 patients) of them

had electrocardiographically documented preoperative atrial fibrillation. To evaluate the relationship between preoperative AF and postoperative mortality all patients were observed for four years following cardiac surgery.
Results: In comparison with patients without preoperative AF, patients with preoperative atrial fibrillation were older (64.4±7.9 vs. 59.7±9.5 respectively, $P<0.02$), with less EF (39±6.7 vs. 43.7±9.6 respectively, $P<0.001$), with more frequent heart failure (HF- 31.2% vs. 9.7%; $P<0.001$), hypertension (81% vs. 69%, $P<0.001$), and more coexistent conditions - diabetes (DM - 18.4% vs. 14.8%, $P<0.03$), obturative pulmonary disease (9.6% vs. 5.1%, $P<0.001$) and mild renal failure (6.2% vs. 3.8%, $P<0.0005$). According to statistical analysis, survival at 6 and 30 days and at 6 and 12 months following revascularization of patients with vs. without AF was 96.4% vs. 98.1% ($P>0.05$), 94.5% vs. 97.3% ($P>0.05$), and 86% vs. 93% ($P<0.03$), and 82% vs. 91% ($P<0.02$) respectively - survival difference at one year was 9%. In follow-up examination we observed further increase of the survival difference: after two years it was 9.8% (81% vs. 90.8%, $P<0.02$), after three years – 10.4% (80.2% vs. 90.6%, $P<0.01$) and at four years 11.1%-79.0% vs. 90.1% respectively ($P<0.005$).
Conclusions: In patients subjected to isolated coronary artery bypass grafting preoperative AF is a high-risk marker of increased mortality of patients undergoing cardiac surgery. In addition AF itself significantly reduces patients' long-term survival. We noticed that during the first year postoperatively survival difference increases most significantly and maintain as significant in follow-up observation.

C3-6
SURVIVAL AND COMPLICATION RATE AFTER LONG-TERM FOLLOW-UP OF ICD IMPLANTATION
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Objective: Purpose of the study was to analyze efficacy of ICD during long-term follow-up, to estimate survival of patients with ICD, to evaluate complications rate in early and late postoperative periods.
Methods: Two hundred and fifty ICDs (145 single-chamber, 83 dual-chamber and 22 triple-chamber) were implanted in Bakoulev Center for Cardiovascular Surgery from February 1990 to November 2006. Primary implantations were performed in 174 patients, in 76 cases ICDs were replaced due to battery depletion.
Results: We evaluated long-term results of 231 III to V generation ICD implantations in 164 patients (126 males, 38 females, mean age 48.0±14.9 years, range 14-78 years). Mean follow-up period was 32.8±30.2 months, range 2-139 months. During this period 95 patients had ICD discharges, time from implantation to first discharge ranging 0.5-70 months. Multifactorial analysis revealed that left ventricular ejection fraction (LVEF) was the only variable influencing the rate of ICD discharges. The mean LVEF was 41.3±16.8% among patients who have already had at least one ICD discharge as opposed to mean LVEF of 57.4±15.7% among those who have not had any ($P<0.03$). Moreover, LVEF appears to be the most important prognostic factor for patient survival, which was 62% in the group of patients with LVEF <40% and 93% in the group of patients with LVEF >40% ($P<0.0001$). Total cumulative proportional survival (Kaplan-Meier) was 79%. Multi-chamber ICDs were shown to improve not only LV pumping function and quality of life (LVEF increasing from 37.3±10.1% to 45.0±10.9%, NYHA class changing from 2.87±1.01 to 2.12±0.64) but patient survival as well. Patient survival was 94% among patients with multi-chamber ICD and 67% among those with single-chamber ICD ($P<0.001$). No intraoperative complications were observed. There was no statistically significant difference for late surgical complications rate between patients with single-chamber and dual-chamber ICDs. Incidence of unmotivated discharges with single-chamber devices was twice as high as with multi-chamber devices.
Conclusions: LVEF and the type of device (single-chamber vs. multi-chamber) are two most significant factors influencing patient survival and quality of life.

C3-7
ROLE OF RESYNCHRONIZATION IN CARDIAC SURGICAL HEART FAILURE PATIENTS
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Objective: Clinical evidences show that the major cause of death for patients who underwent cardiac surgical procedures is heart failure. Aim of this study is the evaluation of the benefits of Cardiac Resynchronization Therapy in heart failure patients candidate to cardiac surgery.
Methods: In cardiac surgical patients with left ventricular (LV) ejection fraction (EF) <30%, LV end diastolic diameter >55 mm and QRS >130 ms and/or mechanical dissynchrony at TDI, a single bipolar epicardial lead was secured on the LV wall and brought in a subclavian pocket at the end of intervention. The resynchronization device can be implanted either during the cardiac surgical procedure or after 3, 6 or 12 months if the patient still need Cardiac Resynchronization Therapy, according to the initial inclusion criteria. During this study were enrolled 20 patients (14 male, age 71±9, NYHA 3.3): six patients underwent isolated coronary revascularization, 13 patients underwent mitral valve repair and one both procedures.
Results: No severe adverse events related to epicardial lead occurred. One patient died after intervention due to complications not related to the epicardial lead implantation. All patients discharged from the hospital survived at mean follow-up of 10.8 months (6-36). In five cases cardiac resynchronization device was implanted primarily during the cardiac surgical procedure, four patients received resynchronization device after three months, two patient after six months and two at one year. Epicardial leads electrical performances were good at implant (pacing thresholds at 0.5 ms (PT) 1.4±1.0 V, egm 14±5 mV, impedance (I) 1193±492 Ohm) as well as during follow-up (PT 0.8±0.4 V, egm 17±9 mV, 868±327 Ohm). Ejection fraction increased from 24.4% at baseline to 34.3% at three months in patients who underwent cardiac surgery alone, and from 25.7% to 44.6% in patients who underwent both cardiac surgery and resynchronization device ($P<0.01$).
Conclusions: Implantation of epicardial leads during cardiac surgical operations is a safe, quick and easy procedure: no adverse events related to epicardial leads implantation itself occurred during this study. Preliminary results in this subset of patients are very encouraging. We believe that higher number of patients and longer FU are needed to evaluate the additional benefits of resynchronization associated to coronary revascularization and/or mitral valve repair in heart failure population.

C3-8
VIDEO-ASSISTED THORACOSCOPY (VATS)-GUIDED LEFT VENTRICULAR EPICARDIAL LEADS IMPLANTATION FOR BIVENTRICULAR RESYNCHRONISATION
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Objective: Cardiac resynchronisation therapy (CRT) for treatment of congestive heart failure (HF) requires transvenous insertion of both a right and left ventricular pacing leads. Implantation of the left lead by way of the coronary sinus sometimes fails or is unfeasible mostly for anatomical reasons. Alternative techniques for left lead insertion are required and an epicardial approach would be useful.
Methods: Fourteen patients (12 male, age 65.4±8.22 years) with severe HF (NYHA class III), in sinus rhythm and conventional indication to CRT were studied. In these patients transvenous implantation of the left lead failed due to the absence of a suitable left vein or the presence of small, tortuous or angulated vessels. In right lateral decubitus position and under single-lung ventilation an antero-lateral left minithoracotomy (3 cm) in fourth intercostal space was made and a camera port was inserted in the same space. A pericardial 2 cm incision was made and one or two electrodes were sewed or screwed in. The lead was guided subcutaneously to the pacemaker.
Results: All patients were extubated in 1 h after surgery and remained in the intensive care unit for <18 h. Chest tubes were removed after a mean of 1.8±0.5 days; 48 h after operation, patients underwent endocardial implantation of right atrial and ventricular pacing leads. All patients were discharged after a mean of 4±1 days. Intraoperative and pre-discharged pacing thresholds at one month were <1.5V\0.5 ms in all cases, with pacing impedence <1000 Ohm. There was neither surgical morbidity nor mortality.
Conclusions: In this preliminary series of patients VATS and very small thoracotomy seem to be an excellent procedure for epicardial lead implantation. It is a feasible and safe procedure with optimal pacing results at a short intervention time and tolerable stress for the patients.

C3-9
AN OVINE ANIMAL MODEL FOR TISSUE CARDIOMYOPLASTY USING CELL-SEEDED SYNTHETIC POLYMERIC SCAFFOLD IN THE INFARCTED HEART
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Objective: The emerging fields of tissue engineering and biomaterials have begun to provide potential treatment of cardiac infarcts. Tissue engineering approaches are designed to repair damaged cardiac tissue through the use of cellular transplantation, and biomaterial scaffolds. In this study, we investigated the effectiveness of a cell-seeded patch including layers of cardiomyocytes and endothelial cells grafted on to the infracted area of the sheep heart.
Methods: Myocardial infarction in sheep was induced by ligation of the distal portion of the left anterior descending coronary artery. Biopsy of the left ventricular cardiac muscle and jugular vein was obtained. Tissue samples were cultured and expanded in-vitro. Expanded cardiomyocytes and endothelial cells were seeded on to the layers of polycaprolactone (PCL) biodegradable sheets. After two months, the patch sheets were sutured on the surface of the infracted myocardium.
Results: Eight weeks after transplantation, there was remarkable thickening as well as decreased paradoxical motion of the ventricular wall in echocardiographic evaluation. There was no significant improvement in global ejection fraction. In microscopic pathologic examinations by H&E staining, electron microscopy and immunohistochemical marking, grafted cells in the scaffold had survived and had been incorporated into the adjacent epicardium. There was also seen a spectacular amount of neovascularization in the graft.
Conclusions: Our data demonstrate that grafting of cell-seeded scaffolds can induce angiogenesis in the infracted region. Such tissue engineered cell-seeded scaffolds are promising means of tissue cardiomyoplasty in the field of regenerative medicine. Further investigations are however encouraged to open new horizons in the treatment of heart failure.

May 18, 2007 2nd Congress Day
16:30-18:30
4th Cardiac Scientific Session - Valve I

C4-1

VALVE SURGERY ON THE BEATING HEART WITH RETROGRADE NORMOTHERMIC BLOOD PERFUSION AS ALTERNATIVE OF CARDIOPLEGIA FOR PATIENTS WITH ACQUIRED HEART DISEASE AND LOW EJECTION FRACTION OF LEFT VENTRICLE

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Objective: The purpose of study to assess efficiency of a continuous normothermic perfusion on beating heart as method of protection during valve surgery in patients with low ejection fraction of left ventricle.
Methods: We used the technique of retrograde oxygenated blood coronary sinus perfusion in 37 patients. Sixteen patients undergoing aortic valve or aortic valve combined with mitral valve repair or replacement, 21 performed mitral valve surgery without application of cardioplegia. The mean LVEF was 31.4±8.1%. Most of patients (29) were in NYHA IV. Mean EuroSCORE was 17%. Adequacy of perfusion was confirmed by the absence of electrocardiographic changes and measurement of impendance of right ventricle in 12 cases.
Results: Volumetric speed coronary perfusion changed from 300 up to 450 ml in mines. The pressure in the coronary sinun did not exceed 60 mmHg. For prevention of development of fibrillation and bradycardia into a contour for coronary perfusion line in addition entered from 100 up to 500 mg of lidocaine. Parameters of delivery and consumption of oxygen by a myocardium were within the limits of admissible values. Postoperative peak creatine kinase-MB (measured every 3 h postoperatively) and peak troponin T concentrations were not significantly increased. Transient pacing was used in 11 patients. In hospital mortality was two patients. One died from renal failure and second patient died from low cardiac output syndrome and infective shock. Most patients were discharged in 2 weeks.
Conclusions: Retrograde blood normothermic perfusion is a good myocardial protection, which simulates physiologic status.
It is applicable to aortic valve and combined mitral valve surgery of patients with low contractility of LV and probably reduces risk of death rate.

C4-2

BRAIN NATRIURETIC PEPTIDE ACTIVITY IN PATIENTS UNDERGOING MITRAL VALVE REPAIR FOR SEVERE ISCHEMIC REGURGITATION

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Objective: Restrictive annuloplasty is nowadays suggested as an option to treat moderate-severe functional mitral regurgitation (MR) in patients undergoing coronary artery by-pass grafting (CABG) operation. Plasma levels of Brain natriuretic peptide (BNP) is over-expressed in wall stress of failing ventricles with severe mitral regurgitation. BNP is an independent marker of ventricular remodelling. We tested the association between plasma BNP levels and the evolution of symptoms, MR degree, and left ventricle remodelling in patients with ischemic cardiomyopathy undergoing CABG and mitral restrictive annuloplasty.
Methods: We prospectively enrolled 17 patients (12 men and five women, mean age 68.6±8.7 years) with severe ischemic mitral regurgitation (NYHA class III or IV) and moderate to severe left ventricular impairment (three patients in cardiogenic shock with IABP support) undergone mitral valve repair. Clinical features and echocardiographic evaluation of left ventricular function were assessed preoperatively and postoperatively at 1 week and 3 months after the operation. BNP levels were assessed preoperatively and 3 months after the operation. Partial flexible ring was used in 11 patients, a complete ring was used in six patients. Ring size was 26 and 28. Mean number of associated grafts performed was 3.4±0.9.
Results: There were no operative deaths, one patient died 28 days after the operation for sepsis. Echocardiographic evaluation 1 week after operations showed improvement in degree (+/++++) of mitral regurgitation (from 3.8±0.3 to 0.9±0.8; $P<0.01$) and a modest increase in LVEF (from 36±11% to 40±10%; $P=0.17$). Three months after mitral regurgitation decreased from 3.8±0.3 to 1.0±0.7 ($P<0.01$), LVEF increased from 36±11% to 43±8% ($P<0.05$) and NYHA class improved from 2.94±1.02 to 1.21±0.42 ($P<0.01$). Left ventricular end diastolic diameters changed from 54.7±5.2 mm to 51.5±5.8 mm ($P=0.51$). Mean plasma BNP levels decreased from 471±248 pmol/l to 55.6±52.8 pmol/l ($P<0.05$).
Conclusions: Restrictive annuloplasty provides satisfactory short-term results in patients with severe ischemic mitral regurgitation. Plasma BNP levels correlate with clinical symptoms and echocardiographic parameters in patients undergone mitral valve annuloplasty.

C4-3

COMBINED MITRAL-AORTIC VALVE DISEASES: RISK-FACTORS OF SURGERY

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Objective: To analyzed risk-factors in surgery of combined mitral and aortic valve diseases (CMAVD).
Methods: One thousand two hundred and ninety seven adult patients (patients) with CMAVD were consequtive operated from 01.01.1981 till 01.01.2006 years in Institute. Predominant genesis of CMAVD was rheumatism. Thirty one patients (2.4%) were in II NYHA class, 317 (24.4%) patients were in III class and 949 (73.2%) patients in IV. The average age was 46.4±8.1 (14-69) years. The following procedures were performed: MVAR ($n=903$), MVR+plastic procedure on AV ($n=194$), AVR+plastic procedure on MV ($n=173$), plastic procedure on both valves ($n=27$). Previous closed mitral commissurotomy (CMC) was marked in 110 (8.5%) patients, constrictive pericardytis in 101 (7.8%), thromboses of LA in 75 (5.8%) patients. Only mechanical valves were used in any position: in the most cases are monodisc, at the last period - bileaflet. Concomitant tricuspid valve disease was corrected by De Vega (plus tricuspid commissurotomy in organic disease) in 258 (19.8%) patients. Preservation of MV's apparatus during MVR was in all cases of mitral incompetence, especially with ESVI >75 ml/m.q. All operations were performed with CPB, moderate hypothermia (28–32 °C), combined ante-retrograde St. Thomas crystalloid cardioplegia.
Results: The hospital mortality (HM) at the last 6 years (2000-2005 years) was 70.1%. HM was higher for double valve replacement than in cases with plastic procedure on one valve. The value of HM depends of following main factors: IV NYHA class, small cavity of LV - end-systolic volume index of left ventricle (ESVI) <15 ml/m.q. (especially for combined MS+AS and using prostheses 29 mm), LV's ejection fraction <0.35, systolic pressure in pulmonary artery >90 mmHg, massive thromboses of LA (thrombotic masses more than 1/3 of volume), constrictive pericardytis, previous CMC, calcification on both valves+3, ESVI >110 ml/m.q. (especially for combined MI+AI), organic tricuspid valve diseases, triple stenoses, cross-clamping time of aorta more than 180 min.
Conclusions: Preferably to perform correction of CMAVD without complicated forms - in II or III NYHA class with bileaflet mechanical valve. The combination of desbribed risk-factors increases value of HM.

C4-4

MITRAL VALVE OPERATIONS WITH THE PORT-ACCESS TECHNIQUE IN 230 CONSECUTIVE PATIENTS

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Objective: We reviewed our experience with the Port Access mitral valve surgery.
Methods: Between October 1999 and January 2007, 230 patients (97 men, 133 women) with a mean age of 58.7 years (range 21-83) underwent either Port-Access mitral valve repair (*n*=177; 76.8%) or replacement (*n*=53; 23.2%) for degenerative disease (*n*=154), rheumatic disease (*n*=48), endocarditis (*n*=7) annular dilatation (*n*=16) and ingrowing myxoma (*n*=5). Quadrangular resection of the posterior leaflet associated with annuloplasty was performed in 144 patients (81.3% of the conservative procedures), isolated annuloplasty in 12 patients, commissurolysis in ten patients, edge to edge plasty in nine patients, triangular resection of the anterior leaflet in two patients. In nine patients polytetrafluoro-ethylene chordae were inserted for anterior leaflet prolapse. A mechanical valve prosthesis was implanted in 36 patients, whereas a biological one was implanted in 17 patients. A left atrium ablative procedure was performed in 32 patients (13.9%). There were four closures of a preexisting paravalvular leak.
Results: Hospital mortality was 1.3% (*n*=3). Thirteen patients (5.6%) had conversion to sternotomy and conventional extra corporeal circulation for repair of a dissected aorta (*n*=4) or the inability to proceed to a safe femoral cannulation (*n*=9). Mean ECC time was 82.1 min. Mean clamping time was 62.7 min. Twenty-one patients (9.1%) underwent a revision for bleeding, the majority of them occurred in the first 50 patients (70%). Revision for bleeding was performed through the same video-assisted Port-Access approach in all but two patients. There were eight cases of cerebrovascular accident due to thromboembolic event (3.5%). Mean intensive care unit and total hospital stay was 28.7 h and 4.5 days, respectively. There were three (1.3%) thoracic wound complications, none of them lethal. In our early experience, three patients developed a groin lymphocele (1.3%).
Conclusions: In our experience with the Port–Access mitral valve surgery, the total operating room time, perfusion time, and cross clamp time decreased with our growing experience and remained stable after a period of 24 months, given a team learning curve of 70 patients. The video assisted Port-Access mitral valve approach is a valid alternative to median sternotomy, with similar standards of results and quality. All patients had a high degree of satisfaction in terms of comfort and cosmesis.

C4-5

BIOMECHANICAL MODEL OF MITRAL VALVE REPAIR WITH QUADRANGULAR RESECTION OF POSTERIOR LEAFLET AND POSITIONING OF TWO DIFFERENT KINDS OF ANNULOPLASTY RING

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Objective: The aim of this study is to evaluate a finite element model of mitral valve reapair to compare the biomechanical behaviour of two kind of annuloplasty ring: complete and semirigid ring (Carpentier-Edwards Physio) and flexible band (Cosgrove-Edwards).
Methods: We create a mathematical finite model of pathological mitral valve considering the annulus plane, the length and the stress of the cordae tendinae and dividing the posterior leaflet in three portion (P1-3). Then we simulate a quadrangular resection of P2 with sliding of P1 and P3 comparing three surgical act: without ring, with Cosgrove band anf with Physio ring. We also consider the influence of different conformation that can assume the posterior anulus after ring positioning: elliptical, prolonged symmetrical conic and asymmetrical.
Results: With respect to the no ring apposition case, the Cosrgove ring model avoids regurgitation and reduces, after resection, stress induced by circumferential strain, caused by structures surrounding annulus, on posterior leaflet tissue. His disavantage is the presence of higher stress on the anterior leaflet and a deformation of physiological shape of posterior leaflet. If this happens a regurgitation area can be created. Rigid ring causes higher stress peaks near commissure, trigones and posterior leaflet, but lower on the cordae tendinae.
Conclusions: The choice of one of the examined rings is mainly related to patient pathological state: if there is a pathology, which can induce ventricular asymmetry, a safer choice has to be made, opting for semirigid, complete ring and not for flexible one which could deform its shape, assuming a dysfunctional shape.

C4-6

MITRAL VALVE REPAIR IN PATIENTS WITH CARDIOMYOPATHY

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Objective: Mitral regurgitation (MR) is a frequent complication of end-stage-heart failure. These patients were either managed medically or with mitral valve replacement, both associated with poor outcome. Mitral valve repair with an undersized annuloplasty may improve survival and reduce the need for allografts.
Methods: Fifty-two patients with an ejection fraction (EF) <35%, end-stage heart failure and mitral regurgitation >2 underwent mitral valve annuloplasty using the carpentier physio ring.
Results: Thirty day mortality was 9.6% (*n*=5). Seven late mortalities were observed. The use of IABP was necessary in seven patients. The 1, 2 and 5 year actuarial survival was 78%, 76% and 54%, respectively.
Conclusions: Mitral valve repair is a safe and effective operative intervention that corrects MR and offers a new strategy for patients with MR and end-stage-cardiomyopathy.

C4-7

SURGICAL TREATMENT MITRAL VALVE DISEASE WITH GIANT LEFT ATRIUM

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Objective: Enlargement of the left atrium more than 6.5 cm are reasons of low probability of consolidation sinus rhythm and high risk of development prosthesis dysfunction (thrombosis) [Di Eusanio G. et al. 1988; Reed D. et al. 1991; Tonguc E. et al. 2001; Erdogan H. et al. 2001].
Methods: From 2001 to 2007 years in our Clinic was performed 72 volume-reduced left atrium during mitral valve surgery. The age of the patients was from 38 to 63 years (47.5±9.1). In 64 (88.9%) cases was paroxysmal atrial fibrillation and eight (11.1%) patients had chronic. The thrombosis of left atrium complicated 16 (22.2%) cases and in 12 (16.7%) patients revealed thromboembolic syndrome. We develop ECHOschemes of anatomic variants of left atrium enlargement (right-posterior, left-posterior and posterior-top displacement), that defined a choice of a technique. We performed different atrioplasy techniques (placation methods in 49 cases): «mercedes»-in ten (13.9%) cases; Kawazoe (paraannular, superior-half, right-side)-in 39 (54.2%); (resection in 19 patients): Sinatra in 16 (22.2%) cases, 3 (4.3%) – triangular resection plasty during MazeIII procedure and in four cases we performed combined resection-plication of left atrium.
Results: We develop indication to atrioplasty perform: giant left atrium with chronic atrial fibrillation and relative contraindication to Maze procedure (re-do surgery, duration of AF more 15 years, bradysystolic and fine-wave forms of AF, contraindication to long cross-clamping time; giant left atrium with paroxysmal AF. The hospital mortality rate was 5.6% (four patients). The main cases of the mortality were: low output syndrome in two (2.8%) cases; hepato-renal failure–2.8%. Three patients (4.2%) were re-explored for bleeding. Echocardiography data before and after operation were: in postoperative period in one case postoperative was not compression postero-basal part of left ventricle (before it was mean 3.27±0.92 ml), it was marked reduced of left atrium (7.8±2.6 ml – before; 5.1±1.9 ml – after operation; volume reduced from 179.3±21.6 to 103.7±14.8 ml). In 38 (52.7%) cases revealed sinus rhythm with adequate rate; syndrome of weakness sinus node in three (4.6%) patients, in occasion of what was implanted two-chamber pacemaker. We did not reveal thromboembolic complications, activation of early paraprosthesis endocaditis was in six (8.3%) cases.
Conclusions: Preoperative definition of anatomic variants of left atrium enlargement according ECHO allows to choose a technique of reduction. Performance volume-reduced left atrium during mitral valve surgery promotes restoration and preservation of sinus rhythm, and reduce risk low output syndrome in the early postoperative period.

C4-8

MINIMALLY INVASIVE AORTIC VALVE REPLACEMENT WITH THE J SHAPED MINISTERNOTOMY: A SINGLE CENTER EXPERIENCE IN 93 CONSECUTIVE PATIENTS

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Objective: Ministernotomy is an alternative approach to median sternotomy in aortic valve replacement. In literature the advantages of this minimal invasive approach are still under investigation. We report our experience in 93 consecutive patients, and we analyzed the postoperative outcomes in order to evaluate the real benefits of this minimally invasive approach.
Methods: Between January 2006 to December 2006, 93 patients underwent aortic valve replacement with J-shaped ministernotomy using standard cardiopulmonary bypass. The data were collected retrospectively. The mean age was 75 years, 38 male, 55 female. Eighty patients had aortic valve stenosis, 13 patients had aortic valve regurgitation. The mean EuroSCORE was 7.5±3.6. All the data are compared with the results obtained in an homogeneous number of patients that underwent aortic valve replacement with the standard complete sternotomy during the same period.
Results: The mean aortic cross clamping time was 56.3 min and the mean extracorporeal circulation time was 68.2. The mean intensive care unit stay was 1.6±1.4 days, and the mean ventilation time was 7.4±4.3 h. The hospital stay was 7.3±2.3 days. The in hospital mortality was 2.1% (2/93 patients). The rate of conversion in total sternotomy was 0%. Two patients required a revision for bleeding, nor revisions for sternal dehiscence were necessary.
Conclusions: The J shaped ministernotomy can be performed with a very low levels of morbidity and mortality. The results are comparable with patients that underwent aortic replacement with the standard complete sternotomy. In our experience the patients underwent aortic valve replacement with J shaped ministernotomy had less bleeding complication, a shorter ventilation time, intensive care unit and hospital stay compared with patients operated with the standard approach. Our results for minimally invasive surgery suggest the usefulness of that approach for isolated aortic valve replacement. The J shaped ministernotomy does not compromise surgical exposure and reduce the surgical trauma with excellent results.

C4-9

THE MITROFLOW AORTIC BIOPROSTHESIS, MID AND LONG-TERM FOLLOW-UP ABOUT 299 PATIENTS

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Objective: Aortic valve replacement with bioprosthesis provides an alternative to mechanical prosthesis, particularly in older patients and those unable to tolerate oral anticoagulants. The main disadvantage of bioprosthesis is a significant structural deterioration 10–15 years after implantation, which can lead to reoperation. Therefore, the international guidelines recommend using bioprosthesis in patient older than 70 years of age.
The aim of the study was to evaluate long-term follow-up after aortic valve replacement with Mitroflow bioprosthesis in a consecutive series of patients.
Methods: Between March 1988 and March 2006, a total of 299 Mitroflow valves was implanted in the aortic position in 299 patients. Their mean age was 75.5 year (40–87) and 160 were male. An isolated aortic valve replacement was performed in 168 patients and associated procedures were CABG (35%), mitral valve replacements (6.3%), mitral valvuloplasty (3.3%), or a replacement of the ascending aorta (3.7%). The valves sizes were 19 (n=34), 21 (n=117), 23 (n=100), 25 (n=43).
Results: The mean and maximum follow-up was 3.2 and 17.5 years. Total follow-up was 910 patient-years. Operative mortality was 7.7%. Actuarial survival at 10 years was 29.9%. Survival rate of valve-related death was 84% at 10 years. Freedom from valve deterioration was of 90% at 10 and 15 years. Fives cases of structural valve deterioration were found. Six patients were reoperated for valve-related problem (one endocarditis, one perivalvular leak with hemolysis and four structural deterioration after respectively 7, 8.8, 9 and 9 years). The retrospective study shows that we had a mismatch for only one patient among 299.
Conclusions: The design of the Mitroflow aortic valve bioprosthesis allowed an aortic valve replacement with no aortic enlargement and no mismatch. The long-term experience shows the long-term results are good and that the structural deterioration rate at 10 years is low.

C4-10

A SINGLE CENTER STUDY OF MORE THAN 150 ELAN BIOPROSTHESES IMPLANTATIONS WITH UP TO 5 YEARS FOLLOW-UP

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Objective: The present study was performed to investigate hemodynamic behaviour of the stentless Elan aortic valve.
Methods: Since August 2000, 153 patients received an Elan bioprosthesis. The mean age at implant was 73.1±9.5 years. The mean logistic EuroSCORE was 12.8% (range 1.5-81.1%). Concomitant procedures were performed in 73 patients (47.7%), coronary bypass surgery in 48 patients (65.8%), mitral valve treatment in 23 patients (31.5%) and others in two patients (2.7%). Patients were followed for complications and hemodynamic behaviour. Echocardiography was performed at discharge, 1 year and thereafter yearly.
Results: Operative mortality was 2.0% (n=3). The mean valve size was 25.2±2.0 mm. The effectiveness of the device was demonstrated by mean gradients (21.0±7.6 mmHg for size 21, 14.5±5.2 mmHg for size 23, 13.9±5.4 mmHg for size 25, 10.1±4.6 mmHg for size 27, 9.5±6.8 mmHg for size 29) at discharge. The mean pressure gradient at discharge was 12.9±6.0 mmHg and at 5 years 7.0±2.8 mmHg. Freedom from structural deterioration was 100% at 5 years.
Conclusions: Mid-term results showed low mortality, absence of structural deterioration and good hemodynamic behaviour.

May 18, 2007 2nd Congress Day
16:30-18:30
5th Cardiac Scientific Session - Congenital

C5-1

USE OF STENTS IN PATIENTS WITH CONGENITAL HEART DEFECTS

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Objective: One hundred and seventy six stents were used in 169 patients with different congenital heart diseases.
Methods: To treat 85 stenosed segments of pulmonary arteries we used 90 stents in 80 patients. Twenty two patients with aortic coarctation and 12 patients with recoarctation underwent stenting of aortic isthmus and we used 34 stents. Six patients with PA type four atresia underwent stenting of large aorto-pulmonary collateral vessel. Four patients after Fontan procedure in a modification of total cavapulmonary anastomoses underwent stenting of narrowed intraatrial tunnel. Stenting of stenotic conduit between the right ventricle and pulmonary artery was performed in six patients. One patient with stenosis of anastomos Gore-Tex and one patient with stenosis of cavapulmonary anastomosis underwent stenting. In one case we carried out the stenting of the atrial septum in patient with mitral valve stenosis. In 30 patients we performed stenting of patent ductus arteriosus. Patients' age varied from 6 h to 27 years. No serious complications were observed.
Results: All the patients had a good postprocedural result. After stenting the diameter of stenosis increased in average from 5.2±2.4 mm to 11.9±3.1 mm (P<0.0005), and systolic pressure gradient fell in average from 54.2±32.8 to 16.3±17.1 mmHg (P<0.0005). The gradient of systolic pressure in aortic isthmus in patients with coarctation or recoarctation was absent and insignificant in all patients. In patients with large aorto-pulmonary collateral vessel the blood saturation increased from 64% to 78% in first series of cases, and from 70% to 77% in second series of cases after stenting. In the patient after Fontan procedure the symptoms of CHF decreased following stenting. After the stenting procedure of conduits gradient of systolic pressure between

the right ventricle and pulmonary artery decreased from 98 mmHg to 35 mmHg in all cases.
Conclusions: Stenting is an effective, but technically rather complicated procedure. PA stenting allows to reduce the obstruction and thus prepares patients for the further open heart surgery. It provides better surgical results. Stenting of the aortic coarctation and the recoarctation may serve as an alternative to open heart surgery. The use of stents is also helpful in large aorto-pulmonary collateral vessel, stenosed conduit and intraatrial tunnels.

C5-2

PRENATAL DIAGNOSIS OF CRITICAL CONGENITAL HEART DEFECTS

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Objective: Critical congenital heart defects – group of congenital heart defects which cause high antenatal and early neonatal mortality and often require urgent surgical interventions. We evaluated the accuracy of prenatal diagnosis of critical congenital heart defects and perinatal outcomes.
Methods: We performed a retrospective analyses of 209 fetal echograms stated the diagnosis of critical congenital heart defects. Ultrasound screening included 2-D echocardiography, color/pulsed Doppler examination as well as a detailed anatomical scanning. Patients were divided into five groups: hypoplastic left heart syndrome (HLHS), hypoplastic right heart syndrome (HRHS), transposition of the great arteries (TGA) with intact ventricular septum, pulmonary atresia (PA) with intact ventricular septum (IVS), PA with complex congenital heart defects (CCHD). The diagnosis was confirmed by postnatal transthoracic echocardiography, angiography, operative findings or autopsy.
Results: The distribution of HLHS (*n*–59): extracardiac anomalies - 2 (3.4%), terminations of pregnancy - 51 (86.5%), postnatal deaths - 5 (8.5%), one year survival - 3 (5%).
The distribution of HRHS (*n*–36): extracardiac anomalies - 9 (25%), chromosomal anomalies - 6 (16.7%), terminations of pregnancy - 31 (86%), one year survival - 5 (13.9%).
The distribution of TGA with IVS (*n*–48): terminations of pregnancy - 3 (6.2%), postnatal deaths – 2 (4%), one year survival - 43 (89.5%).
The distribution of PA with IVS (*n*–27): extracardiac anomalies - 8 (29.6%), chromosomal anomalies – 3 (11%), terminations of pregnancy - 18 (66.6%), antenatal deaths – 1 (3.7%), postnatal deaths – 3 (11%), one year survival - 5 (18.%).
The distribution of PA with CCHD (*n*–39): extracardiac anomalies - 11 (28%), chromosomal anomalies – 8 (20.5%), terminations of pregnancy - 26 (66.6%), postnatal deaths – 4 (10.2%), one year survival - 9 (23%).
**P*<0.05 vs. other groups.
There were five errors in the prenatal diagnosis.
Conclusions: Critical congenital heart defects can be diagnosed in fetal life by echocardiography with a high degree of accuracy – 97.6%.
The prognosis of the fetuses with critical congenital heart defects is poor. 68.8% (144/209) of the fetuses with critical congenital heart defects died, including elective terminations.
The precise early diagnosis gives better opportunities for parents to make an appropriate decision and for surgeons to develop future strategies.

C5-3

RESULTS OF THE MODIFIED FONTAN OPERATIONS WITH SIMULTANEOUS ATRIOVENTRICULAR VALVE REGURGITATION REPAIR

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Objective: Until recently, atrioventricular valve regurgitation (AVVR) was considered to be a significant risk factor for Fontan operations. Despite an increasing number of valvular repairs performed during univentricular correction of complex congenital defects, late results of these interventions have not been thoroughly examined. The aim of the study is to evaluate the outcomes of AVV repair performed simultaneously with Fontan operation.
Methods: AVVR was diagnosed in 36 (12%) out of 300 patients who underwent modified Fontan procedure during the years 1983-2005. Severity of regurgitation was graded on a scale from 1+ to 4+ by color Doppler echocardiography. Results of interventions were compared in two groups of Fontan patients in which AVVR was corrected (*n*=15) or remained untreated (*n*=21). Methods of AVVR repair included annuloplasty, leaflet cleft repair, plastic reconstruction of common AV valve, closure of the valve or its replacement. The duration of follow-up in groups with corrected and non-corrected AVVR did not differ and reached 4.0±3.2 years and 4.6±3.4 years, respectively.
Results: In the compared groups, 12 (80%) patients with corrected AVVR and 18 (86%) patients with non-corrected AVVR survived after surgery (*P*>0.05). However, late results in patients with corrected AVVR were significantly better. There was no late mortality. The majority (92%) of patients were in NYHA classes I-II. The severity of AVVR significantly declined compared to pre-operative levels, and was as low as 1.1±0.8+. On the contrary, only 50% of patients with non-corrected AVVR were in NYHA classes I-II (*P*<0.01). Four (19%) patients died of heart failure. Postoperative AVVR did not change compared to pre-operative level, reached 2.5±0.8+, and was significantly higher than in patients with corrected AVVR (*P*<0.01).
Conclusions: Surgical repair of AVVR performed together with modified Fontan operation provides good late results. Non-corrected AVVR significantly worsens the outcome of Fontan procedure.

C5-4

VALVED BOVINE JUGULAR VEIN CONDUIT FOR RIGHT VENTRICULAR OUTFLOW TRACT RECONSTRUCTION: MID-TERM RESULT

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Objective: Several type of conduits have been used for surgical reconstruction of right ventricular outflow tract congenital anomalies with RVOT obstruction. Young age, small-size conduits and hypoplastic pulmonary branches remain risk factors for conduit failure. Furthermore, the availability of small-sized graft required for paediatric patients remains a limiting factor. Aim of our study is to evaluate the durability, resistance and biological tolerance of the Contegra® conduit, a valve-containing bovine jugular vein.
Methods: The mid-term results (follow-up time 3-75, mean 25.1 months) of RVOT reconstruction with Contegra were retrospectively analyzed in 118 patients. This series consisted of: nineteen patients with pulmonary atresia with VSD, two PA, 44 TOF, 11 truncus, nine complex TGA, nine DORV, seven failed conduit, 17 pulmonary valve incompetence. The patients age ranged from 1 month to 53 years (mean 28.1±83.3 months), weights were from 3.3 to 83 kg (mean 11.1±14.8 kg), Nakata Index varied from 110 mm^2/m^2 to 578 mm^2/m^2 (mean 275.6±124.2 mm^2/m^2). Associated anomalies were present in 40 patients (33.8%). 78/118 patients (66.1%) had already received palliative operations or interventional catheterism. The Contegra conduit sizes varied in diameter between 12 and 22 (12: 34.7%; 14: 33.05%; 16: 8.4%; 18: 9.3%; 20: 5.08%; 22: 9.3%). We implanted 43 unsupported Contegra and 75 supported.
Results: ICU stay mean time was 56.9 h. Hospital mortality was 24/118 patients (20.3%). Patients discharged from hospital underwent echocardiographic evaluation of: conduit diameter, valve incompetence, mean and max gradient, PRV/LV, presence of degeneration/intimal proliferation, study of the ventricles. There were three late deaths and none of them was conduit-related. Five patients required reinterventions (5.4%) for stenosis at the distal anastomosis or conduit aneurysm. The interval from conduit implantation to reintervention ranged from 2 to 24 months. Percutaneous interventions were performed in seven patients (7.6%) for pre-existing stenosis of the pulmonary arteries. During follow-up two patients developed severe conduit valve incompetence, in eight patients the max gradient increased up to 60 mmHg, no one developed structural deterioration of the conduit. Overall survival was 77.2% (91/118).
Conclusions: The Contegra conduit offers a valid alternative for RVOT reconstruction, if compared to other homograft. Clinical advantages are greater availability in sizes from 12 to 22, easy implantation, no surgical bleeding, no need of anticoagulations. Mid-term freedom from dysfunction is good; long-term durability must be determined. The presence of distal stenosis or conduit aneurysm is always related to pre-existing hypoplasia of pulmonary branches. The Contegra conduit is currently our choice for RVOT reconstruction.

C5-5

INTERVENTIONAL THERAPY FOR TACHYARRHYTHMIAS IN INFANTS

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Objective: Our experience of treatment 1st year children with tachyarrhythmias.
Methods: During 5 year period (2001–2006) 25 patients at 1st year of life with tachyarrhythmias, such as WPW syndrome, atrial flutter, ectopic tachycardia were treated in our centre. Fifty percent were infants under

3 months of age. Some of them had associated cardiac defects (ASD, VSD). Minimal weight was 2.5 kg. Male-female ratio was 3:1. Four cases diagnosed in fetus. Fifteen patients suffered WPW syndrome, only four of them were with manifested WPW syndrome. Medication treatment included amiodarone (83%), digoxin (42%). Nine infants were with atrial flutter, and half of them had congenital cardiac defects. One child of 7 months old suffered ectopic atrial tachycardia. In all patients clinical manifestation included paroxysmal atrial tachycardia, poor feeding, pallor, rarely – perioral cyanosis. Physical examination revealed one stage of CHF in 91.6% of infants and 2A stage in 8.4% patients. Two-dimensional echocardiography showed low cardiac output (EF – 32%), LV dilatation, MV insufficiency. Infants with WPW syndrome usually had ortodromic reciprocating AV tachycardia with heart rate 180-200 bpm. Indications for interventional therapy were: sustained SVT, ineffective medical treatment, signs of CHF, echo-signs of cardiopathy. Topical diagnosis of accessory pathways and ectopic atrial tachycardia was the main principle of electrophysiological study.
Results: Twenty-one patients underwent invasive electrophysiological study. In four newborns with atrial flutter transesophageal high-frequency stimulation was performed. Infants with WPW or ectopic tachycardia without any congenital heart defects underwent catheter ablation. Left accessory pathways dominated (*n*=9), right (1) and septal (5) were less common. The procedure took 120+20 min (av. time), fluoroscopy time – 17+4 min. In six infants with tachyarrhythmias and associated cardiac defects both 'problems' were eliminated during one-stage surgical treatment. RFA was successful in 96%. In one patient with left accessory pathway we could not achieve an appropriate result, that's why he underwent open heart surgery. There were no complications after interventions. Control examination in 3–12 months after intervention showed good results, absence of SVT and CHF.
Conclusions: Infants with tachyarrhythmias become symptomatic and may cause critical condition in 1st year of life. Interventions approved in patients with CHF, cardiopathy signs and ineffective medical therapy. RFA in management of WPW syndrome is highly effective in this group of patients.

C5-6

MID-TERM ASSESSMENT OF THE RECONSTRUCTED ARTERIES AFTER THE ARTERIAL SWITCH OPERATION

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Objective: The arterial switch operation (ASO) is currently the preferred treatment of transposition of the great arteries (TGA). In the long-term, there are some concerns about the fate of the neo-arterial trunks.
Methods: Since 1993, 105 neonates underwent ASO. Seventy-one patients had simple TGA and 34 patients had TGA with VSD, including eight patients with Taussig-Bing anomaly. Aortic arch pathology was associated in 12 patients. Late follow-up was focused on the assessment of neo-aortic valve function, residual LVOTO, residual RVOTO and time-related size measurement of both neo-arterial roots after ASO.
Results: Within a mean follow-up of 4.7±3.9 years (1 month – 13 year), 17 reinterventions were performed in 13 patients. Freedom from reintervention at 1 and 5 year was respectively 98.5% and 96.9% for TGA/IVS, vs. 64.5% and 63.0% for TGA/VSD. Mainly TGA with VSD (*P*=0.04) and aortic arch anomaly (*P*=0.07) predisposed to later reintervention. At least trivial aortic regurgitation was found in 32% in TGA/IVS vs. 59% in TGA/VSD (*P*=0.01), with subsequent worsening with 1 grade in 23%. Aortic regurgitation (AR)=grade 2 developed in 9% in TGA/IVS vs. 24% in TGA/VSD (*P*=0.05). A VSD (*P*=0.02) and major pulmonary to aortic annulus size discrepancy (P/A ratio >1.5) (*P*=0.01) were significant predictors for some aortic regurgitation. Multivariate time-related regression analysis revealed only the duration of follow-up as main determinant of late AR=2 (*P*=0.04). Aortic root dilation was promoted by a VSD as the mean aortic sinus z-score was 3.23 in TGA/VSD vs. 2.11 in TGA/IVS. However, the growth was similar for both groups. In presence of significant AR, the aortic sinus z-score was even higher (3.38 vs. 2.25) with increased growth or dilation. Some LVOTO was noticed in 21% in TGA/VSD vs. 2% in TGA/IVS, and correlated significantly with a P/A ratio >1.5 (*P*=0.016). Concerning the RVOT, increased flow velocity was observed in 46%, located at the pulmonary branches in 70%. The gradient exceeded 30 mmHg in three patients, resulting in two reoperations for significant RVOTO.
Conclusions: After ASO, the neo-aortic root is larger than normal and may precede significant progressing aortic regurgitation, particularly in presence of underlying severe aortic – pulmonary annulus discrepancy. Since the factor time is the most important factor of late neo-aortic valve dysfunction, further serial surveillance after ASO is mandatory.

C5-7

EXTRACORPOREAL MEMBRANE OXYGENATION FOR INTRAOPERATIVE CARDIAC SUPPORT IN CHILDREN WITH CONGENITAL HEART DISEASES

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Objective: Extracorporeal membrane oxygenation (ECMO) is commonly used in both children to allow recovery from ischemic injury or cardiac surgery, to support the circulation in patients with cardiomyopathy, and as a bridge to transplantation. It has achieved success in providing cardiac support for this group of patients with expected mortality due to severe myocardial dysfunction. In this modern era, no pediatric patients with cardiopulmonary failure should be allowed to die without considering the use of ECMO support. We report our experience in pediatric patients supported by extracorporeal membrane oxygenation (ECMO) for intraoperative circulatory failure between January 1987 and December 2005.
Methods: Sixty patients with mean age of 5.11±5 years and mean weight of 15.7±6.9 kg had intraoperative ECMO support for failure to wean off cardiopulmonary bypass (*n*=38, 63.3%), low output syndrome (*n*=8, 13.3%), right ventricular failure (*n*=6, 10%), left ventricular failure (*n*=3, 5%), malignant arrhythmia (*n*=1, 1.7%), pulmonary hypertension (*n*=2, 3.3%) and repeated resuscitation (*n*=2, 3.3%).
Results: Mean duration of ECMO support was 4.98 days±1. Thirty patients (50%) had full myocardial recovery and were successfully weaned and discharged. Four patients eventually underwent heart transplantation and another one is still awaiting for available donor. There was impossibility of weaning in 16 (26.6%) patients because of multi-factorial complications, i.e. cerebral coma, massive cerebral hemorrhage, pulmonary failure, consumption coagulopathy and therapy-resistant myocardial insufficiency, and eventually succumbed. Ten (16.7%) patients did not survive after decannulation. Overall mortality on ECMO as intraoperative cardiac support was 43.3% and overall survival was 56.7%.
Conclusions: Our experience shows that ECMO support can be offered intraoperatively to any patient with potentially reversible pulmonary, cardiac or cardiopulmonary failure, excluding those whose outcome is inevitable. In the majority of patients who did not survive late after weaning from ECMO support, significant myocardial dysfunction persisted or pulmonary hypertensive events. Nevertheless, a large portion of patients who were successfully weaned from ECMO ultimately survived to leave the hospital.

C5-8

RESULTS OF SURGERY FOR EBSTEIN'S ANOMALY IN INFANTS

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Objective: We sought to analyze the early results of valve replacement for this rare malformation in children.
Methods: The records of 28 patients (patients age ranged from 12 months to 3 years, median age 2.3 years) who underwent surgery for Ebstein's anomaly between 1/2000 and 10/2006 were reviewed. Most patients were symptomatic, 46% had significant functional impairment (NYHA class III), 22% in NYHA class IV, 32% in NYHA class II preoperatively. All patients had atrial communication (patent foramen ovale or ASD), in 14% revealed other congenital heart defects. Surgical procedures included valve replacement with biological valve 'Bionics' (*n*=20), 'Medtronic Mozaic' (*n*=4), 'Biogliss' (*n*=1) and mechanical valve 'Medinge' (*n*=1), one and a half ventricular repair (*n*=16). Dimensions of prosthethic valves ranged from 23 to 28 mm.
Results: There were four hospital deaths (operative mortality 14.2%). All patients were significantly symptomatic in NYHA class III-IV. Causes of death included cardiac (low cardiac output, right ventricular failure, arrhythmias) and non-cardiac (multiple organ failure). We did not perform 1&1/2 ventricular repair in three cases, and in one case this procedure was prolonged – and made in 3 days later first surgical operation.
Conclusions: The biological valve replacement for Ebstein's anomaly in infants is rare surgical procedure. However, we report valve repair in infants preferred procedure. Also patients with one and a half ventricular repair have benefited from the unloading effect of a supplementary cavopulmonary shunt with consequent reduced hospital mortality due to right ventricular failure. The results of valve replacement surgery for Ebstein's anomaly in infants can be assumed as satisfactory.

C5-9

TEMPORARY CARDIAC ASSIST DEVICES FOR PEDIATRIC POSTCARDIOTOMY SUPPORT: 8 YEARS EXPERIENCE

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Objective: Postcardiotomy cardiac failure often occurs after repair of complex congenital heart defects and frequently requires the use of temporary circulatory assist devices. We report our 8-year institutional experience of the using of intraaortic balloon pump (IABP) and extracorporeal membrane oxygenation (ECMO) in the treatment of postcardiotomy heart failure in children.

Methods: Since 1998 till 2006 IABP was used for circulatory support with postoperative left ventricular failure in 30 patients (age 2–15 years, median 4.5 years). The weight of the children ranged from 9 to 35 kg. In all cases IABP was used at the early postoperative period. The pumping module used was the Datascope System 98 XT, modified with a pediatric safety chamber. The volume of intraaortic balloons ranged from 5.0 to 12.0 cc.

During this period 45 children (age 2 days to 7 years, median 7 months) with postoperative biventricular failure required ECMO after repair of complex congenital heart defects. ECMO was used conditions, when weaning from CPB was impossible, because of total biventricular failure. In all cases, ECMO implantation was performed perioperatively through the right atrium and ascending aorta. In all cases, we used an ECMO circuit that composed of oxygenator, 'Biopump' centrifugal pump and heat exchanger. Hemofiltration was applied in 35 patients.

Results: Duration of IABP therapy varied from 3 to 45 h. Complications occurred in two patients (2 of 30, or 6.6%). Overall survival was 53.3% (16 of 30).

Duration of ECMO ranged from 4 to 240 h (median=76 h). Twenty patients (20 of 45, or 44.4%) were successfully weaned from ECMO. Of these, only seven children (7 of 45, or 15.5%) were discharged from the hospital.

Conclusions: IABP could be a useful tool to support children with left ventricular failure. It is very important to use IABP at the proper time, because delay (until cardiac output is critically low) gives patient no chance for survival.

ECMO still plays an important role in the treatment of children with circulatory failure because of its ability to provide biventricular support. Regardless of the fact that, in our case ECMO was associated with substantial complications and high mortality, none of the five of our surviving patients would have survived without ECMO.

C5-10

LATE RESULTS OF FONTAN OPERATION: COMPARISON OF DIFFERENT TECHNIQUES

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Objective: Modified Fontan operations are thoroughly used for the surgical treatment of complex anomalies with functionally single ventricle. However, late mortality and morbidity after these procedures still remains a matter of concern. The aim of this study was to compare the late results of different Fontan techniques.

Methods: This is a retrospective analysis of the postoperative follow-up in 227 of a total of 315 patients subjected to different methods of Fontan procedure during the years 1983-2005. Eighty six of them were after total cavopulmonary anastomosis, 72 – after atrio-pulmonary anastomosis, 63 – after extracardiac conduit, and six – after atrio-ventricular anastomosis. The mean time of follow-up reached 7.5 years (range, 1-22 years). The mean follow-up time was the longest after total cavopulmonary anastomosis (9 years), and the shortest - after extracardiac conduit (3 years). The methods of follow-up examination included echocardiography, cardiac catheterization, and bicycle ergometry.

Results: The lowest late mortality rate of 5% occurred after extracardiac conduit, and the highest (18%) - after atrio-ventricular anastomosis ($P<0.01$). The best functional results were achieved after extracardiac conduit and total cavopulmonary anastomoses. The number of patients after these operations, who were in I-II New York Heart Association (NYHA) classes, reached 92% and 74%, correspondingly. Functional status of patients after atrio-pulmonary and atrio-ventricular anastomosis was worse: the percentage of patients in I-II NYHA classes was as low as 67% and 50%, correspondingly. Late complications, which happened more frequently in high risk candidates during the first several years after surgery, included congestive heart failure, protein-losing enteropathy, and arrhythmias. Arrhythmias occurred more often after atrio-ventricular and atrio-pulmonary anastomosis. Late complications after atrio-pulmonary and atrio-pulmonary anastomosis were mainly caused by blood congestion in the right atrium typical for these methods of correction. More than 90% of complications following total cavopulmonary anastomosis and extracardiac conduit resulted from a different hemodynamic profile caused by the stenosis of pulmonary branches or caval veins, recanalization of the pulmonary trunk or the presence of major aorto-pulmonary collaterals.

Conclusions: The follow-up after different Fontan techniques has shown that the best late results are achieved in patients with extracardiac conduit and total cavopulmonary anastomosis. However, longer period of follow-up after extracardiac conduit is needed for the comparison of these methods of hemodynamic correction.

C5-11

SURGICAL TREATMENT OF PATIENTS WITH CONGENITAL DISORDERS OF BLOOD CIRCULATION IN THE AORTIC ARCH BRANCHES

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Objective: To analyze reasons of blood circulation disorders in subclavian arteries and to evaluate results of surgical treatment of congenital disorders of the aortic arch and its branches.

Methods: We analyzed the results of surgical treatment of 1546 patients with coarctation syndrome with/or without associated pathology of the aortic branches.

The systolic pressure gradient between upper limbs variated from 25 to 120 mmHg (average gradient – 48+5 mmHg) in patients with an average age of 16+0.9 (3–56) years.

We revealed 106 patients (6.9%) with blood circulation disorders in one or both subclavian arteries. Frequency of a. Luzoria in the research group contained 31 cases (2%).

The main reasons of blood circulation disorders in subclavian arteries:

- left subclavian artery:

1) Atypical coarctation of the aorta (between left common carotid artery and left subclavian artery) – 20.8%
2) Coarctation of the aorta with aortic arch and left subclavian artery hypoplasia – 20.8%
3) Kinking of aortic arch with coarctation syndrome and blood circulation disorder in left subclavian artery – 24.5%
4) Congenital atresia of the aortic arch – 3%- right subclavian artery (A. Lusoria)
5) Coarctation of the aorta and A. Lusoria – 29.3%

Into special group we put 12 patients (11.3%) with blood circulation disorders in both subclavian arteries:

1) Coarctation of the aorta with position of both subclavian arteries lower than coarctation – four cases
2) Aortic arch kinking, coarctation syndrome, A. Lusoria – six cases
3) Coarctation of the aorta, aortic arch and left subclavian artery hypoplasia, A. Lusoria – two cases.

Results: Satisfactory clinical and anatomic results were obtained in 1504 patients (97.3%). Restoration of the direct blood flow in subclavian artery was performed in all cases with detected anomaly of subclavian arteries.

Analysis of paraplegia reasons in four patients from 1546, operated on with congenital pathology of isthmus of the aorta (kinking, coarctation, aneurysm), detected that all of them had ischemic nature and in all four cases abberant disposition of aortic branches took place.

In spite of the average aortic clamping time 14+6 min and absence of hemorrhagic complications cross-clamping of the aortic arch and both subclavian arteries without preventive neuroprotective methods, led to the mentioned dramatic complications.

Conclusions: Reconstructive operations in patients with congenital anomaly of the aortic arch and blood flow disorders in subclavian arteries have to be performed with preventive neuroprotective methods, such as cardio-pulmonary bypass, regional hypothermia and medicine protection.

May 18, 2007 2nd Congress Day 16:30-18:30 2nd Cardiovascular Scientific Session

CV2-1

THE MID-TERM RESULTS OF TEVAR FOR DESCENDING THORACIC AORTIC PATHOLOGIES

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Objective: Nowadays, strategy for treatment of thoracic aortic aneurysm, especially for descending aorta have been changed with advent of thoracic endovascular aortic aneurysm repair (TEVAR). However, it is still argued whether TEVAR is totally indicated or not for thoracic aortic diseases because long-term result of TEVAR is not reliable. In this study, we investigated the result of TEVAR for descending thoracic aortic pathologies in our institution.
Methods: From November 1999 to December 2006, 56 patients (40 male and 16 female) with a mean age of 70 years (range 20-85 years) underwent TEVAR for descending thoracic pathologies (45 degenerative, six dissected, three infective and two traumatic aorta diseases), 13 of which were emergent rupture cases. There were 28 fusiform and 20 saccular aneurysms, three of which were mycotic aneurysms. As for the risk factors, 16 patients (28.6%) had chronic obstructive pulmonary disease (COPD) and five (8.9%) had cancer. The stent grafts used were 43 Giantruco Z stents (Cook) covered with woven dacron grafts and 11 Matsui-Kitamura nitinol stent grafts.
Results: TEVAR was successful in 87.5% (49/56) of patients. The aneurysm regression rate (defined: aneurysm diameter was 5 mm shorter for more than 6 months) of fusiform, saccular and dissected type was 73.3%, 90.0% and 100%, respectively. We had five surgical conversion cases (one graft migration, one graft kinking, three iliac injury). As for the patients with iliac injury, their mean height and body weight (BW) was 149 cm and 43 kg, respectively, both of which were smaller than those of patients without iliac trouble (mean height 159 cm, BW 59 kg). The 30-day mortality of TEVAR was 5.4% (3/56), two of which were emergent cases. There were nine endoleak cases (5 type I, 2 type II, 2 type III), four of which were caused by kinked graft deployed at distal arch or little bit tortuous aorta near diaphlagma. Actuarial survival at 1, 3 and 5 years was 87.2%, 84.9% and 71.6% respectively. Major aortic event-free survival of 1, 3 and 5 years was 71.8%, 55.6% and 48.7%, respectively.
Conclusions: TEVAR for descending thoracic aortic pathologies, especially saccular or dissected aneurysm could be alternative for open surgery at high risk patients. The indication of TEVAR should be cautious, especially for patients with small heights or tortuous aorta.

CV2-2

STENT-GRAFTING FOR ACUTE TYPE B AORTIC DISSECTION: MID-TERM RESULTS IN A SINGLE CENTER EXPERIENCE

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Objective: To analyze our experience in the treatment of acute type B aortic dissection with thoracic endografts.
Methods: A retrospective analysis was performed of the patients treated, in our center, due to acute complicated type B dissection (TBD). From 2001, among 45 patients observed with acute TBD (symptom onset <2 weeks) 14 (31.1%) (mean age: 53aa; 12 men) underwent a thoracic aortic endograft implantation. Indications for intervention included: persistent thoracic pain (ten cases), intractable hypertension despite optimal medical therapy (six cases), end-organ ischemia (three cases), signs of impending rupture (one case), leg ischemia (one case). Two different stent-grafts were used: Talent® in twelve patients, Excluder® in 2. After discharge, CT controls were undertaken at 1, 6, 12 months and then, in absence of complications, yearly.
Results: Procedure was successfully carried out in all cases. There were two perioperative deaths (mortality of 14%), no cases of paraplegia, a post-implant syndrome in 45% of patients and one case of acute renal impairment requiring temporary hemodialysis (7%). Average follow-up was 34 months±8 (range 3-60). Two patients deceased during follow-up due to comorbidities. Overall 1 and 3 years survival rate, including hospital mortality, was respectively 85.7 and 64.3%. In five patients (37.5%) the exclusion of the left subclavian artery was necessary without any cerebrovascular or limb complication. We had a satisfactory thoracic aortic wall remodelling in all cases and aortic rupture did not occur in this series; in two patients (16.6%) we observed the onset of retrograde flow within the false lumen of the thoracic dissection between the stent graft and the aortic wall. Only in one case was necessary the deployment of an additional distal endovascular component. Six patients had persistent dissection in the abdominal aorta but, in only one (16.7%) the aortic enlargement required a surgical approach. After 18 months one female patient experienced a distal progression of dissection that involved the left renal artery leading to kidney malperfusion that we successfully treated with renal stenting. The average free of events survival rate at 1 and 3 years was respectively 85.7% and 46.7%.
Conclusions: The endovascular treatment for acute TBD can be performed with an acceptable morbidity and mortality rate. Stent graft seems to be efficient in reducing the risk of aortic rupture in the mid-term. Nevertheless, the challenging features of this disease together with its insidious nature make mandatory a close and life-long follow-up.

CV2-3

INTENTIONAL LEFT SUBCLAVIAN ARTERY OVERSTENTING DURING THORACIC EVAR: PRIMARY REVASCULARIZATION OR NOT?

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Objective: Thromboembolic cerebrovascular accidents (CVA) are a serious complication after EVAR of thoracic aortic pathologies, mostly when the covering of the left subclavian artery (LSA) is required to achieve an adequate proximal landing zone. Requirement of LSA revascularization is open to debate. We report our strategy to heighten the discussion.
Methods: Out of 70 patients undergone EVAR for thoracic aortic pathologies, between March 2001 and June 2006, 15 patients (21.4%) had an intentional LSA coverage: six (40.0%) patients for descending thoracic aortic aneurysms (DTA) and nine (60.0%) for acute type-B aortic dissection. CVA preoperative risk assessment includes: a) color-duplex scanner and angiography to determine the extracranial cerebral circulation and the Willis circle supply; b) spiral computed tomography (CT) to detect the aortic arch atheromasia seriousness. In all patients a Free-Flo Talent stent-graft was used. Intraprocedural angiography and discharge CT scan were performed to confirm successful deployment. Follow-up included clinical examinations and serial CT scan.
Results: No primary LSA revascularization was performed because the preoperative evaluation showed absence of significant obstruction of extracranial arteries, a patent Willis circle and a moderate aortic arch atheromasia. The LSA overstenting was followed by a differential in systolic blood pressure between the right (134.2±13.6 mmHg) and left arms (97.8±23.1 mmHg). No fatal or neurological complications or subclavian steal phenomena and/or left arm ischaemia occurred; one patient (6.7%), with moderate aortic arch atheromasia, experienced transient left amaurosis. At follow-up, two (13.4%) deaths were observed: one procedure related, 13 months after EVAR. No endoleak or CVA were observed.
Conclusions: Despite the relative ease and low morbidity of LSA revascularization, major complications as thoracic duct leak, Horner syndrome, besides risk to the recurrent and vagus nerves, can be observed. Nevertheless a primary LSA revascularization is mandatory in patients with ipsilateral dominant vertebral artery or obstruction of an internal carotid artery or left internal mammary artery used as a bypass conduit, even if the embolic risk from arch atheromasia cannot be avoid. Otherwise, following described diagnostic protocol, the intentional LSA coverage without primary revascularization, can be considered as a safe procedure.

CV2-4

DESCENDING THORACIC AORTA DISEASE: ENDOVASCULAR VS. OPEN REPAIR

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Objective: Recent enthusiasm for innovative endovascular therapies to treat aortic disease has encouraged many centers to investigate endoluminal grafting of the thoracic aorta. Aim of the study was to compare results of the endovascular vs. open repair of thoracic aorta aneurysms, dissections

and ruptures, elective and emergency. Major endpoints were postoperative mortality and morbidity (spinal cord ischemia, cardiac, renal and pulmonary complications).
Methods: From January 2000 to September 2006, 61 patients underwent treatment for thoracic aorta disease. Patients were divided into three groups according to treatment. Group A patients (27 patients, 44.2%) underwent open surgery though left thoracotomy, 48% (13 patients) elective and 52% (14 patients) emergency procedures. Group B patients (22 patients, 36%) underwent endovascular repair, 64% elective (14 patients) and 36% emergency (eight patients) procedures. Group C patients (12 patients, 19.6%) underwent an 'hybrid' repair, consisting into an open procedure followed by endovascular graft placement, 50% elective and 50% emergency.
Results: Total postoperative mortality was 24.5% and morbidity 4.9% (paraplegia). Group A mortality was 29.6% (eight patients), two elective and six emergency patients, whereas morbidity was 15.3% (2 elective patients suffering from paraplegia). Group B mortality was 18.1% (4 patients), one elective and three emergency patients, no morbidity was observed. Group C mortality was 25% (three patients), two elective and one emergency patient, whereas morbidity was 16% (one elective patient suffering from monoplegia).
Conclusions: Endovascular repair seems to reduce mortality and morbidity in selected patients. Whenever feasible, endovascular treatment could represent a valid alternative to open repair. Treatment should be performed in highly specialized vascular surgery units, able to offer the best treatment choice for each patient and to treat complications by both endovascular or open repair.

CV2-5

CHANGES IN CEREBROSPINAL FLUID AND BLOOD LACTATE CONCENTRATIONS AFTER STENT-GRAFT IMPLANTATION AT CRITICAL AORTIC SEGMENT

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Objective: Obstruction of blood flow through the Arteria Radicularis Magna (ARM) or the artery of Adamkiewicz has been linked with ischemic spinal cord injury after conventional thoracic aortic repair. Whether or not endoluminal stent-grafts, deliberately positioned against this artery can cause similar damage to the spinal cord has not been comprehensively investigated. The purpose of this canine study was to assess the blood and cerebrospinal fluid (CSF) concentrations of lactate - a well-known biochemical marker of ischemic neurological injury, before and after stent-graft implantation against the ARM.
Methods: Endoluminal stent-grafting was performed through the transfemoral route in ten mongrel dogs. Devices were constructed using hand-made Z-stents of 316L stainless steel covered with thin-walled dacron fabric. In five animals (experimental group), stent-grafts covered the fourth and fifth lumbar segmental arteries - which have been described as the canine equivalents to the ARM in humans. In the remaining five animals (controls group), devices of similar length were placed in the lower thoracic aorta. CSF was obtained by cisternal puncture technique at the following time points; before stent-grafting, and 15, 30, and 60 min after stent-grafting. Parallel arterial blood samples were also obtained using a heparinized syringe. All samples were centrifuged and the supernatant fluid was analyzed for lactate using an automated blood gas analyzer (Stat Profile Ultra M; Nova Biomedical Corp, Tokyo, Japan). Neurological status of the animals before and after the procedure was assessed using the modified Tarlov scale.
Results: The mean preprocedural lactate concentration in the CSF was 1.7±0.3 mmol/l. Mean postprocedural levels in the experimental group at 15, 30, and 60 min were 3.1±1.9, 3.9±1.1, and 11.9±2.5 mmol/l, respectively (control values; 2.1±1.9, 2.7±1.1, and 1.9±1.5 mmol/l, respectively). A maximum increase by 800% from baseline ($P<0.001$) was noted in the experimental group 60 min after stent-grafting. Mean preprocedural blood lactate level was 1.8±0.6 mmol/l, while the mean postprocedural concentrations in the experimental group at 15, 30, and 60 min were 2.9±1.2, 3.4±1.7, and 3.9±2.0 mmol/l, respectively. Two out of the five animals in group A suffered transient hind limb weakness (Tarlov score 3).
Conclusions: Selective placement of stent-grafts against the ARM in dogs resulted in a conspicuous increase in CSF lactate concentrations 60 min after the procedure, although it was not always associated with obvious physical signs of spinal cord injury. The true significance of this finding needs to be determined by evaluation of other markers of ischemic neurological damage.

CV2-6

IS INTERVENTIONAL APPROACH STILL REASONABLE FOR TREATMENT OF MALPERFUSION IN TYPE B AORTIC DISSECTION VS. ENDOVASCULAR STENT GRAFTING?

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Objective: Type B aortic dissection with malperfusion caused high mortality if untreated. Lately, endovascular stent grafting (EVSG) for closing entry has been the first option to treat this pathology also in terms of preventing chronic aorta dilation. However, it is reported EVSG might have the miserable complications such as newly type A retrograde dissection or stroke. On the other hand, interventional approach involved in fenestration or enlargement of aortic true lumen is also a less invasive option to relieve malperfusion. In this study, we evaluated interventional approach for malperfusion in Type B aortic dissection compared with EVSG.
Methods: Fourteen patients (eight male and six female) with a mean age of 59 years underwent interventional treatment (fenestration and/or stenting) for malperfusion in type B aortic dissection since 2003. Seven patients had leg, four had renal and three had mesenteric ischemia. Nine patients were treated with fenestration of the intimal flap with two stenting in abdominal aortic true lumen and one stenting in iliac artery. Other procedure is three with stenting for mesenteric, renal and iliac artery respectively, one with percutaneous transluminal angioplasty for renal artery, and one with stenting in abdominal aortic true lumen alone. During the same term, we had six cases of EVSG in chronic type B aortic dissection without malperfusion using Matsui-Kitamura nitinol covered stents with bare edges.
Results: As for the interventional approach, complete relief of malperfusion was achieved in 86% (12/14) of patients. Neither type A retrograde dissection nor stroke were found. The 30-day mortality rate was 21% (3/14), two of which were due to mesenteric ischemia. Actuarial survival of 1 and 3 year was both 77% and Event-free survival of 1 and 3 year was 70% and 56%, respectively. As for the EVSG, five of six cases were successful in entry closure in type B aortic dissection. However, we had one morbidity case of retrograde type A dissection treated by EVSG although three months had passed from the onset.
Conclusions: Interventional approach is a less-invasive and effective procedure for malperfusion in type B aortic dissection. Actually, EVSG has been acknowledged the excellent method to close entry and prevent chronic dilation of aorta. However, it should be reminded EVSG have the risk of type A retrograde dissection or stroke.

CV2-7

ABDOMINAL AORTIC ANEURYSM (AAA) REPAIR AFTER CARDIOPULMONARY BYPASS

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Objective: In the past 13 years, we have surgically treated 25 patients (age 56 to 74 years): elective - 23, urgent - two with AAA. The patients undergo an operative stage procedures during period of 4 to 84 months.
-Surgical strategy: In all patients standard intraoperative monitoring, the routine use of concomitant epidural analgesia, blood autotransfusion by Cell Saver system, aprotinin in reduce bleeding, inferior mesenteric artery replantation in four patients is being used.
Methods: Examination of aortic wall specimens showed significant degeneration and inflammation (of aortic wall).
The proximal anastomosis was done near the renal arteries with insertion graft technique. We haven't experienced any patient for lack of proximal neck in endovascular prosthesis graft insertion.
Results: There were no perioperative signs of myocardial ischemia, renal insufficiency. Vascular complications were seen in two patients - one have paraparesis and second required embolectomy of femoral artery caused by embolic occlusion. One patient died (4%) after operation because of massive bleeding on the 2nd day after operation.
Conclusions:·Every patient before CABG and then yearly after operation have indication for AAA screening.

- Rapid enlargement of AAA not only transversly but also proximaly as well demands aggressive approach to AAA repair, which could be the inflammatory response to cardiopulmonary bypass.
- Coronary bypass surgery is preferable before AAA repair.
- Results of coronary bypass is better in patients with AAA because arteries are relatively large and rarely with multiple lesions.

CV2-8

MYOCARDIAL INSTABILITY IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE

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Objective: Patients who undergo peripheral arterial surgery are known to be at high risk from perioperative cardiac events. Because of their inability to exercise, and therefore stress their myocardium, ischaemic heart disease (IHD) often goes unrecognised in these patients, and standard analysis of resting ECG's does not detect most of this underlying coronary disease. The measurement of QT dispersion (QTd) has been shown in cardiac patients to predict mortality – possibly by detecting underling areas of myocardial damage. Our aim was to compare QTd in patients with lower-limb arterial disease (LLAD) and a control group.
Methods: Casenotes of patients who underwent major surgery for LLAD (above or below knee amputation; peripheral arterial bypass, or lower limb endarterectomy) during 2002 were examined for demographic details, and for analysis of their ECG to determine QT d.
The notes and ECG's of 20 patients undergoing elective hernia repair during the same period were also examined as controls.
Results: Subjects with LLAD had a higher QTd (median [IQR] 60 ms [40-100 ms]) than controls (40 ms [40-80 ms]); P=0.039 [Kruskal–Wallis]).
Subjects with overt IHD did not have a higher prevalence of an abnormally high QTd (>70 ms) (33% of subjects with IHD) compared to those without overt IHD (44%, P=0.245 χ^2 test).
Conclusions: This study provides further evidence that patients with severe LLAD have underlying coronary artery disease. Furthermore, as overt IHD in these patients was not associated with higher QTd, it appears that many patients with diseased coronary arteries are not being recognised as such. QTd may therefore be useful in identifying such individuals, in the absence of more traditional criteria.

May 18, 2007 2nd Congress Day
16:30-18:30
3rd Vascular Scientific Session - ESCVS Young Vascular Surgeon Prize

V3-1

DUPLEX SCREENING FOR ASYMPTOMATIC CAROTID ARTERY DISEASE AFTER PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY

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Objective: The association between internal carotid artery [ICA] stenosis and coronary artery disease is well established. The aim was to evaluate the prevalence of asymptomatic mild [30-49%], moderate [50-69%] and severe (70-99%) ICA stenosis in patients who underwent previous coronary angioplasty (PTA).
Methods: After obtaining ethics committee approval 144 consecutive patients aged between 65 and 75 years were invited for carotid duplex evaluation with a linear 6 MHz array transducer by trained vascular sonographers within a single unit. A peak systolic velocity >230 cm/s in the ICA was considered as significant (>70% stenosis).
Results: Of the 144 patients approached, 118 (82%) attended (male:female ratio 3.2:1, age range 65-75, median age 71 years). Duplex ultrasound revealed one occlusion, 70% or more ICA stenosis in three patients (3%), 50-69% stenosis in 12 patients (10%) and 30-49% stenosis in 29 patients (25%).
Conclusions: Carotid artery disease with a luminal stenosis of 30% or more is common in patients who underwent previous PTA [38%]. The yield of significant ICA stenosis [70% or more], which would benefit from carotid endarterectomy according to the Asymptomatic Carotid Surgery Trial is low [3%]. Recommendation for initial screening and subsequent follow-up duplex examination for evaluation of disease progression of such cohorts remains debatable.

V3-2

CAROTID ENDARTERECTOMY BY EVERSION: A TEN-YEAR EXPERIENCE WITH 360 PATIENTS

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Objective: Carotid endarterectomy (CE) by eversion has technical advantages over CE by a longitudinal arteriotomy: it eliminates the need to use a patch for closing the arteriotomy, therefore it is a much more expeditious technique and it eliminates the need to use a shunt.
However, the long-term durability of CE by eversion has not yet been well established. We here report our ten year's experience with this technique.
Methods: Between March 1997 and December 2006, 360 consecutive patients (234 men 126 women, mean age 72 years, range: 44-92 years) underwent 387 CE by eversion. Of those 360 patients 116 (32%) were symptomatic (TIA, Amaurosis fugax or RIND) and 244 (68%) were asymptomatic (carotid stenoses >70%).
The technique for CE was as follows: the common carotid artery was obliquely transsected about 1 cm proximally to the carotid bifurcation and the internal and external carotid arteries were both endarterectomized by eversion. Reanastomosis was done with a 6/0 continuous suture.
Duplex scans were obtained from every patient before discharge and then six weeks, three months, six months and every year after the CE.
Results: Early results: the mean internal carotid artery cross clamping time was 13 min (range: 5-32 min). There were no death, one stroke and three TIAs (1%). Twenty (5%) patients had a transient palsy of a cranial nerve (recurrent or hypoglossal nerves). There was also one reoperation for bleeding.
Late results: mean follow-up is now 44 months. Forty patients died of whom two of a stroke. There were also two non fatal strokes. One asymptomatic occlusion of the internal carotid artery was diagnosed 6 weeks post operatively. Four patients developed also a asymptomatic restenosis due to intimal hyperplasia (6 to 18 months postoperatively). These four patients were reoperated on without any death nor any central or peripheral neurological complication.
Conclusions: In our experience carotid endarerectomy by eversion is a reliable and durable operation.

V3-3

CAROTID ARTERIAL STIFFNESS AS A POTENTIAL PREDICTING FACTOR OF IMPENDING RESTENOSIS FOLLOWING CAROTID SURGERY

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Objective: Restenosis following carotid surgery remains a problem, not being solved by CAS. Furthermore, available data suggest, that the incidence of restenosis following carotid artery stenting may even be higher, than that of patients following conventional carotid endraterectomy.
Our objective was to search for independent morphological risk factors enabling to predict the occurrence of carotid restenosis. The hypothesis was that the elasticity of the carotid artery wall may be related to the occurrence of restenosis following carotid endarterectomy.
Methods: Ninety consecutive patients undergoing carotid endarterectomy between October 2005 and June 2006 were prospectively reviewed. All patients underwent a detailed US exam of their carotids performed according to the accepted study protocol. Elasticity of carotid arteries was assessed by Wall Tracking System VED from IFTR PAS performed at three stages: prior surgery, one day post surgery and three months after surgery. Following factors were taken into analysis: coefficient-a (determinant of artery's elasticity), carotid plaque morphology (GSM histogram), type of surgery (classic TEA, patching vs. eversion technique) and classic risk factors for atherosclerosis. The data were processesed statistically using a Stata 7.0 program. For comparison of mean coefficient-a value, a variety analysis for repeated measurements was applied. P<0.05 was regarded as significant.
Results: Out of 90 patients included in the study, 78 had no restenosis (86.6%) while among remaining 12 restenosis was detected (13.4%). Patients with no restenosis (group I) had a significantly stiffer carotid arteries (P<0.0001) as compared to the group with restenosis. At the time of II-nd measurement, the differences regarding carotid elasticity among the two groups were not significant. At measurement III, all 12 patients from group II (restenosis) had a significantly higher values of coefficient-a than the patients from group I

(P<0.0001). The results of multivariate analysis of classic risk factors showed no correlation between the two analyzed groups (P=NS). Surprisingly, the average GSM values between the two analyzed groups also did not substantially differ (P=NS). Also, no correlations were found between the types of operation (classic TEA, patching vs. eversion technique).
Conclusions: 1. Carotid arterial stiffness as measured by coefficient-a may be related to processes leading to the development of restenosis following carotid surgery. 2. Further studies should be advocated to confirm this report and to explain potential mechanisms of this phenomenon. 3. Carotid plaque morphology assessed by the GSM method does not allow predicting the incidence of carotid restenosis.

V3-4

ABDOMINAL AORTIC ANEURYSMS: FACTORS INFLUENCING RUPTURE

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Objective: To identify the influence of differnet clinical, genetic and biochemical factors on abdominal aortic aneurysms (AAA) rupture. The aim of the study is to investigate any predictorous influnece on AAA rupture by: aneurysmal diameter, age, sex, smoking, diabetes mellitus, arterial hypertension, CAD, POVD, COPD, polimorphysm of the genes responsible for synthesis of MMP-9 and apoE, as well as the serum concentrations of MMP-9, MMP-2, and TIMP-2.
Methods: Study included 63 patients treated surgically because of AAA between 2005 and 2006. Out of them there were 30 elective (27 male and 3 female; aged 66.2±7.5 year), and 33 urgent procedures due to aneurysmal rupture (29 male and four female patients aged 69.7±7.5 year). Aneurysmatic diameter is measured by CT scan prior to operation. Electivelly operated patients had AAA with more than 5 cm in diameter. For gene analysis is used DNA isolated from lymphocites by 'solting out' method. Polymorphism analysis of genes MMP9 C-1562T and ApoE in 112 and 158 codoms, is done by PCR/RFLPs method. (PCR-polymerase chain reaction; RFLPs-restriction fragments lenght polymorphism). The concentration of MMP-2, TIMP-2 in serum is measured by ELISA method, while the MMP-9 concentration by specific colored supstrate for this enzyme.
Results: Approximate value of aneurysmal diemeter in the group of urgently operated patients due to rupture (82.5 mm; 40-110 mm) was siginificantelly larger than in the group of electively operated patients (74.1 mm; 40-100 mm). (Mann–Whitney test, Z=2.42, P=0.016). Urgently operated patients with aneurysmal rupture were siginficantely older compared to electivelly operated ones. (Mann–Whitney test, Z=2.131, P=0.033). MMP-2 and TIMP-2 serum values were significantely higher in patients with ruptured AAA.
Conclusions: Patients with ruptured AAA were significantely older. They had aneurysm of the larger diameter, more often had COPD and siginficantely higher MMP-2 and TIMP-2 values.

V3-5

PREDICTORS OF OUTCOME AFTER ABDOMINAL AORTIC ANEURYSM RUPTURE - THE EDINBURGH RUPTURED ANEURYSM SCORE

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Objective: Many surgeons adopt a selective policy of intervention for ruptured abdominal aortic aneurysm (AAA). This study aimed to develop an objective method of identifying patients suitable for attempted repair.
Methods: Consecutive patients selected for attempted repair of ruptured AAA over a 31-month period (January 2000 to July 2002) were entered into an observational study. Fifty-eight preoperative physiological and biochemical variables were recorded and related to operative outcome.
Results: One hundred and five patients underwent attempted repair of a ruptured AAA. There were 39 (37%) deaths in-hospital or within 30-days of operation. On univariate analysis, haemoglobin <9 g/dl (P=0.038), BP<90 mmHg (P=0.036) and Glasgow Coma Scale <15 (P=0.016) were found to be risk factors that predicted death. Of 70 patients with no or one risk factor, 20 (29%) died. Of 30 patients with two factors, 15 (50%) died, and of the five patients with all three factors, four (80%) died. There was a significant association between mortality and cumulative risk factors (P=0.003).
Conclusions: These data represent a novel, predictive risk model for patients with ruptured AAA. The component risk factors are easily assessed in the emergency setting and can accurately inform preoperative risk stratification to support patient selection.

V3-6

HYBRID TREATMENT OF AORTIC ARCH, THORACOABDOMINAL AND MULTILEVEL AORTA DISEASE

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Objective: Aorta diseases can have a crucial localization, such as aortic arch and thoracoabdominal aorta. Moreover, the aorta can be affected by multilevel disease, involving abdominal and thoracic segments at the same time.
The aim of our study was to analyze our experience in the hybrid treatment of these complex aorta lesions.
Methods: From January 2000 and January 2005, 966 patients underwent abdominal aortic aneurysm repair. During the same period, 72 patients were treated for different thoracic aorta diseases. A hybrid treatment was electively performed in 15 cases. All patients were 15 males, with a median age of 75 years (range 68 to 84 years): six for aortic arch aneurysm (AA), four for thoracoabdominal aneurysm (TAAA), which required surgical revascularization of all visceral and renal arteries, and for multilevel aortic disease (MLD) in the remaining six cases (abdominal aortic aneurysm associated with descending thoracic aortic aneurysm in four cases, type B dissection and penetrating aortic ulcer in the remaining two cases). Follow-up examination was carried out at 1, 6, and 12 months and yearly thereafter with CT scan and chest X-ray.
Results: Technical success was obtained in all patients and no intraoperative mortality or complications occurred. One patient, operated on for a TAAA, died in the third postoperative day for MOF (6.2%). Paraplegia occurred in a patient treated for MLD (6.2%); no other neurological complications were observed. In the postoperative period one patient (6.2%), treated for MLD, required an adjunctive stent-graft placement for the treatment of a type III endoleak. The mean follow-up duration was 11.2±4.5 months (range 1-36). During this period we observed one death, unrelated to the procedure, and no other endoleak, migration and reintervention occurred.
Conclusions: Our results suggest hybrid treatment of complex aorta lesions to be feasible and safe, associated with encouraging early results.

V3-7

ENDOVASCULAR TREATMENT FOR ACUTE TRAUMATIC TRANSECTION OF DESCENDING AORTA: FOCUS ON OPERATIVE TIMING AND LEFT SUBCLAVIAN ARTERY MANAGEMENT

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Objective: Operative timing and management of acute traumatic aortic rupture (TAR) are still matter of debate. In addiction, no general consensus regarding how best to handle cases with a short proximal neck has been reached. We reviewed our endovascular experience focusing on these topics.
Methods: From July 1998 to September 2006, 31 patients (27 males and 4 females, mean age 36.9 years) were referred to our Institution for acute traumatic rupture of descending aorta following road or occupational accidents. In 11 patients (group I), an early stent-graft procedure was performed while in 16 patients (group II) endovascular repair (EVAR) was delayed. Median time from trauma was 24 h (range, 5-120 h) in Group I and 1.5 months (range, 0.8-18 m) in Group II. Eight patients (25.8%) had an inadequate proximal neck (<5 mm from the origin of the subclavian artery). Of these, two had the left subclavian artery (LSA) totally covered by the endoprosthesis and two partially. Four patients who presented a postraumatic pseudoaneurysm involving the left subclavian artery (three patients) or the left common carotid artery (one patient) underwent conventional open surgery at a mean time of 25 days after the accident.
Results: No operative mortality or complications occurred in patients submitted to open delayed surgery. Technical success was obtained in all patients submitted to EVAR. There were neither intraoperative nor perioperative deaths. Cerebellar stroke was detected in one patient after the intentional closure of LSA. Follow-up (mean, 32.7±27.5 months) was 100% complete. No late deaths, endoleak or complications occurred.
Conclusions: Endovascular approach was a safe and flexible procedure in TAR and allowed us to fit the operative timing to every single patient's clini-

cal and radiological findings. Intentional closure of the LSA, performed in emergency conditions, is associated to an actually-umpredictable but effective risk of cerebral ischemic complications. In presence of an inadequate proximal landing zone, conventional open surgery still remains a favourable option as alternative to EVAR associated to surgical revascularization of the LSA.

V3-8

THE IMPACT OF ATHEROSCLEROTIC LESIONS ON THE HIGH-ENERGY PHOSPHATE METABOLISM IN THE EXERCISING CALF MUSCLE

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Objective: In patients with demonstrable peripheral arterial disease (PAD) suffering from concomitant orthopedic or neurologic problems, it may be very difficult and time consuming to determine the reason for waking distance limitation in an objective way. In those patients it might be very helpful to measure the influence of arterial lesions on the metabolism of the affected muscle during exercise. Phosphor-31 magnetic resonance spectroscopy (31P MRS) has been established for the non-invasive investigation of mitochondrial capacity in the muscle.
The purpose of this study was to investigate the impact of atherosclerotic lesion load as given by the runoff resistance (ROR) on phosphocreatine (PCr) kinetics during incremental, exhaustive calf exercise in patients with bilateral symptomatic PAD.
Methods: Using a 1.5 Tesla whole body magnetic resonance (MR) scanner, 26 patients (2 women and 24 men) with bilateral symptomatic PAD and 24 healthy male controls underwent serial 31P MRS during incremental exercise at 2, 3, 4 and 5 Watt. In patients, the ROR was determined on MR-angiograms. In both, patients and controls, the ankle brachial pressure index (ABPI) was determined.
Results: The mean ROR of the patients' legs was 10.6±4.4. The patients exhibited significantly increased PCr time constants at the first (36.7 s, 13.8-360.3 s vs. 22.9 s, 9.2-60.7 s; $P<0.001$), at the second (68.1 s, 4.2-757.2 s vs. 18.3 s, 5.2-57.6 s; $P<0.001$), at the third (65.3 s, 14.7-277.7 s vs. 29.0 s, 4.48-97.2 s; $P<0.001$) and the fourth increment (64.1 s, 34.2-548.8 s vs. 34.6 s, 4.9-106.2 s; $P=0.002$) as well as during recovery (53.2 s, 11.1-353.2 s vs. 41.4 s, 15.1-122.4 s; $P=0.002$) compared to the normal controls. The RORs of the patients' showed a significant correlation with the PCr recovery time constants ($r=0.48$; $P<0.001$).
Conclusions: The present study confirms that patients with symptomatic and multisegemental PAD show clearly increased PCr time constants during exercise as well as recovery and hydrolyze larger amounts of PCr during exercise compared to normal controls. The atherosclerotic lesion load is clearly reflected in prolonged PCr recovery time constants. In conclusion it seems, that the influence of arterial obstructions on the muscle metabolism can be objectively measured by the use of 31P MRS ergometry of the calf in PAD patients.

V3-9

HEMODYNAMIC INSTABILITY DURING AND AFTER CAROTID ARTERY STENTING: A SINGLE CENTER EXPERIENCE

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Objective: To assess the impact of pre and intra-operative variables on onset of hemodynamic instability during and after carotid artery stenting.
Methods: Pre-operative (age, sex, hypertension, diabetes, hyperlipemia, smoking, coronary artery disease, pulmonary, renal, liver failure, anti-hypertensive medications, previous TIA or Stroke, previous CEA or CAS or myocardial revascularization, percentage of stenosis and US plaque morphology) and intra-operative (angiographic percentage of the stenosis, stent type, atropine administration) variables were collected in 128 consecutive patients who underwent CAS at our institution form January 2004 within 3 years. Data of Hemodynamic Instability, defined as drop of Systemic Blood Pressure >50 mmHg or episodes of asystole >4 s intraoperatively and as lowering trend of SBP and lowering trend of Heart Rate postoperatively, were prospectively recorded. Pre- and intra-operative variables were analysed on respect to intra or postoperative HI occurrence.
Statistical analysis: Independent *t*-test (two groups) or ANOVA one way and χ^2 and logistic regression were used for pre and intra-operative continuous and discrete values respectively to assess their relationship to outcome. Backward exclusion using a criterion $P<0.1$ was performed and with variable in the final model considered significant at $P<0.05$.
Results: Analysis of pre- and intra-operative variables on intra-operative HI: Coronary artery disease and previous myocardial revascularization significantly influenced intra-operative heart rate (episodes of asystole >4 s) ($P=0.05$). Female sex (OR=2.94, CI 95% 0.98-8.85) $P=0.05$ and hyperechogene plaque (OR=4.03, CI 95% 1.27-12.77) $P=0.05$ were the only independent clinical predictors of intra-operative drop of Systemic Blood Pressure >50 mmHg.
Analysis of pre- and intra-operative variables on post-operative HI: age >80 ($P=0.04$), male sex ($P=0.01$), hyperlipemia ($P=0.04$), coronary artery disease ($P=0.03$) influenced significantly the post-operative lowering trend of heart rate. Stenosis percentage 71-90% ($P=0.03$), hyperechogene plaque and metallic stent influenced significantly post-operative lowering trend of SBP ($P=0.03$).
Lower heart rate was disclosed in the patients with postoperative neurologic complication (67.3 pbm vs. 75.9 bpm; $P=0.02$).
Conclusions: Many pre and intra-operative variables have impact on onset of HI. Often they co-exist in the same patients who undergo carotid artery stenting. In these patients a strict intra and post-operative hemodynamic monitoring is mandatory to prevent onset of severe complications.

V3-10

THE REFERRAL PATHWAY AND DAY-CASE CAROTID ENDARTERECTOMY AT A DISTRICT GENERAL HOSPITAL

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Objective: The aims of this study were to examine both the current local referral pathway of carotid artery stenosis and to assess the feasibility of day case carotid endarterectomy (CEA) in these patients.
Methods: A retrospective review of all CEA performed at a busy district general hospital over an 18-month period commencing January 2005. Data pertaining to both referral and surgical management was collected from patient case-notes and the in-hospital electronic record system.
Results: Within the study period, forty patients underwent CEA (M: F; 22: 18) with a mean age of 72.2 years (range 54-90 years). All but two operations were performed under local anaesthesia (95%). Twenty-nine patients (72.5%) were symptomatic (all with proven carotid artery stenosis >70-99%) with an average time to CEA since last neurological event of 64 days. The remaining 11 CEA were performed for asymptomatic disease with carotid artery stenosis >80-99%. There were no deaths or peri-operative ipsilateral strokes. Day-case CEA was proposed in ten patients (25%) but three of these cases ultimately required an overnight stay (one hypotension, one bradycardia, one nausea). In the seven patients undergoing successful day-case CEA, there were no hospital re-admissions or adverse events recorded.
Conclusions: Present local referral pathways need to be improved in order to reduce the delay from last carotid territory symptom to surgery. For selected patients, day-case CEA may well be a viable treatment option that requires further evaluation.

V3-11

IS IMMUNOTHERAPY THE FUTURE FOR PREVENTION OF MYOINTIMAL HYPERPLASIA AFTER THERAPEUTIC INTERVENTION FOR ATHEROSCLEROSIS?

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Objective: There is considerable evidence to suggest that the cytokines secreted by T cells, both in the peripheral circulation and in plaques, can alter the pathological events that occur in human atherosclerosis. The Th1 subset of T cells produce the cell-mediated response leading to the induction of cytotoxic T cells and macrophage activation, whilst the Th2 or immune response is characterised by the production of interleukins that stimulate an antibody response. Immunotherapy with agents such as heat killed bacteria or heat shock protein 65 can modulate the cytokine response and thereby potentially reduce myointimal hyperplasia (MIH). The aim of this study is to assess the effect of novel immunotherapeutic heat killed bacteria on the development of MIH (using intima/media ratio) in a rat carotid balloon trauma model, and to examine the differentiated T cell response by measuring the expression of interferon γ (Th1) and interleukin-4 (Th2).

Methods: Seventy five Sprague-Dawley rats were divided into five groups who received intramuscular injection of the following heat killed bacteria (ii) Gordonia bronchialis, (iii) Rhodococcus coprophilus, (iv) Tsukamurella inchonensis, (v) Mycobacterium vaccae or (i) negative control. After 49 days they underwent balloon induced trauma to the left common carotid artery under anaesthesia. The rats were sacrificed after 70 days and the carotid arteries fixed, stained and intima and media measurements taken using Scion software. Blood was taken for cytokine analysis at 49 and 70 days. Statistical analysis was performed using a Mann–Whitney *U*-test and the McNemar test for analysis of the cytokine response to each immunotherapeutic agent.
Results: None of the untreated right common carotid arteries showed evidence of myointimal hyperplasia. There was a significant reduction in intima/media ratio in all the rats treated by immunomodulation vs. the negative controls (0.91±0.05 vs. 0.52±0.03 vs. 0.60±0.03 vs. 0.43±0.03 vs. 0.37±0.03; $P<0.001$). There was a significant increase in both interferon-γ and interleukin-4 levels in response to immunomodulation ($P<0.05$) with a significant change in interferon-γ response with Rhodococcus coprophilus, Tsukamurella inchonensis and Mycobacterium vaccae ($P<0.001$) and in interferon-4 with Rhodococcus coprophilus and Tsukamurella inchonensis ($P<0.001$).
Conclusions: Treatment with heat-killed bacteria inhibits myointimal hyperplasia through immunomodulation and may provide a novel therapeutic option in the prevention of stenosis or occlusion of bypass grafts or of vessels treated by angioplasty or stenting.

V3-12

THE FIRST EXPERIENCE WITH AN EX VIVO CAROTID CIRCULATION MODEL

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Objective: The optimal therapeutic strategy for the treatment of the extracranial stenosis of the carotid artery requires profound knowledge of the pathophysiological processes and the hemodynamically changes in atherosclerotic carotid vessels. This study was designed to investigate the influence of stenosis degree and systemic pressure on the changes in carotid flow in an ex vivo carotid model.
Methods: Carotid models with three latex layers and six different stenosis (0%, 10%, 30%, 50%, 70% and 90%) were produced. The diameter of the common carotid artery and internal carotid artery was 7 mm and 6 mm respectively. The models were inserted into an ex vivo circulation system. To achieve the blood-like viscosity a particle-containing solution was used. The flow (Fmean) measurements were performed by the ultrasound transit time method. The systemic mean pressure was varied from 50 to 140 mmHg. Data with $P<0.05$ were considered significant.
Results: There is a clear decrease of the flow in the internal carotid artery of our model in the presence of high graded (more than 70%) stenosis ($P<0.0001$). Furthermore significant flow differences appeared by the high graded stenosis in dependence of systemic pressure, especially by stenosis more than 70%. The most substantial decrease of the carotid flow (70 mmHg) was measured by 90% stenosis and hypotensive systemic pressure of 80/40 mmHg.
The pressure decline over the stenosis was seen due to the increase of stenosis degree with the most significant value by 90% stenosis and hypertensive systemic pressure of 180/120 mmHg. There is only slight increase of the pulsatility index (PI) but for the 90% stenosis systemic pressure of 180/120 mmHg ($P<0.05$).
Conclusions: The presented ex vivo carotid model demonstrated the highly significant dependency of the carotid flow on the changes of stenosis degree as systemic pressure. These data show the necessity of further studies on the pathophysiological changes of the carotid blood circulation and in particular during operative and/or interventional procedures for high graded stenosis.

V3-13

THE CLINICAL RESPONSE OF CLAUDICANTS TO SUPERVISED EXERCISE MAY BE INDEPENDENT OF NEUTROPHIL RECRUITMENT

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Objective: It has been proposed that exercising patients with intermittent claudication (IC) causes neutrophil-mediated ischaemia reperfusion injury. Interleukins are cytokines involved in neutrophil recruitment. Recruited neutrophils adhere to vascular endothelium and transmigrate across using the cell adhesion molecules L-selectin and E-selectin.
Supervised Exercise (SEP) improves patients' walking distances. However, the arterial stenosis is not treated. SEP patients should therefore show increased ischaemia reperfusion injury when walking distances increase.
Percutaneous transluminal angioplasty (PTA) restores previously reduced perfusion. Following PTA, treadmill exercise testing should produce less ischaemia reperfusion injury than before PTA. PTA patients should also have less reperfusion injury than patients undergoing SEP.
Combining the two treatments (BOTH) may result in less reperfusion injury despite improved walking distances. This is because PTA restores perfusion, while SEP gives additional distance benefits.
Methods: Fifty-one patients were randomized into three treatment groups, Supervised Exercise (SEP: a three-month supervised exercise programme), angioplasty (PTA) and combined therapy (BOTH: PTA followed by a three-month exercise programme).
Patients were assessed before, one, three and six months following therapy. At each visit, samples were analysed both before (baseline) and after (peak) a treadmill exercise test. During the treadmill test, initial claudication distance (ICD), maximal walking distance (MWD) was recorded, as well as patient-recorded walking distance (PRWD).
We studied Interleukins 1, 6, 8 and 10 as the markers of neutrophil recruitment. L- and E-selectin were also studied as markers of neutrophil transmigration.
Results: The clinical indicators of lower limb ischaemia (PRWD, ICD and MWD) improved.
Baseline and peak levels of Interleukins IL-1, IL-6, IL-8 and IL-10 did not change over the duration of this study.
No change was also found in the L-selectin or E-selectin levels.
There is also no significant difference between the groups at each time point.
Conclusions: Although the clinical indicators of lower limb ischaemia improve, there is no evidence of in vivo neutrophil recruitment following acute treadmill exercise to claudication.
Treating patients with SEP alone or following angioplasty (BOTH) causes no additional neutrophil recruitment.
Combining SEP and PTA (BOTH) gives further increases of walking distance without additional ischaemia reperfusion injury.
Other markers of neutrophil activity may also be studied in order to examine if neutrophil activity and ischaemia reperfusion injury is increased independently of interleukin-mediated recruitment.

V3-14

THE BRACHIO-BRACHIAL ARTERIOVENOUS FISTULA: A NEW ALTERNATIVE TO PROSTHETIC GRAFTS

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Objective: To evaluate a new surgical procedure creating an arteriovenous fistula from the brachial artery and a brachial vein in patients without adequate superficial venous circulation in the upper limb.
Methods: Retrospective analysis included 37 patients, in whom a brachio-brachial fistula had been created in an end-to-side configuration. After the maturation period (one month), the brachial vein was transposed into the subcutaneous tissue.
Results: Thirty-seven patients underwent 37 brachio-brachial fistula constructions. Primary patency was achieved in all patients. One month after surgery, 31 (83.7%) of these patients had a functional fistula, but in only 30 (81.08%) cases it was suitable for hemodialysis following transposition to subcutaneous tissue. During the 1-month maturation period, the fistula became occluded in six patients, and in one case the vein was permeable but too small to permit hemodialysis. Thirteen patients developed temporary edema of the forearm during the first month, in one case the edema was extended to the entire arm, but no other complications associated with the procedure. Follow-up lasted 3–32 months during which a further four of the 30 patients presented with fistula occlusion.
Conclusions: The brachio-brachial fistula seems to be a good alternative to prosthetic grafts in patients without superficial venous circulation in the upper limb.

V3-15

PROSPECTIVE ANALYSIS OF OUTCOME PREDICTION AFTER RUPTURED ABDOMINAL AORTIC ANEURYSM

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Objective: Prospective validation of prognostic scoring systems for ruptured abdominal aortic aneurysm (RAAA) is lacking. This study assesses the validity of three established risk scores and a new prognostic index.
Methods: Patients admitted with RAAA over a 26-month period (2002-2004) were recruited prospectively. The Glasgow Aneurysm Score (GAS), Hardman Index (HI), POSSUM scores, and the Edinburgh Ruptured Aneurysm Score (ERAS) were recorded and related to outcome.
Results: Over the study period, 111 patients were admitted with RAAA. Of these, 84 (76%) underwent attempted operative repair and were included in the study; 37 (44%) died after operation.
The GAS, HI, POSSUM physiology score and the ERAS were statistically related to mortality. However, analysis by receiver-operator characteristic curve revealed the ERAS to be the best predictor of death with an area under the curve (AUC) of 0.718 (95% CI 0.605–0.831). The HI and GAS performed less well with an AUC of 0.685 (95% CI 0.568–0.802) and 0.641 (95% CI 0.522-0.759) respectively. Although the V-POSSUM equation predicted mortality effectively (P=0.086), the RAAA-POSSUM derivative demonstrated a significant lack of fit (P=0.009).
Conclusions: Prospective validation shows that the Hardman Index, GAS, and V-POSSUM and RAAA-POSSUM scores do not perform well as predictors for death after RAAA. The ERAS accurately stratifies perioperative risk, but requires further validation.

May 18, 2007 2nd Congress Day
16:30-18:30
4th Vascular Scientific Session - Peripheral

V4-1

BELOW KNEE BYPASS SURGERY FOR CRITICAL LEG ISCHEMIA

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Objective: Revascularisation for critical leg ischemia remains an issue of discussion because of the relatively high-risk patients and demanding procedures. Critical leg ischemia is the leading cause of hospitalisation in our experience making up 72% of PAOD patients in the last 5 years. Thirty-five percent of them had below knee occlusions. The authors present their experience in the last years.
Methods: Resting ECG, Segmental contractility and EF on Echocardiogram, Functional respiratory examination and blood creatinine level were the main risk variables taken into consideration. High risk patients were excluded as revascularisation candidates and amputations were performed in different levels.
One hundred and two patients were selected for below knee surgery, of which 19 with critical leg ischemia of both legs. The main sign/symptom were rest pain in 30 legs, minor necrosis or ulcer in 73 and anterior foot gangrene in 18 cases.
Patients' mean age was 68.3 years old, with 1/3 over 70 years of age. Male/female ratio was 4/1.
One hundred and twenty one below knee bypasses were performed, 97 of them as single procedures and 24 as adjunctive run off surgery. The out flow artery were distal popliteal artery in 69 cases, crural arteries in 35 and pedal arteries in 17 patients. The grafts used were reinforced PTFE prosthetic grafts in 47 cases, PTFE-GSV composite grafts in 22 cases, reversed GSV in 21 cases and 'in situ' GSV in 31 cases.
Results: Perioperator mortality was 5.8%. Permeability resulted 72.7% at the first year and 61.9% at the third year. Foot salvage rate was 86.6% and 51% respectively for the rest pain and gangrene group of patients.
Conclusions: Careful patient selection is essential for good results of revascularisation and low mortality. Congestive hart failure, active coronary disease, high creatinine and low FEV1 are to be considered as predictors of high morbidity.

V4-2

ABOVE KNEE FEMORO-POPLITEAL BYPASS: IS THERE A ROLE FOR DUPLEX SURVEILLANCE?

M. Welch, S. Ray
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Objective: Previous studies have suggested that after above knee femoro-popliteal bypass (AKFPB), patency rates for prosthetic grafts are as good as vein. Vein graft surveillance is well established, but the need for prosthetic surveillance is unclear. We have examined our own experience with Dacron AKFPB with a view to establishing a protocol for graft surveillance.
Methods: Notes of all patients undergoing AKFPB between October 2000 and August 2006 were analysed retrospectively. Data were tabulated for age, gender, co-morbidity, indication for surgery and follow-up provision. Univariate comparisons of patency were made by the Kaplan-Meier method.
Results: Fifty-four patients (35 males; 19 females; 56 limbs) underwent AKFPB for disabling claudication (37), critical ischaemia (12) or acute ischaemia (7). Median follow-up was 16 weeks (range 1-192 weeks); mean age 65.7 years for males and 74.7 for females. Risk factors included 51 smokers, 35 hypertensives, 20 ischaemic heart disease, 17 hyperlipidaemia, 12 diabetes and ten cerebrovascular accidents. Twenty-two had previous radiological (11) or surgical (11) interventions.
Sixteen patients (29%) had complications: Fifteen grafts occluded with return of rest pain and one graft infection; 11 of these underwent revisional bypass surgery, two graft excisions, two amputations and one was treated conservatively. Eleven of the 16 (68.75%) occlusions occurred within one year of implantation, the median patency rate of these being 7.5 months. The range for primary patency overall varied from one day to 4 years 3 months, with a mean of 417 days. Primary 3 year patency was 40%.
Conclusions: Our results would suggest the need for more careful follow-up with regular duplex ultrasound imaging during the first year after prosthetic AKFPB, similar to vein graft surveillance.

V4-3

ENDOVASCULAR TREATMENT OF ASYMPTOMATIC POPLITEAL ANEURYSM

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Objective: The aim of this prospective comparative study was to analyze results of an 8-year experience of endovascular treatment (ET) of PAs using the Hemobahn/Viabahn endograft respect open repair (OR). End points were primary and secondary patency rate.
Methods: The study was a prospective randomized clinical trial from January 1999 to December 2003 and a prospective comparative study from January 2004 to December 2006. Patients with an asymptomatic aneurysmal lesion in the popliteal artery≥2 cm at the angio-CT were included in the study. Indication to ET was for all PAs with a proximal and distal neck length >1 cm; contraindication were: 1. age <50 years, 2. poor distal run-off 3. contraindication to anti-platelet, anti-coagulant or thrombolytic therapy.
Results: Between January 1999 and December 2006 a total of 48 PAs (27 OR Group A-21 ET Group B) were enrolled. Primary patency rate at 12 months was of 100% in Group A and 80.9% in Group B and of 71.4% and 88.15 respectively at 72; secondary patency rate was at 72 months of 88.15% and of 85.9% for Group A and B. No statistical differences were observed at the log-rank test. During the whole study period in three (14.3%) patients of Group B a conversion to open surgery was required for endograft occlusion.
Conclusions: We can conclude, with the power limitation of the study, that asymptomatic PA treatment can be safely performed using an ET in patients with suitable anatomy, obtaining comparable long-term results to OR.

V4-4

COMPARATIVE STUDY OF AUTOLOGOUS VENOUS FEMORO-DISTAL BYPASS PROCEDURES IN TYPE III DISTRIBUTION OF PAOD IN DIABETIC VS. NON-DIABETIC PATIENTS

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Objective: There are three types of PAOD distribution on arterial tree of lower extremities. It is proven that type III (infrainguinal distribution) is more prominent in diabetic than nondiabetic patients. Also, diabetic

patients suffer higher complication and mortality rate following reconstructive surgery of this region.
AIM of the study is the comparative analysis of the results of bypass reconstructive surgery in patients with type III PAOD distribution according to the presence of diabetes.
Methods: From 1999-2003 on the Clinic for Vascular surgery in Novi Sad, Republic of Serbia, 118 patients with infrainguinal distribution of PAOD were operated on. They were divided in two groups. First group consisted from 51 nondiabetics and second from 67 diabetic patients. Subgroups were formed according to clinical states and there were differencies in IV a, (46 diabetics and four nondiabetics) and IV b state (11 diabetic and 30 nondiabetic patients).
Results: Percent account and statistical findings using χ^2 test showed statistical difference in complications rate, number of salvaged limbs and finally, mortality rate between diabetic and non-diabetic patients.
Conclusions: In diabetic patients there are significantly more humide trophical changes (IV a state). Overall complication rate is significantly higher as well as major amputation rate. Finally, mortality rate is significantly higher in diabetics than in non-diabetic patients.

V4-5
FUNCTIONAL OUTCOME AFTER FEMORAL ENDARTERECTOMY WHERE ANGIOPLASTY WAS NOT POSSIBLE: SINGLE CENTRE EXPERIENCE
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Objective: Femoral arterial disease remains an area where endovascular treatment has poor results. The purpose of this study was to assess limb salvage and functional outcome in patients who underwent femoral endarterectomy (FE) when angioplasty was not possible.
Methods: Single centre retrospective analysis of all patients undergoing FE in the last 4 years. Late functional outcome in all living patients was assessed by duplex scanning and direct questioning by telephone.
Results: FE was performed on 30 patients (20 males and 10 females) with 32 symptomatic legs to treat gangrene (*n*=5), rest pain (*n*=7) and incapacitating intermittent claudication (*n*=20) with mean age of 76.2 years. Twenty-three FE were performed electively and nine were emergency procedures. Twenty-two patients were operated under GA, five under LA and three under spinal/epidural anaesthesia. Forty three percent patients underwent simultaneous revascularization procedure (33% profundaplasty, 3% fem-fem x-over, 3% fem-pop and 3% aorto-bifemoral bypass). Overall patency rate and limb salvage rate was 80% and 74% respectively at mean follow-up of 25 months. Early mortality was 6% (two patients with gangrenous limbs, sepsis, MOF) and morbidity was 24% (3% MI, 21% superficial wound infection & dehiscence).
Conclusions: The functional outcome of FE is very favourable in femoral stenosis either as a primary or adjunctive procedure where angioplasty is not possible. FE can be performed under loco-regional anaesthesia which is potentially suitable in elderly patients to avoid major amputation and its associated sequelae.

V4-6
HYBRID APPROACH FOR ILIAC ARTERY AND DISTAL LESIONS
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Objective: The morbidity of the patients who treated endovascular for iliac artery and then surgical treatment for its distal lesions was improved by hybrid approach.
Methods: One hundred and ten patients (105 male- (95.45%) - 5 female- (4.55%)) operated between October 2001-April 2006. Twenty-eight (26%) of 110 patients treated firstly with iliac PTA-stent and femoro-popliteal or femoro-distal by-pass was made 15-30 days later. For cardiac investigation dypradamol myocard perfusion spect was applied. All patients underwent to aorta-femoro-popliteal and/or cardiac angiography. PTA-stent desicions has made with experienced interventional radiologists (TASC A and B iliac lesions).
Surgical treatment only was applied TASC C and D iliac lesions. Klopidogrel tablet 75 mg/daily treatment ceased 5 days before from surgery and LWM heparin was continued. Ankle/ brachial index was measured in all patients. Spinal or general anesthesia was used. Patient follow-up was made with physical examination, Doppler US and MR angiography postoperatively.
Results: During the bypass procedure, proximal blood flow was perfect and at the end of the operation ATA and ATP pulsations was palpable. The patients who treated by hybrid therapy was used 6 mm or 8 mm PTFE graft in the above-knee by-passes (57.14%), saphenous vein (five patients-17.86%) and 6 mm heparin-bounded PTFE (seven patients-25%) in the below knee by-passes. Nobody had early graft thrombosis. Late graft thrombosis was seen in two (7.14%) patients. All patients healed with distal embolectomy without proximal embolectomy. Because of proximal flow was perfect stent restenosis was not observed. Medical treatment of graft thrombosis patients was continued warfarin. Nobody had amputation or mortality. Late infection was seen in only one (3.57%) patient.
Conclusions: Life comfort increased by hybrid approach for iliac artery and its distal lesions, instead of a major vascular surgery operation smaller intervention was applied. Perfection of proximal blood flow was effected graft patency positively.

V4-7
SURGICAL APPROACH TO THE POPLITEAL ARTERIES' LARGE PSEUDOANEURYSMS DEVELOPED AFTER PENETRATING INJURIES
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Objective: Traumatic penetran arterial injuries can cause late complications as pseudoaneurysm even after months or years. The civilian incidence of such pseudoaneurysms constitutes 0-3.5% of all popliteal aneurysms. This study was undertaken to describe the management of pseudoaneurysms (PSAs) of popliteal artery after penetrating injuries.
Methods: From January 2000 through December 2006, we performed revascularization eleven patients' PSAs at the popliteal arteries after penetrating (stab or gunshot) injuries in our Cardiovascular Surgery Department. There were 11 male patients with mean age of 36.8 years (enter 24 and 76). All patients underwent Duplex ultrasonography and lower extremity arteriography.
Results: The delay in diagnosis from the time of injury ranged from 6 weeks to 1 year, with a median delay of 4 months. We performed elective surgery, using generally the optimal revascularization principles in all cases. There were no deaths or graft related complications, the early and late patency rate and limb salvage were 100%. All patients were able to completely straighten the affected leg at the time of discharge. The mean follow-up was 2.2 years (range, 4 months-6 years), and the mean time to discharge was 5.5 days (range 5-8 days).
Conclusions: Traumatic pseudoaneurysms of the popliteal artery are rare in civilian vascular surgery practices. Open surgical repair must be the standard approach for the symptomatic and rapidly enlarging PSAs in order to avoid from rupture, thrombosis and embolization those threatening the function and vitality of the extremity and less invasive methods must be preserved for rare and complicated cases.

V4-8
SUBINTIMAL RECANALIZATION AND STENTING FOR LONG SUPERFICIAL FEMORAL ARTERY OCCLUSIONS
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Objective: To assess the feasibility and mid-term outcome of combined subintimal recanalization and stenting for the treatment of long superficial femoral artery (SFA) occlusions.
Methods: From 2002 to 2006, 31 consecutive patients (22 male, 9 female) with severe chronic ischemia were intended to be submitted to subintimal wire placement and routine stenting of SFA. The mean age of the patients was 67.3 years (range 61-79 years). Risk factors included diabetes mellitus (*n*=9, 29%) and end-stage renal failure (*n*=4, 12.9%). Thirteen patients (41.9%) were treated for disabling intermittent claudication, seven (22.6%) were treated for rest pain and 11 (35.5%) for ischemic ulcers or gangrene. The mean ankle-brachial index (ABI) was 0.51 (range 0.28-0.72). The procedures were performed under local anesthesia and using fluoroscopic guidance for entering subintimal space with an angled 0.035' hydrophilic guidewire (Radifocus; Terumo, Japan); in 14 (45.1%) cases of flush occlusion of SFA, the procedures were made with associated duplex guidance to direct the devices into the SFA ostium. After advancement over the wire of a 5 Fr vertebral catheter (Terumo, Japan) and re-entry into the true lumen at the distal end of the lesion, self-expandable nitinol stents (Bard® Luminexx™ until 2006,

February, and then Protégé® EverFlex™) were placed in the whole subintimal space. The number and the length of stents was dictated from the length of the intentional subintimal dissection. The site of re-entry was chosen without compromise the feasibilty of a future bypass grafting. When completion arteriogram revealed residual stenosis, a post-dilatation was performed.
Results: Twenty-eight patients (90.3%) underwent successful procedures, whereas two attempts failed because of inability to pass the guidewire through SFA occlusion and one because of arterial perforation. Two of the patients with unsuccessful SFA subintimal recanalization underwent successful leg bypass and one required an above-knee amputation. Arterial stenoses proximal or distal to the recanalized segment were treated with concomitant balloon angioplasties in five (16.2%) cases. The mean ABI increased to 0.87 (range 0.62-1.0) after the procedures. All the patients with successful SFA subintimal recanalization and stenting had resolution of symptoms and healing of ischemic lesions.
Twenty-three of the 28 patients (82.1%) who had successful SFA procedures were patent at a mean follow-up of 21±6 months (range 2-57 months), and overall survival was 80.7%.
Conclusions: Subintimal recanalization and routine stent placement allows high technical success rates and mid-term patency rates in the management of long SFA occlusions, with no significant procedure-related complications.

V4-9
RESULTS OF POPLITEAL ARTERY RECONSTRUCTIONS AFTER BLUNT LOWER LIMB INJURIES
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Objective: In contrast to reconstructions of the popliteal artery after penetrating trauma (stab and gunshot wounds), data on the outcome of popliteal artery repair after blunt injuries are limited.
Methods: All patients who underwent emergency repair of popliteal artery lesions in our institution after blunt lower extremity injuries since January 1990 were retrospectively analysed. Rates of perioperative death, limb salvage, vessel patency and vascular re-interventions were considered as study endpoints.
Results: A total of 39 patients (34 male; median age: 33.7 years; range: 12.9-77.0) who presented with lesions (22 intimal fractures, 17 transsections) of the popliteal artery (segments: I, *n*=19; II, *n*=15; III, *n*=5) after blunt trauma underwent emergent repair (five primary sutures, 33 saphenous vein and one PTFE interposition). Median Mangled Extremity Severity Score (MESS) was seven (range: 3-11). Preoperatively, 33 patients (85%) presented with signs of ischemia. Median time until revascularisation was 8 h (range: 3-30). Simultaneous to arterial repair, fasciotomy was performed in 81% of the patients. Thirty-three patients (85%) had instable fractures or joints, which required stabilisation either prior (*n*=28) or after (*n*=5) arterial repair.
Within 30 days after arterial repair, survival rate was 97%, primary patency rate was 90% and limb salvage rate was 87%. Postoperatively, 52 additional surgical procedures were performed in a total of 21 patients: bypass revision (*n*=5; four patients); amputation (*n*=7; five patients); fasciotomy (*n*=5; five patients); necrosectomy (*n*=17; seven patients); skin grafts and revisions (*n*=13; five patients); skin sutures after fasciotomy (*n*=5; five patients).
Conclusions: Emergency repair of popliteal artery lesions in blunt limb injuries is frequently complicated by ischemia-reperfusion syndrome. Therefore, in our series, more than 80% of individuals underwent simultaneous fasciotomy, however, 13% experienced subsequent limb loss. After arterial reconstruction, more than 50% of the patients had additional surgical procedures.

V4-10
MAJOR LIMB AMPUTATION AND THE SHARED EMERGENCY OPERATING LIST
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Objective: To assess the factors implicated in the day of surgery cancellation of those vascular patients listed for major limb amputation in a large district general hospital.
Methods: This was a small retrospective study from October 2005 to January 2006. Data collection pertaining to bookings of major limb amputation (i.e. above-knee, below-knee and revision) on both emergency and elective lists was obtained by retrieval of electronic theatre management records and case note review.
Results: In the 3-month study period, 37 theatre listings were made for limb amputation in twenty-eight patients with a median age of 71 years (range 32-90 years). Fourteen bookings were made on a dedicated shared 'emergency' list and the remaining 23 were planned within elective operating time. For the entire series there were 14 cancellations (38%), nine of which (64%) were potentially avoidable. Eleven of the cases cancelled (79%) occurred on the emergency list with a consequent average delay to surgery of 1.4 days for patients fit enough to be re-listed (*n*=11). Reasons for cancellation included inadequate pre-operative preparation (*n*=7), medically unfit (*n*=4) and lack of theatre time (*n*=3).
Conclusions: This study demonstrates an unacceptably high cancellation rate of those patients listed for limb amputation, who with their multiple comorbidities could be better managed without this delay. Improvements may be made by better liaison both within and between surgical and anaesthetic teams, a shorter delay between anaesthetic assessment and actual time of surgery and possibly a dedicated emergency vascular list.

V4-11
SUBINTIMAL BALLOON ANGIOPLASTY AS ONE OF THE NEW METHODS IN TREATMENT OF PATIENTS WITH THE CRITICAL LIMB ISCHAEMIA
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Objective: To define opportunities of a method subintimal balloon angioplasty in treatment of patients with a critical ischaemia of the leg.
Methods: Four hundred and fifty patients with a critical ischaemia of the leg were on treatment and research. To 21 patients as operative treatment the method subintimal angioplasty (SA) of peripheral arteries of finitenesses is applied. Middle age of patients – 72 years. Duration of a critical ischaemia was more than 3 months. The degree of ischaemia corresponded 4-5 categories on Rutherford. Forty one procedure of subintimal balloon angioplasty of following arteries were made: 12 – iliac, superficial femoral and arteries of a dhin, 15 – superficial femoral and distal arteries of a leg and 14 – tibioperonel trunk and arteries of a shin is executed.
Results: After procedure SA primary success of procedure and in the first month of supervision has made 76.2% (*n*=16). Thrombosis in a zone of subintimal angioplasty in the early postoperative period - 23.8% (*n*=5), thrombectomy from iliac and femoral segments and thrombectomy from femoral and popliteal segments – 14.3%. Iliac and femoral prosthetics with femoroprofundoplasty – 4.7% (*n*=1), endarterectomy from iliac and femoral segment in combination with femoroprofundoplasty – 4.7% (*n*=1). Amputation of a hip in a middle third – 9.5% (*n*=2), amputation foot – 4.7% (*n*=1). Lethal outcome – *n*=1 (as a result of ischaemic insult).
Conclusions: The applied new technological method of treatment of occlusion and stenotic defeats of peripheral arteries of the leg demands the further investigation of its application at a critical ischaemia. Positive results of this method testify to its perspectivity.

V4-12
THE ROLE OF ANGIOPLASTY IN DISTAL BYPASS FOR CRITICAL LEG ISCHAEMIA
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Objective: Distal bypass is an established modality in the treatment of patients with critical leg ischaemia (CLI). However, adjuvant radiological intervention may be required to improve the long-term outcome. This study examines the role of angioplasty as a salvage procedure for failing grafts or as a planned procedure (hybrid) for distal bypass in patients with CLI.
Methods: Over a 4.8-year period, 58 consecutive distal bypasses (in 57 patients) performed for CLI under a single surgeon in a tertiary referral centre were analysed retrospectively. Presenting symptoms, risk factors, 30-day mortality and major amputation rates were studied. All patients were enrolled in a one-year graft surveillance programme. Hybrid procedures were defined as planned staged pre-bypass inflow angioplasty or post-bypass outflow angioplasty. The series included 12 women and 45 men (median age; 73 years, range 45-86 years). Forty-two patients were diabetic and 22 had either renal impairment/end-stage renal failure. Thirty-one patients presented with foot ulceration; 24 with rest pain and 20 with digital gangrene. Four patients had acute-on-chronic ischaemia. The site of the proximal anastomosis was the common femoral artery in 24 patients, below knee popliteal in 14, superficial femoral in 10, above-knee popliteal in seven and external

iliac in three. The target artery for the distal anastomosis was the anterior tibial in 22 patients, dorsalis pedis in 12, posterior tibial in nine, peroneal in nine and the tibeo-peroneal trunk in six. The median combined anaesthetic and operative time for surgery was 280 min. The median follow-up was 23.5 months.

Results: Thirty-three bypasses required angioplasty (64%) (17 hybrid and 22 salvage). In the hybrid group, 13 patients had pre-bypass angioplasty for inflow stenosis and four had distal run-off angioplasties post-bypass. In the salvage group, angioplasty of the inflow was performed in five grafts, proximal anastomosis in five, distal anastomosis in eight and mid-graft stenosis in two. Five patients required more than one procedure. Five patients presented with graft occlusion. Two were successfully treated with thrombolysis, one required surgical revision and two patients suffering claudication only did not require further intervention. The overall major amputation rate was 10.34% (six limbs) and the 30-day post-bypass mortality rate was 1.75% (one patient). Following angioplasty, one patient suffered groin haematoma, with no overall recorded mortality.

Conclusions: Distal bypass has a high limb salvage rate in patients with CLI. However, the majority of patients will require angioplasty either as a planned hybrid or as a salvage procedure.

V4-13

TIBIAL VESSEL PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY IN PATIENTS WITH CRITICAL LIMB ISCHEMIA: SHORT AND MID-TERM RESULTS

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Objective: To determine feasibility, safety and early outcome of infrapopliteal percutaneous transluminal angioplasty (PTA) in patients with critical leg ischemia (CLI).

Methods: From January 2003 to November 2006, 38 limbs with CLI were treated by tibial vessel PTA. Nineteen had gangrene, 17 ulcerations and two rest pain. Thirty-one patients (81%) were diabetics. Twenty patients (53%) presented also more proximal lesions and underwent concurrent femoropopliteal PTA (17) or bypass (3). Runoff status included one tibial vessel in 32 limbs and two vessels in the remaining six. Forty-one tibial vessels were treated, 14 presented occlusions and 27 single or multiple significant stenosis.

Mean follow-up was 10 months (1-29) by means of clinical and duplex examination.

Results: Technical success was achieved in 40 of 41 treated vessels. There was one technical failure that led to an early below-knee amputation. One patient developed a false aneurysm in the groin that was treated surgically. Two patients died during the perioperative period.

Duplex ultrasonography was performed before discharge in the remaining patients showing hemodynamic success and patency in 34 cases and a postoperative occlusion in one case.

The 12-month primary assisted patency, limb salvage and survival rates were 95%, 85% and 88%, respectively. Three patients were amputated despite patency because of major tissue loss explaining the discrepancy between patency and limb salvage rates.

Conclusions: Infrapopliteal PTA is a feasible and safe treatment of critical limb ischemia with a high primary patency and limb salvage rates at one year. Durability of results is uncertain and has to be confirmed by long-term follow-up.

May 19, 2007 3rd Congress Day
11:30–13:00
6th Cardiac Scientific Session - General

C6-1

COMPARATIVE EVALUATION OF MULTIMEDIA-DRIVEN, INTERACTIVE AND CASE BASED TEACHING IN HEART SURGERY

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Objective: Multimedia-augmented instruction with various approaches is used in heart surgery. There is little evidence which instructional techniques and media are of advantage to impart knowledge more effectively and lead to better application of knowledge in the operation room.
Methods: Sixty-nine students learned with an interactive, case-based teaching (ICBT) course about aortic valve replacement. They were compared with controls exposed to identical information provided by a multimedia module presenting content systematically (SMM; n=69) and a print medium (PM; n=57). Motivation, computer knowledge, and didactic quality were evaluated with psychometric tests. All groups performed multiple choice pretests and posttests and participated in live surgery during which their performance was assessed.
Results: All groups had equal computer knowledge, but the ICBT group felt significantly less-motivated and more challenged. Multiple choice posttest results were comparable (ICBT 80.2%±10.9%, SMM 76.7%±13.3%, PM 76.9%±11.1). During surgery, the ICBT (79.2%±16%) and SMM groups (82.9%±10%) performed significantly better than the PM group (64.7%±12%; both P<0.0001). Overall didactic assessment was significantly worse in the ICBT group when compared with the SMM and PM groups.
Conclusions: For novices in heart surgery, ICBT was less motivating than traditionally structured content (SMM and PM). The ICBT did not improve performance in the operation room. However, both multimedia groups could better apply their knowledge during live surgery. The PM is as effective as multimedia when factual knowledge has to be retained.

C6-2

PROGRESSIVE EXPERIENCE WITH A MINIATURIZED EXTRACORPOREAL CIRCUIT

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Objective: The benefits of a miniaturized extracorporeal circuit are becoming well known. The safety is well documented and more is becoming known about its role in blood conservation. The purpose of this study is to assess the experience benefit relationship with the new technology.
Methods: From April 2004 to December 2006, our first 500 patients maintained on a miniaturized extracorporeal cardiopulmonary bypass circuit and were compared to 200 patients undergoing their surgery with the use of a conventional cardiopulmonary bypass circuit. Transfusion data were examined. The group maintained on the miniaturized circuit was further subdivided into groups of fifty patients chronologically to examine the role of cumulative experience.
Groups were further subdivided by preoperative hematocrit of 35% to assess the progressive transfusion experience.
Results: For all patients regardless of preoperative hematocrit, the transfusion rate for patients for whom the miniaturized circuit was used decreased by 45% intraoperatively, 66% postoperatively, and 46% overall (either intraoperatively or postoperatively). For patients with preoperative hematocrits ≤35% the transfusion rates decreased 44% intraoperatively, 49% postoperatively, and 48% overall. For patients with preoperative hematocrits >35%, the transfusion rate decreased 31% intraoperatively, 63% postoperatively, and 53% overall. Further examination shows that for patients with hematocrits ≤35% the decrease in the transfusion rate was more dramatic early in the experience. Whereas for patients with preoperative hematocrits >35% the decrement was more gradual.
Conclusions: A decremental transfusion rate is noted with progressive experience using a miniaturized extracorporeal cardiopulmonary bypass circuit. For patients with lower (≤35%) preoperative hematocrits, the decrease in transfusion rates was noted earlier and was more dramatic. For patients with higher (>35%) preoperative hematocrits, the decrement was more gradual but equally statistically significant.

C6-3

MARKED ANNULAR RESTRICTION TO IMPROVE POSTOPERATIVE RESULTS IN THE TREATMENT OF FUNCTIONAL MITRAL REGURGITATION

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Objective: The gold standard for treatment of functional mitral regurgitation is still under discussion. Relevant recurrence of significant mitral regurgitation at midterm follow-up has been reported in several studies, regardless the technique used. We designed this study in order to identify if the degree of restriction of mitral annulus could influence early and midterm residual mitral regurgitation following treatment of functional mitral regurgitation using restrictive annuloplasty.
Methods: Thirty-two consecutive patients undergoing CABG and repair of functional mitral regurgitation were enrolled. Preoperative trans-thoracic ECHO (performed 1–3 day before surgery) showed MR >3+ in 24 patients (75%) and a mean mitral annulus diameter of 39±3 mm. Restrictive mitral annuloplasty was performed in all patients using both CE-Classic (12 patients) and CE-Physio (20 patients) ring. Size of the ring was chosen aiming an annular restriction of at least 25% (size 28 was used in 24 patients, size 26 in 8). Degree of annular restriction was correlated to early LV reverse remodelling (in terms of LVEDD and LVEDV reduction) to postoperative EOA and transmitral pressure gradient and to early postoperative residual MR.
Results: Postoperatively no residual MR was detected in all patients. Both LVEDD and LVEDV were significantly reduced compared to the preoperative (54±2 and 46±8 mm, 121±20 and 96±18 for LVEDD and LVEDV respectively, P<0.005). Mean percentage of annular restriction was 28±6%. Linear regression showed significant correlation (r=0.53, P<0.001) between degree of annulus restriction and LVEDV reduction. Mean EOA was 3.3±0.7 cm^2 with no significant gradient in any patient.
Conclusions: A marked restriction of mitral annulus (>25% of the preoperative annulus) obtained using maximum size 26 or 28 ring, seems to favourable influence early postoperative LV reverse remodelling, allowing for a complete early postoperative resolution of functional mitral regurgitation. 'No tolerance' of residual MR should be, therefore, the target of mitral repair even in case of functional mitral regurgitation and could avoid midterm recurrence of significant MR.

C6-4

SURGICAL TREATMENT OF POSTINFARCTION ANTERIOR LEFT VENTRICULAR ANEURYSMS: LINEAR VS. PATCH PLASTY REPAIR

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Objective: The patch plasty repair is more and more advocated against linear closure for the surgical treatment of postinfarction anterior left ventricular aneurysm (LVA). A comparative estimation of the clinical results of those two different techniques seemed us advisable.
Methods: Between 1985 and 2004, 53 patients (mean age of 64.2+8.3 years) underwent repair of anterior LVA. Twenty-seven patients underwent linear repair (group 1) and 26 patients patch plasty (group 2). The mean left ventricular ejection fraction was 33.9+8.2% in group 1 vs. 29.7+10.2% in group 2 (P=0.118). Preoperatively 85.2% in group 1 were in NYHA functional class III or IV vs. 88.5% in group 2 (P=0.71). All patients had preoperative recurrent ventricular tachycardia (VT) and non-guided encircling cryoablation for treatment of VT was performed in all patients. Coronary revascularization was performed in 29.6% of patients in group 1 and 42.3% in group 2 (P=0.398).
Results: The overall in-hospital mortality was 1.9% as one patient died of low cardiac output (LCO). LCO was the most frequent early postoperative complication and was observed in 66.7% of patients in group 1 vs. 65.4% in group 2 (P=1). LCO was related to right coronary artery disease on multivariate analysis (odds ratio 6.9, P=0.0097). Mean follow-up was 6.4+4.8 years (range 1 day–17.5 years). Overall survival at 10 years was 65.5% in group 1 vs. 60.6% in group 2 (P=0.395). At 10 years, 91.5% of patients were free from VT or sudden death in group 1 vs. 81% in group 2 (P=0.269). At follow-up the patients' functional status improved and among survivors 76.9% in group 1 were in NYHA functional class I–II vs. 62.5% in group 2 (P=0.432). Deaths from congestive heart failure (CHF) occurred in 38.5% of patients in group 1 vs. 55.6% in group 2 (P=0.632). Preoperative left ventricular end-diastolic pressure above 20 mmHg was a predictor of mortality from CHF on multivariate analysis (odds ratio 9.6, P=0.038).

Conclusions: Our experience could not reveal significant differences between linear closure and patch plasty repair in short and long-term results. The choice of repair technique should be adapted to each patient's anatomical and physiological characteristics.

C6-5

OUTCOME OF CARDIAC SURGERY IN PATIENTS RECEIVING PREOPERATIVE MECHANICAL VENTILATION: 10-YEAR EXPERIENCE

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Objective: Though preoperative ventilation is a recognized risk factor for operative mortality there is little data in literature on these high risk patients. We conducted a 10-year review of all patients who received mechanical ventilation prior to undergoing cardiac surgery.
Methods: Prospective data on 6545 patients undergoing cardiac surgery at Blackpool Victoria Hospital, Blackpool from 1997 to 2006 were reviewed. Out them 56 patients were receiving preoperative mechanical ventilation.
Results: The mean age was 58 years and 57% were male. Preoperative clinical characteristics were recent MI 32%, recent PCI 9%, impaired LV function 48%, cardiogenic shock 44.5%, arrhythmia 44.6%, hypertension 39%, and renal failure 12.5%. Operative priorities were salvage 28.5% and emergency 30%. Procedures performed were CABG 21%, Valve 32%, complex procedures 17% and others 30%. The mean bypass and x-clamp times were 146 and 73 min respectively and IABP was used to support circulation in 39% patients. Out of them 48% patients died postoperatively. Among the non survivors 30% died in theatre and 70% died in hospital. The causes of death were cardiac 13, multi-organ failure 11, neurological 2 and other 1. Mean postoperative ICU and hospital stays were 6.5 and 30 days among survivors. Their morbidity included renal failure 14%, GI 7%, respiratory 39%, prolonged ventilation 39% and reopening 7%. Out of hospital survivors 44% were discharged to another hospital and 56% were discharged home.
Conclusions: Risks of morbidity and mortality have remained high in patients needing preoperative ventilation in spite of a decade of rapid advances in cardiac surgery and intensive care.

C6-6

INFLUENCE OF THE ORIENTATION OF A PROSTHETIC MITRAL VALVE ON THE INTRAVENTRICULAR FLOW – AN EXPERIMENTAL MRI STUDY

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Objective: Orientation-related monoleaflet mechanical valve flow and velocity studies in the downstream are limited in mitral valve replacement studies in contrast to aortic valve replacement studies.
Methods: In five sheep, ventricular blood flow was visualized prior to the implantation of a Medtronic Hall Tilting Valve Model. In six sheep the implant orientation was either anatomical (disc aligned with the anterior leaflet) or anti-anatomical. The mitral subvalvular apparatus was preserved. Sheep were positioned within an 1.5 T-field strength MR scanner (Magnetom Sonata; Siemens) to assess time-dependent three dimensional blood.
Results: The preoperative ventricular velocity profiles presented negligible individual variances. Streamlines passed homogeneously without any spatial differences in flow velocities into the left ventricle creating an apical helix. Starting from the anatomical position blood entered mainly through the major orifice of the mechanical valve. The single artificial leaflet mimicked the rudder effect of the natural anterior mitral leaflet, preventing blood streaming directly towards the septum. The area with inhomogeneous blood velocities in the ventricle increased but not significantly from the preoperative status. The non-axial inflow not directed directly to the apex converted to a similar helix as observed in the preoperative cases. Antianatomical orientation of the prosthesis caused a significant increase of turbulence immediately after passing the mitral prosthesis. The main stream was changed so significantly that the blood flow shifted towards the septum and caused higher velocities of the stream profiles and turbulence apically. The blood streamed directly towards the mitral valve prosthesis in an S-shaped manner. Increased nonphysiological turbulent flow pattern were observed in the aorta, to a lesser extent with the anatomical position. Additionally, the in- and out-streaming blood seemed to cross each other in the antianatomical orientation and the prosthesis seemed to stay longer open.
Conclusions: To achieve optimal hemodynamics, rotation of the mitral tilting valve has to be considered carefully, as has been long known from aortic valve replacement studies.
In conclusion, a method for quantitative assessment of left ventricular blood flow patterns using magnetic resonance imaging has been employed to detect the consequences of different orientations of mitral valve prosthesis. Clinical studies are required to transfer the results of the animal experiment to humans and to answer the question if the orientation of the prosthesis might be an additional risk factor in postoperative outcomes.

C6-7

OBESITY AND EARLY COMPLICATIONS FOLLOWING CARDIAC SURGERY

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Objective: To assess the prevalence of obesity, and the association between obesity and postoperative complications, in patients undergoing cardiac surgery in the state of Victoria, Australia.
Methods: Retrospective analysis of data, collected by the Australasian Society of Cardiac and Thoracic Surgeons Cardiac Surgery Database Project, of 11460 patients undergoing coronary artery bypass or valve surgery between June 2001 and January 2006 at public hospitals in Victoria. Patients were divided into three groups by body mass index (BMI): non-obese (BMI 20–30), obese (BMI >30–40) and morbidly obese (BMI>40). Prevalence of obesity was compared to age and sex-matched adult Australian population data. Associations between obesity and morbid obesity and the following postoperative outcomes were assessed by univariate and multivariate methods: operative mortality, stroke, post-operative myocardial infarction, pneumonia, prolonged ventilation, reintubation, renal failure, deep sternal infection, readmission to the intensive care unit (ICU), return to theatre for any cause, return to theatre for bleeding, prolonged length of stay.
Results: 31.1% of patients had BMI >30 (29.3% obese, 1.9% morbidly obese) compared to an expected prevalence of 21.4%. Morbid obesity was associated with a greater incidence of prolonged ventilation (OR 2.4, 95% CI 1.6–3.7), readmission to ICU (OR 2.2, 95% CI 1.2–4.1) and prolonged length of stay (OR 2.1, 95% CI 1.4–3.3). Both obesity and morbid obesity were associated with a higher incidence of renal failure (OR 1.4, 95% CI 1.1–1.7; OR 2.9 95% CI 1.7–4.9) and deep sternal wound infection (OR 2.4, 95% CI 1.5–3.8; OR 7.2, 95% CI 2.8–18.7).
Conclusions: Obesity is 1.45 times more prevalent in patients having cardiac surgery in Victoria, compared to the general adult Australian population. Both obesity and morbid obesity are associated with greater early morbidity, but not mortality.

C6-8

THE PATIENTS WITH AN ADDITIVE EUROSCORE >10: FOLLOW-UP AT 30 DAYS AND ONE YEAR

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Objective: Several studies tried to evaluate the real mortality in the high-risk patients in cardiac surgery. The EuroSCORE underpredicts the real risk in this category of patients. We studied the mortality at 30 days and 1 year, the number of hospital readmissions and the evolution of NYHA functional class of the patients with additive EuroSCORE=or >10.
Methods: Were studied 1269 patients who underwent heart surgery in our hospital between June 2003 and September 2005. During follow-up were made periodical clinical exams and, when that it was not possible, phone interviews were made to all patients with additive EuroSCORE=or >10. We statistically analysed the left ventricular end-diastolic volume (LVEDV) additionally to standard EuroSCORE parameters.
Results: Among 1269 patients who underwent cardiac surgery 233 (18.4%) had an additive EuroSCORE=or >10 (average 11.8, range 10–20) with an expected mortality of 29.7%. The observed in-hospital mortality was 17% (n=40). Thus under follow-up were 193 patients: among these 22 (11.3%) died within one year, with an average survival period of 2.8±2.2 months (0.5–7.4 months). Among the 171 survivors at one year 26 (15.2%) had experienced new hospital admissions, 15 (8.8%) were in NYHA class I, 121 (70.0%) were in NYHA class II and 29 (16.9%) were in NYHA class III.
Statistical analysis following a logistic regression model showed that the following significant factors had influenced the 30 days bad outcome of those

critical ill patients: emergency (P=0.001), acute myocardial infarct within 30 days before surgery (P=0.035), severe left ventricular dysfunction (P=0.002) and pulmonary hypertension (P=0.01), postinfarct septal rupture (P=0.005). We used the same statistical analysis in order to find the long-term outcome determining factors. It resulted that acute myocardial infarction at less of 30 days before intervention and previous neurological events are the factors that influence the late mortality (P<0.004 and respectively P<0.044). Left ventricular ejection fraction (LVEF) <35% at from-hospital discharging was well correlated (P=0.013) with the late mortality, while there was no correlation between mortality and the left ventricular end-diastolic volumes (P=0.17).
Conclusions: The patients with LVEF <35% and additive EuroSCORE=or >10 with the contributing factors pulmonary hypertension, recent myocardial infarct and neurological events deserve further care strategy because the mortality risk is 28% and, among the discharged patients, 17% are remaining in NYHA III functional class.

C6-9

LOW INCIDENCE OF COMPLICATIONS IN COMPLETE ARTERIAL MYOCARDIAL REVASCULARIZATION

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Objective: Advantages in late outcomes of myocardial revascularization with the use of arterial conduits are widely recognised. However, concern regarding potential complications, particularly in the elderly, obese and diabetic patients prevents the systematic adoption of procedures of total arterial myocardial revascularization. This retrospective study was designed to evaluate the rate of mortality and morbidity in a consecutive series of patients who underwent complete myocardial revascularization with the exclusive use of arterial conduits.
Methods: From January 1, 1996 to March 15, 2006 a series of 2482 consecutive patients underwent total arterial myocardial revascularization using both internal mammary arteries (LIMA, RIMA) with or without the gastroepiploic artery (GEA). The age of the patients ranged 35–81 years (mean 67 years). Men comprised the 80% of the cases and women the 20%. Diabetes mellitus was present in 34% of the patients, 17% were obese, 12% had coronary obstructive pulmonary disease (COPD), 3.4% had both diabetes and COPD. Elective procedures were performed in 82% of the cases and 18% were urgent. IMAs were harvested as skeletonized vessels in 97% and GEAs in 82% of the cases. Operative strategy was planned according to the coronary anatomy. An anastomosis with the GEA was performed in 631 patients with severe (>90%) stenosis of the right coronary artery. Bilateral 'in situ' IMAs were utilized in 966 patients. In 891 patients a composite Y-graft, with the free RIMA anastomosed to the LIMA, was employed in order to reach the coronary branches of the lateral and posterior aspects of the heart. In seven cases (0.2%) an arterial conduit had to be replaced by a venous graft because of inadeguate blood flow.
Results: Hospital mortality was 1.2%. The incidence of perioperative myocardial infarction was 0.8%. Intra-aortic baloon pump was utilized in 0.6% of the cases. The incidence of stroke was 1.3%. The incidence of mediastinitis was 0.7%. Statistically significant relations between mediastinitis and risk factors have not emerged: obesity (P=0.608), diabetes (P=0.311), both factors (P=0.790).
Conclusions: Complete myocardial revascularization using exclusively arterial conduits can be routinely performed with low mortality and complication rates. Advanced age, obesity, diabetes mellitus and multivessel coronary disease do not represent a contraindication to this procedure even in urgent cases, despite the increased complexity of the procedure. Inadequate blood flow in an arterial graft is a very rare event.

C6-10

MIDSEGMENT HARVESTING OF RIGHT INTERNAL THORACIC ARTERY DECREASES STERNAL ISCHEMIA

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Objective: We aimed to keep sternal vascularity better by harvesting only midsegment of the right internal thoracic artery than using conventional bilateral internal thoracic artery harvesting method, and we evaluated the sternal vascularity with single photon emission computed tomography (SPECT).
Methods: Ninety patients undergoing coronary artery bypass grafting (CABG) were divided into three groups: Patients who will have a full length of right internal thoracic artery as a graft for CABG, group 1 (full-RITA, n=30); patients who will have a midsegment of right internal thoracic artery, group 2 (mid-RITA, n=30); and patients who will not have a right internal thoracic artery, group 3 (non-RITA, n=30). Before the surgery and twice after surgery, all patients underwent a bone scan with SPECT to evaluate the sternal vascular activity.
Results: Postoperative early scans (6.76±0.8 days) showed a reduction of blood flow into the both side of the sternum compared with the preoperative scans (P<0.001). In full-RITA group, there was no significant difference between left and right hemi-sternum (0.563±0.039 and 0.558±0.016 respectively). But, in Group 2 and 3, right hemi-sternum showed significantly better vascularity than left hemi-sternum (P<0.001). Four patients (13%) with diabetes mellitus in full-RITA group had sternal infection (P=0.034); two of them were deep sternal infection with dehiscence. In mid-RITA and non-RITA groups, there was only one patient of each group had superficial infection. The late postoperative scans at six months (156.6±17.1 days) after surgery demonstrated both side of the sternum were affected a reduction of blood flow in all group when compared with preoperative scans, but significantly better flow than the early postoperative scans. In late period, sternum showed significantly higher vascularity in group 2 than group 1 patients (P<0.001).
Conclusions: We can safely use mid-RITA technique with improved sternal vascularity and decreased sternal complications than full-RITA technique.

C6-11

DEVELOPMENT OF RESTENOSIS AFTER PERCUTANEOUS CORONARY INTERVENTIONS AND VASCULAR GROWTH FACTORS

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Objective: Restenosis of coronary arteries after endovascular interventions significantly restricts clinical effectiveness of the procedure in late postoperative period despite recent advances in implantable devices and pharmacological support.
To evaluate changes of humoral expression of vascular endothelial growth factor-165 (VEGF) and basic fibroblast growth factor (bFGF) in patients with coronary artery disease (CAD) before and after percutaneous coronary interventions (PCI) and to determine prognostic significance of these factors as markers of restenosis development.
Methods: The study group included 47 male patients with CAD (mean age 58.3±10.5 years). The control group consisted of 29 healthy male volunteers (mean age 51±6.3 years). Coronary angiography showed single-vessel CAD in 13 (27.6%); two-vessel disease – in 6 (12.7%) and three-vessel disease – in 28 patients (59.7%). PCI were performed on 143 stenotic arterial segments. VEGF and bFGF levels were determined in plasma by ELISA with 'Anthos-2020' microplate analyzer. Blood samples were taken before and 24 h after coronary angioplasty.
Results: The plasma concentrations of VEGF and bFGF were increased in patients with CAD compared to the control group. There was no correlation between the level of growth factors and age of patients, CAD duration, arterial hypertension and cholesterol concentration. The humoral expression of VEGF during PCI revealed no significant changes: 169.9±102.1 pg/ml at baseline and 173.9±101.6 pg/ml after procedure. However, bFGF showed correlation with extent PCI: in patients with revascularization of three arterial segments, the level of bFGF in postoperative period decreased by 2.1, whereas in the group with less intervention it changed insignificantly. Late follow-up (17.4±3.2 months) results were related to the bFGF level at 24 h after PCI irrespective of the number of diseased coronary arteries and extent of revascularization. The presence of angiographically confirmed restenosis correlated with a dramatic drop in bFGF concentration in plasma immediately after intervention (r=0.8708, P=0.0014). At the same time in patients without restenosis no significant change in bFGF level has been revealed.
Conclusions: The plasma concentration of main vascular growth factors depends on severity and extent of coronary atherosclerosis and is an objective criterion reflecting the severity of CAD. Both the total of bFGF level and the consistent patterns of bFGF concentration one day after PCI may serve as reliable indicator of increased restenosis risk in late postoperative period.

C6-12

OPCAB SURGERY IN PATIENTS WITH RISK OVER 10% PREDICTED BY THE EUROSCORE

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Objective: Introduction: The OPCAB method redesigned by Sergeant P in 1999 in Lueven, Belgium allows complete myocardial revascularisation without risks of hemodynamic instability, arrhythmias and cerebrovascular accident during surgery.
The aim of the study: To evaluate the results after OPCAB surgery in high risk patients (over 10% predicted by the EuroSCORE).
Methods: A series of 127 consecutive patients operated in two Institutions (August 2005 – September 2006), according to Sergeant P procedure, is analyzed after a complete myocardial revascularisation. Among those 28 patients (22%) with the mean age of 72.1 years had the mean risk predicted by the EuroSCORE 19.7% (minimum 10.7%, maximum 71.5%). The mean number of coronary anasthomoses was 2.38/patient (2–4). LIMA to LAD was used in all cases.
Results: The postoperative mortality in this high risk group was zero. Neither conversion nor intravenous inotropic support were used. Postoperative arrhythmia was registered in five patients (17.8%). In two patients (7.1%) the pleural drainage due to effusion was necessary and in one patient (3.5%) revision due to haemorrhage was done. The maximum hospital stay was eight days.
Conclusions: Our results confirm the OPCAB technique for complete myocardial revascularisation, can be fully realized even in high risk patients.

May 19, 2007 3rd Congress Day
11:30-13:00
7th Cardiac Scientific Session - Valve II

C7-1

RESULTS OF MITRAL VALVE REPAIR FOR ACTIVE INFECTIVE ENDOCARDITIS: 20-YEAR SINGLE CENTRE EXPERIENCE

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Objective: We retrospectively evaluated early and long-term results of mitral valve repair (MVR) in patients with isolated infective mitral valve endocarditis (MVE).
Methods: Between 04/1986 and 12/2006, 1082 operations due to active infective endocarditis including 368 overall MVE operations were performed at our institution. Fifty of these patients (31 males, median age 48 years) received MVR due to active MVE. Thirty-five patients (70%) had severe MV insufficiency. A variety of ring and leaflet plasty techniques with autologous or homologous pericardium avoiding artificial material were used to restore the MV, with concomitant CABG in four cases (8%). Probability of survival and freedom from recurrence and reoperation were calculated using Kaplan–Meier analysis. χ^2-test was used to identify predictors. Median follow-up of 6.65 years (9 months–19.6 years) was completed in all survivors.
Results: Operative and 30-day mortality was 2% (n=1) and 10% (n=5). The overall 1, 5 and 15 years survival rate was 86.0%±4.9%, 78.7%±6.1% and 60.1%±8.8%, respectively. Freedom from MV reoperation due to failure of reconstruction at 1, 5 and 10 years was 86.6%±5.0%, 84.4%±5.4%, and 79.1%±7.2%. Three patients (6%) developed early recurrent infection, leading to MV replacement in two. At follow-up 89.3% (25/28) of patients had mitral regurgitation of grade I or less.
Conclusions: MVR can be performed when all obviously infected material is resected and the remaining tissue allows re-shaping of a competent valve. Autologous or homologous tissue is used for suture-enforcing pledgets and as additional repair material. As a rule no prosthetic material is implanted. Following these strategies MVR for MVE shows very good early and long-term results.

C7-2

RESULTS OF THE SHELHIGH STENTLESS BIOPROSTHESIS IN PATIENTS WITH ACTIVE INFECTIVE ENDOCARDITIS: 6-YEAR SINGLE CENTRE EXPERIENCE IN OVER 230 PATIENTS

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Objective: This study investigated the early and mid-term results following valve replacement with the new Shelhigh stentless bioprosthesis made entirely of biological material in patients with active infective endocarditis (AIE).
Methods: Over the last 20 years 1082 operations were performed in 1006 patients with AIE at our institution. Of these, 235 patients (mean age 59 years) received Shelhigh bioprostheses between 02/2000 and 12/2006. A total of 72.6% had native AIE and 27.4% prosthetic AIE. Surgery was regarded as urgent in 57.4% and as an emergency procedure in 42.6%. The mean follow-up time is 2.5±0.11 years (range, 5 months to 6.2 years).
Results: There was a highly significant difference in the survival rate between patients who were operated on urgently vs. in an emergency: 30-day, 1-year, 3-year and 5-year survival was 83.7%, 67.7%, 63.6%, and 56.0% vs. 57.3%, 45.3%, 34.9%, and 31.0%, respectively. The main cause of early death was septic multiorgan failure. Only nine patients required reoperation due to reinfection of the Shelhigh bioprostheses (3.4%).
Conclusions: Our experience in the use of Shelhigh bioprostheses in patients with native and prosthetic endocarditis shows the early and mid-term results, in particular the low reinfection rate and the good hemodynamics, to be comparable with the results achieved using homografts. Since these prostheses are readily available and their implantation straightforward, they are increasingly being used in patients with endocarditis. These promising results need to be verified in the long-term.

C7-3

INITIAL CLINICAL EXPERIENCE WITH NEW SUTURELESS TRILOGY AORTIC VALVE SYSTEM

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Objective: Aortic valve replacement is a standardized but complex and time-consuming procedure requiring considerable invasiveness. Further, stented biologic prostheses have limited durability due to calcification of valve leaflets and elevated pressure gradients in small valve sizes. A new tri-lobal bovine pericardial valve has been developed to address these issues. The Trilogy valve consists of a flexible, stand-alone gasket which is similar to an annuloplasty ring and bovine pericardial valve (crown). Tissue Retention Elements (TREs) are deployed with a rapid-fire delivery tool for fixation of gasket to annulus. The valve crown with leaflets, is mounted onto the gasket using a guiding and locking mechanism. Utilizing a modular and sutureless implantation technique, this system (TAVS) offers potential long-term durability, rapid implantation, superior hemodynamic performance and adaptation to minimally invasive approaches.
Methods: Five European centers enrolled 12 patients in an approved feasibility trial called EASE (European Arbor System Evaluation). Patients were indicated for isolated AVR or AVR/CABG. Pilot studies of duration of standard AVR with conventional prostheses enrolled 233 patients (control group). Hemodynamic performance was assessed at discharge and reviewed by an echocardiographic core lab. A standard sternotomy was used in 11 cases, and 1- with upper mini-sternotomy. Implant time was measured from completion of annulus sizing to final attachment of prosthesis (conventional procedure) or valve crown (TAVS). Interim steps included insertion of an independent sewing ring (gasket), attachment of the gasket to annulus with staples (TREs – Tissue Retention Element), and locking the valve crown to the gasket.
Results: In control group mean cross clamp time and time from start of cusp removal to end of suture tying were 73 and 44 min. Moderate and severe difficulties in suturing were noted in 23%. In group with TAVS time of implantation was about 25 min. No difficulties in placement of TAVS were noted. No perivalvular leaks were reported at discharge by echo core lab. Hemodymanic parameters (EOA, MPG) immediately after operation and at

discharge compared favourably to existing valve technologies. The learning curve for this system was minimal, as evidenced by the procedure times measured.
Conclusions: These initial results demonstrate the feasibility of the modular and sutureless Trilogy Aortic Valve System in humans. Early hemodynamic results and implantation times are encouraging. Further studies need to be performed to demonstrate the clinical outcomes and long-term durability of this new concept in AVR.

C7-4
IS IT JUSTIFIED TO PERFORM THE ROSS PROCEDURE IN ELDERLY PATIENTS?
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Objective: Although the Ross procedure allows optimal left ventricular regeneration and excellent hemodynamic behavior, it is controversial to perform this operation in patients 60 years or older.
Methods: Since May 2000, 375 consecutive patients received a Ross operation in which we identified 116 patients over the age of 60 years. The mean age was 65.2±3.2 years (range 60–76 years). Concomitant procedures were performed in 55 patients (47%), coronary bypass surgery in 21 patients, ascending aorta aneurysm repair or replacement in 15 patients, mitral valve repair or replacement in 13 patients, and atrial ablation in six patients. Transthoracic echocardiography was obtained preoperatively, at discharge and at yearly intervals. Records were evaluated for survival, clinical status, adverse events and valve function.
Results: Follow-up was 100% complete. Hospitality mortality was 2.6% (three patients). Up to 4 years of follow-up, one cardiac and two non-cardiac deaths occurred. During follow-up, two patients were reoperated on the neo-aortic valve. The average mean pressure gradient at discharge over the neo-aortic valve was 5±2 mmHg and at the at the latest follow-up 4±1 mmHg, with absence of neoaortic regurgitation regurgitation.
Conclusions: The Ross operation showed to be an appropriate option in elderly patients due to excellent hemodynamic behavior and low reoperation rates.

C7-5
ROSS OPERATION: LONG-TERM RESULTS AND THE RISK FACTORS FOR AUTOGRAFT DILATATION
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Objective: Progressive dilatation of the pulmonary autograft after the aortic root replacement remains the main risk factor for reoperation. We represent our follow-up results with attemption to identify the risk factors for dilatation and progressive aortic regurgitation.
Methods: One hundred and eight Ross and three Ross-Konno operations were performed between December 1993 and August 2006. All operations were performed as a total root replacement. The relation of the patient age, time from the operation, preoperative aortic valve disease, diameter of aortic annulus, root and sinotubular junction (STJ), role of the autograft supporting with pericardial and synthetic strips to development of the autograft dilatation and progression of the autograft regurgitation was examined.
Results: Early mortality was 6% (seven patients). There was consistent and substantial increase over time in the mean dimensions at the root and STJ levels in all patients. In patients with preoperative diagnosis of aortic insufficiency and large diameter at all levels, dilatation of the aortic root and STJ was expressed mostly. One patient was reoperated due to severe autograft insufficiency due to aortic root and STJ dilatation after 4 years, one-due to aortic root aneurysm with mild insufficiency after 5 years. In one patient autograft valve was replaced with mechanical prosthesis due to endocarditis. Dilatation of the aortic root was more rapid in patients with increased blood pressure. There were five replacements of the pulmonary homograft. At 10 years actuarial freedom from reoperation on pulmonary autograft was 95%, in the pulmonary homograft 93%. Risk of autograft dysfunction in patients with dilated STJ at 5 years is 10%, at 8 years 50%, at 10 years -87%.
Conclusions: Long follow-up of patients after the Ross procedure with aortic root replacement showed excellent surviving after 12 years. The main risk factors for dilatation of the aortic root and STJ are: time after the operation, preoperative diagnosis of aortic insufficiency with large diameters at all levels according to BSA and increased blood pressure. Dilatation of the aortic root does not increase the aortic insufficiency until the aneurysm formation or dilatation of the STJ is detected. Dilatation of the STJ is associated with increased risk to the development of the autograft dysfunction. Pericardial strips do not prevent from aortic root dilatation. There were no significant dilatation in patients with synthetic strips.

C7-6
AORTIC VALVE REPLACEMENT IN THE OCTOGENARIANS: THIRTEEN YEARS OF EXPERIENCE WITH BIOLOGICAL PROSTHESIS
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Objective: The aging of the population is pushing forward the surgical limits, and octogenarians are becoming a relevant pool of patients suitable for aortic valve replacement. To reduce the mortality and the morbidity, a full preoperative screening and a perfect surgical timing are mandatory. In this study we describe our thirteen-year experience in aortic valve replacement for this group of high risk patients.
Methods: Between 1993 and 2006, 111 octogenarians (mean age 82±2.5 years) underwent a planned aortic valve replacement. In particular, the valve disease was a pure degenerative stenosis in 95 patients (85.58%), a regurgitation (due to acute endocarditis) in four patients (3.6%) and a mixed disease in 12 patients (10.81%). Sixty-three patients (56.75%) suffered of systemic hypertension and 25 (22.52%) had a chronic kidney insufficiency. According to the age, they all received a biological valve prosthesis. In one case the aortic root was also enlarged and fifteen times a sub-valvular septal myectomy was performed.
Results: The hospital mortality was 5.4% (six patients) and it was due to cardiac decompensation (3), multi organ failure (2), and sepsis (1). One patient developed a sternal wound infection and four patients had a transitory postoperative acute kidney insufficiency. Five patients were re-operated for hemostasis. In our series, there were no postoperative neurological events. The mean hospital stay was 12 days and all patients survived at surgery were followed-up: there were no cardiac re-operations and they all had a good age-related quality of life. The mean life-expectancy after aortic valve replacement in our series of octogenarians was 7.5 years.
Conclusions: The aortic valve replacement procedure in the octogenarians is feasible and safe. The postoperative complications rate and the neurological events can be significantly reduced, and the new generation of biological heart valve prosthesis can reduce the risk of graft degeneration and re-operation.

C7-7
OCTOGENARIANS AND VALVULAR HEART SURGERY: DOES CONCOMITANT CABG INFLUENCE OPERATIVE OUTCOME
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Objective: Octogenarians constitute a growing proportion of cardiac surgical practise in the United Kingdom. This is largely due to the improved standards of medical care coupled with increasing life expectancy in the industrialized nations. Valvular heart disease accounts for a significant number of these patients. We analysed the characteristics and outcomes of octogenarians undergoing valve replacements, both in isolation and in combination with coronary artery bypass surgery (CABG), at our tertiary referral institution.
Methods: Prospectively collected data from the cardiac registry of our unit was analyzed. Preoperative risk factors and in hospital mortality in were evaluated in 139 patients who underwent valvular surgery±CABG.
Results: From October 1997 to November 2006, 6222 patients underwent cardiac surgery at our institution. This included 255 octogenarians. Fifty-eight patients had isolated valve replacement (Group 1) and 81 patients had valve replacement+CABG (Group 2). They had a similar mean age (82.8±2.06 vs. 82.7±5.44) the two groups were similar for incidence of diabetes (8.6% and 9.8%) and hypertension (53.4% and 56.79%). There was an increased incidence of smoking and peripheral vascular disease in the CABG and valve group (Group 1). There was a marked rise in Group 1 in the patients with renal impairment (25.9% vs. 8.6%) and impaired LV (62.9% vs. 48.2%). Non elective cases were more frequent in the combined valve and CABG group (Group 1) - 56.7% vs. 39.65%. However, the time spent on ITU and the inotropic requirements were comparable for both the groups.

There was a greater mean blood loss for the combined valve and CABG group (1090 ml vs. 802 ml).
Isolated valve surgery in the study group was associated with a mortality of 5.17% whilst the combined valve and CABG group had a mortality of 4.9%.
Conclusions: Based on our experience, concomitant CABG at the time of valvular heart surgery does not adversely affect the operative outcome. The very favourable results in the more challenging CABG and valve group suggest that these high risk patients should be considered actively for surgery in today's climate of increasing in hospital referrals in an aging population.

C7-8
AORTIC VALVE REPLACEMENT WITH STENTLESS XENOGRAFT CRYOLIFE-O'BRIEN. TWELVE YEARS FOLLOW-UP
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Objective: This study was conducted to prospectively evaluate the twelve years follow-up results after aortic valve replacement with the Cryolife-O´Brien stentless xenograft.
Methods: Between October 1993 and December 2006, 251 patients underwent aortic valve replacement with stentless xenograft Cryolife-O'Brien. There were 130 males (51.8%) and 121 females (48.2%) with an age media of 71.29±7.71 years.
The most frequent aortic valve lesion was the aortic stenosis (64.5%), followed by aortic insufficiency (10.8%) and double lesion (24.7%).
The ethiology of the aortic valvulopathy was degenerative in 80.9% of patients, reumatic in 12%, congenital valve disease in 4%, infective endocarditis in 2.8% and previous prosthesis disfunction in 0.4%.
Sixty patients underwent an associated procedure: CABG (18.3%), mitral surgery (3.2%) and aortic supracoronary graft (2.4%).
Results: 30-day hospitalary mortality was 5.6%. The identified mortality predictor factors were CPB time, ischaemic time and preoperatory NYHA class. The mean follow-up time was 10.37±3.9 years. There were 40 late deaths during the follow-up period. The survival rate was 93.8±1.6% at 1 year follow-up; 81.3±3.4% at 5 years; 70.8±6.6% at ten years, and 57.9±7.4% at 12 years.
There were 11 embolic events. The freedom of embolic event rate was 98.3±1.1% at 1 year follow-up; 94.9±2.1% at 5 years, and 92.1±2.6% at 10 and 12 years.
The incidence of infective endocarditis in prosthetic valve was 2%. The freedom of infective endocarditis rate was 98.6±0.7% at 1 year follow-up; 98.0±1.5% at 5 years, and 96.7±1.5% at 10 and 12 years.
Twenty-one xenografts were explanted because technical failure (two patients); haemolytic anemia (one patient); prosthetic endocarditis (Four patients), and primary prosthetic dysfunction (11 patients). The aortic xenograft was substituted in three patients as a prophylactic measure during other cardiac procedure. The freedom of redo rate was 97.7±0.9% at 1 year follow-up; 94.1±2.5% at 5 years, and 86.8±7.15% at 10 and 63.6±11.7% at 12 years.
Conclusions: The aortic stentless xenograft Cryolife-O'Brien is an excellent and safe alternative to aortic valve replacement in aged population with a great late survival rate and a low complication rate.

C7-9
AORTIC VALVE SUBSTITUTION IN PATIENTS WITH POOR VENTRICULAR FUNCTION
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Objective: Aortic valve substitution in patients with poor ventricular function is associated with high mortality and morbidity and little is known about how patients evolve. We present our experience with this group of patients.
Methods: We analyzed our results with 141 patients who had an aortic valve replacement (with or without CABG) between 1987 and 2005. All of these patients had an ejection fraction of than 40% (mean 34%). Of these patients, 15% were diabetic, and 37% had hypertension. Average age was 65 years (range 27–86). Preoperative functional class was III–IV in 88% of patients. Stenosis was present in 52%, 27% had insufficiency, and 21% double lesion. By echocardiography mean valvular area was 0.85±0.3 cm^2, for the stenosis group and mean telesystolic diameter was 54±10 mm for the insufficiency group. CABG was required in 35 patients. Follow-up was by post or telephone and evaluated major events, functional class and survival.
Results: Follow-up was completed for 95% of patients. Mean duration was 5.7 years (861 patients/year). Hospital morbidity was 23%. Hospital mortality was 1.4%. Survival was 96.2% at one year, 84.7% at five years, and 56.1% at ten years. At 10 years, 77% of survivals were in class I–II.
Conclusions: Hospital mortality was low and postoperative morbidity was acceptable.
Survival at 10 years was much better than that reported for drug treatments in this group of patients.
Poor ventricular function is not in itself a contraindication for valve surgery.

C7-10
PATIENT-PROSTHESIS MISMATCH CAN BE PREDICTED AT THE TIME OF OPERATION
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Objective: Patient-prosthesis mismatch is a frequent cause of high postoperative mortality and gradients. The objective of this study was to determine whether mismatch can be predicted at the time of operation.
Methods: Indices used to predict mismatch were valve size, indexed internal geometric area and projected indexed effective orifice area (EOA) calculated at the time of operation, and results were compared with the indexed EOA measured by Doppler echocardiography after operation in 1097 patients.
Results: The sensitivity and specificity of these indices to detect mismatch, defined as a postoperative indexed EOA of 0.85 cm^2/m^2 or less, were 30% and 84% for valve size 47% and 86% for indexed internal geometric area, and 79% an 87% for projected indexed EOA.
Conclusions: The projected indexed effective orifice area calculated at the time of operation accurately predicts mismatch, where as valve size and indexed internal geometric area cannot be used for this purpose.

May 19, 2007 3rd Congress Day
11:30-13:00
8th Cardiac Scientific Session - Heart Failure

C8-1
LEFT VENTRICULAR RECONSTRUCTION FOR POST-ISCHEMIC CARDIOMYOPATHY: THE S. ANNA HOSPITAL EXPERIENCE
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Objective: To report our experience with left ventricular reconstruction (LVR) in patients with post infarction cardiomyopathy.
Methods: From March 2002 to December 2006, 190 patients (28% female, age: 67.7±9 years) with post-ischemic left ventricular wall thinning (<6 mm) were operated. Preoperative clinical profile: N.Y.H.A. class III–IV: 87 patients; E.F. (mean±S.D.): 31±7%; Mean number of diseased coronary arteries: 2.2±1; Akinetic area 107 patients (diffuse 52%), diskinetic area 83 patients; Moderate-severe mitral regurgitation: 48 patients; I.A.B.P. support: 16 patients; EuroSCORE: 5.7±3.8. Operative procedures: all the patients received an LVR as proposed by Dor; Associated CABG: 171 patients; Mitral valve procedure: 41 patients (75% repair); Left ventricular epicardial lead implantation for early resincronization: 8 patients. I.A.B.P. support: 80 patients. Follow-up: 28±15 months, 95% complete.
Results: In-hospital overall mortality: 8% (16 patients, all with diffuse asynergic area), mortality in elective procedures: 4.7%. No difference in mortality was found between akinetic and diskinetic left ventricular wall. At follow-up there were ten cardiac related deaths. In five patients a re-operation for severe mitral regurgitation was required. Twenty-two patients received an implantable cardioverter-defibrillator for ventricular arrhytmias or resinchronization therapy. Among survivors, 80% of patients are in N.Y.H.A. class I–II; three patients are in waiting list for Htx.
Conclusions: LVR can be performed with acceptable mortality. An increased mortality seems to be related to the extension of the asynergic area and

not to the presence of diskinesia or akinesia. In our experience, LVR should be considered in all patients with coronary disease and poor left ventricular function with wall thinning and should always be associated with extensive coronary revascularization, mitral repair/replacement and resincronization therapy when necessary.

C8-2

CAUSES OF REPEATED REMODELING OF LEFT VENTRICLE AFTER DOR PROCEDURE

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Objective: To reveal morphological factors causing unfavourable follow-up outcome of surgical treatment of patients with ischemic cardiomyopathy (ICMP) and with left ventricle (LV) aneurysm according to the data of intraoperative biopsies of LV myocardium and right atrium (RA) auricle.
Methods: The object of the study was biopsy material of LV myocardium and RA auricle from 48 patients with ICMP. CABG was performed in 12 of them and the rest 36 patients were operated for reconstruction LV geometry in combination with CABG. Clinical criteria of patients' inclusion into the study were the following: ESI LV >80 ml/m^2, EDP LV >30 mmHg, LV EF <40%, presence of a- and dyskinetic areas in LV, angina of III–IV class CCS, heart failure of III class NYHA, ICMP from 1 to 8 years. Number of distal anastomoses is 3.6±1.1; degree of MR – 1.51±0.92. Histologic specimens were coloured with hematoxyline and eosin; electron microscopic study of cardiomyocytes was held. The following morphometrical parameters were estimated for revelation of postoperative remodeling risk factors: parenchymal-stromal ratio (PSR), trophic index (TI), zone of pericapillar diffusion (ZPcD), Kernogan index (KI) and specific volume of granules of natriuretic factor (NUF) in atrial cardiomyocites.
Results: In all the patients LV EF increased statistically significantly (from 39.5±5.8% to 45.8±4.4%) in the early postoperative period; LV EDI decreased (from 144.6±13.8 ml/m^2 to 108.4±8.9 ml/m^2) (P<0.05). In the follow-up period (1 year) all the patients were divided into two groups: in 36 patients (the 1st group) volume of the cavity, contractile function of LV remained satisfactory. In the rest 12 patients (the IInd group) there was noticed significant decrease of LV EF (up to 34.4±4.7%) due to increase of LV EDI (up to 129.3±13.1 ml/m^2 (P<0.05)). Drawing morphological parallels of postoperative heart remodeling in patients with ICMP showed that diffusive, lymphocytic-macrophage inflammatory infiltration of myocardial stroma in combination with severe fibrosis (PSR<1.5), low TI (<0.015) and big value of ZPcD (>1000 mcm) and KI (>1.6) of LV myocardium are the factors connected with unfavourable follow-up results of surgical treatment. Degree of MR comprised 1.08±0.79 and 1.91±1.08, correspondingly, for the patients with positive and negative dynamics of the follow-up postoperative period. Moreover, we showed inverse correlative relationship between content of NUF granules in the cardiomyocites of RA auricle and the outcomes of Dor procedure.
Conclusions: Thus, combination of the foregoing features is morphological predictor of postoperative heart remodeling in patients with ICMP.

C8-3

HEMODYNAMIC EFFICIENCY OF GEOMETRICAL RECONSTRUCTION OF THE LEFT VENTRICLE (LV) IN CASE OF POSTINFARCTION ANEURYSM AND ISCHEMIC CARDIOMYOPATHY

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Objective: To study the impact of left ventricular geometrical reconstruction influence on parameters of contractile function of LV and hemodynamics in early postoperative period.
Methods: Geometrical reconstruction of the left ventricle has been performed in 411 patients with various forms ischemic cardiomyopathy. There were 368 men and 43 women. Mean age was 54, 3 years. All patients were with Canadian cardiovascular society class III or IV angina and with NYHA class II or III. They were 3, 4 class in average according to CSS, and 3, 2 class according to NYHA. The surgery was carried out with the use of synthetic patch excluding all fibrotic segments from the LV cavity. The average amount of bypasses was 3.1 for one patient. LIMA was used in 97% of cases. Forty-four patients underwent additional surgery on mitral valve, 13 - tricuspid repair, and one patient - aortic valve replacement. Results of the operations were estimated according to the data of transthoracic and transesophageal echo, the hemodynamics was evaluated by Swan-Ganz catheter.
Results: Indexes of LV sphericity and conicity before surgery were accordingly: 0.6±0.02 and 0.52±0.01, respectively 0.76±0.02 and 0.88±0.06 (P<0.05) respectively, what testifies about significant reverse LV remodeling following after the reconstruction with restoration of LV shape, which is close to normal elliptic shape. Average EDV index decreased from 156±23 up to 91±17 ml/m^2, LV EF increased from 29.5±5.1 up to 41.1±6.2%. Significant increase of cardiac index, decrease of pulmonary artery pressure, and also increase of streams speed and restoration of spiral orientation of a blood flow in the cavity of LV were evident.
Conclusions: Geometrical reconstruction of the left ventricle results in the improvement of hemodynamic parameters, restoration of geometrical ratio, and normalization of speed and spiral orientation of a blood circulation in the LV cavity.

C8-4

PAPILLARY MUSCLE APPROXIMATION FOR FUNCTIONAL MITRAL REGURGITATION

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Objective: In patients with ischemic left ventricular dysfunction and functional mitral regurgitation, the surgical treatment of the mitral insufficiency remains a challenging issue. We report a new approach to relocate the displaced papillary muscle towards the mitral annulus, and to reduce tethering.
Methods: Retrospective data from 13 patients operated for Functional Mitral Regurgitation from February 2005 to July 2006 were analyzed.
Results: They were four females (31%), and nine men; with a mean age of 71.9±7.7 years old (range: 48–79). Mean left ventricular ejection fraction was 36±10%. Main clinical antecedents were arterial hypertension (77%), acute myocardial infarction (54%) and tobacco habit (46%). Seventy-seven percent of the patients were in NYHA class III or IV. Mean Logistic EuroSCORE was 19.2±13.6. Three patients had previous PTCA procedures. All patients had mitral annulus dilation and papillary muscle displacement. Papillary muscle approximation with a U-shape single stitch and mitral annuloplasty was performed in all 13 patients. Concomitant coronary artery bypass procedures were performed in eight patients. Mean coronary anastomosis was 2.8±0.5 (range: 2–3). In one patient a left ventricle aneurysm was excluded. Four patients died in the postoperative period, the main cause was septic shock (postoperative pulmonary infection, mediastinatis). Their mean Logistic EuroSCORE was 34.2±14.7. Perioperative transoesophageal echocardiogram showed no mitral insufficiency at the end of the surgery. At the follow-up (mean 11.3±3.5 months, range: 6–24 months) all patients that were discharged from the hospital were alive (n=9). All were in NYHA I (7) or II (2). The echocardiography showed mild or no mitral regurgitation in all nine. Any valve related complication or reintervention was not necessary during the follow-up.
Conclusions: Papillary muscle approximation repositioning showed good results in the short-term in the treatment of functional ischemic mitral regurgitation. Further clinical assessment on LV dynamics and recurrence of mitral regurgitation should be performed in long-term studies.

C8-5

LEFT VENTRICULAR RESTORATION ACCORDING TO MENICANTI IN ISCHEMIC HEART FAILURE MID-TERM RESULTS

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Objective: In patients with coronary artery and poor LV function, ventricular reconstruction (VR) combined with revascularization is viable surgical option. Criteria for patient selection and optimal surgical technique are still debated.
Methods: Ninety-one consecutive patients (74 male/17 female) undergoing ventriculoplasty between March 2003 and February 2006 were analyzed. Reconstruction was accomplished using a template for creating an elliptical ventricle with a precalculated volume. Preoperatively 35 patients (38.5%) had moderate/severe mitral valve regurgitation, mean congestive heart failure (CHF) class was 2.23 and mean EuroSCORE was 6.55. Operative procedure included CABG in 76 patients (83.5%), VSD closure in two (2.2%), mitral

valve replacement in four (4.4%) and mitral valve repair in 31 (16 Paneth-Burr's, 15 undersized mitral annuloplasty).
Results: Hospital mortality was 5.5% (five patients). Significant symptom class improvement was seen 87% with a mean 1.1. Actuarial survival at 2 years was 88%. EF improved postoperatively by 8.5% (*P* 0.004). At 2 year following ventriculoplasty patients demonstrated mild re dilation of the left ventricle and improvement in EF. Moderate/severe MI demonstrated seven patients with suture annuloplasty and not any with undersized mitral annuloplasty (*P* 0.003).
Conclusions: LV reconstruction modo Menicanti proves be safe method. It provides good control of symptoms and improves cardiac function. In case of concomitance MI suture annuloplasty is contraindicated.

C8-6
PRE-OPERATIVE FACTORS INFLUENCING THE SURGICAL LATE RESULTS FOR ISCHEMIC CARDIOMYOPATHY
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Objective: Patients with ischemic cardiomyopathy (ICM) who have large ventricular volume, severe wall motion abnormalities, reduced ejection fraction, and mitral/tricuspid regurgitation, are extremely high risk of death and cardiac events. CABG with surgical left ventricular restoration (LVR) and surgery for mitral valve complex represent a promising therapeutic option for these end-stage patients. Pre- and intra-operative factors which influence the long-term results after operation for ICM were evaluated.
Methods: Eighty-seven patients (Mean age: 67 years) with ICM had CABG with mitral valve operation. Among them, LVR was performed on 38 patients. Cox proportional hazard model for long-term survival and multiple logistic analysis for recurrence of mitral regurgitation and LV remodeling were used for multivariate statistical analysis.
Results: Preoperative factors influencing long-term survival were LVDd (left ventricular diastolic dimension: Odds ratio; 1.721, *P*=0.0292) and EDVI (endiastolic volume index: Odds ratio; 0.880, *P*=0.0457). For recurrent mitral regurgitation, LVDd and PMP (papillary muscle positioning) are the positive factors (Odds ratio; 0.063, 5.915e-5 and *P*=0.0053, 0.0173, respectively). LVDd was the only factor affecting the LV remodeling (re-dilatation: Odds ratio; 0.381, *P*=0.0215).
Conclusions: Among many factors, preoperative LVDd has been revealed to be the most important indicator for long-term survival, recurrent mitral regurgitation as well as LV re-dilatation in ICM.

C8-7
ACUTE CARDIAC SUPPORT FOR CARDIOGENIC SHOCK: A SINGLE CENTER EXPERIENCE
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Objective: Acute cardiac failure, especially when the onset is post-cardiac surgery is a mostly lethal condition. The availability of a simple, quick to implant, easy to manage cardiac support device is mandatory to efficacy address this problem, furthermore in the impossibility of a weaning from bypass pump. In this abstract we report our experience with Levitronix-CentriMag® in our non-transplant center.
Methods: CentriMag® is available at our institution since February 2004. In this period was used in six different patients. In five cases were young patients (<65 years) postcardiotomy failure (one bivalve replacement, two CABGs and two MV-Replacement+CABG) and one case a young lady (28-year) with acute cardiorespiratory failure due to a LES pneumonia. In four cases as ECMO (MEDOS-LT-oygenator applied), in one case was as LVAD and one case an RVAD. The cannulation-sites were both central (RA/LA to Ascending-aorta) or peripheral (Femor-femoral).
Results: Three patients were successfully weaned from support, two died immediately after; one patient was transferred to a transplant centre, where was properly managed. In one case acute RV failure developed few hours after weaning from the ECMO, thus a CentriMag® RVAD support was promptly initiated. The support-devices constantly allowed flow above the 4 l/min. Heparin infusion was used only when no bleeding was present from the drainages (<20 cc/h), and ACT was kept between 200–240 s on ECMO, and around 180 s in VAD support. Standard ICU bed and protocol were applied. Weaning from the devices were initiated when cardiac function was estimated acceptable by TEE-monitoring.
Conclusions: In our experience the Levitronix CentriMag® was an easy and prompt, off the shelf, cardiac support device. In our center with no transplant and limited cardiac support experience the device allowed cardiovascular resuscitation in extremely diseased patients. Is still unclear in our limited experience, when and on which parameters should be driven the weaning and the device removal.

C8-8
PROGNOSTIC VALUE OF MYOCARDIAL VIABILITY IN SEVERE ISCHEMIC LEFT VENTRICULAR DYSFUNCTION AND CHRONIC ANTEROAPICAL ANEURYSM
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Objective: This study sought to define the prognostic value of myocardial viability in patients with severe ischemic left ventricular dysfunction and chronic anteroapical aneurysm who underwent endoventricular patch plasty with associated coronary grafting.
Methods: This retrospective study selected 37 consecutive patients (32 men and 5 women, mean age 59±10.5 years, range 31–75 years) who underwent endoventricular patch plasty for chronic anteroapical left ventricular aneurysm with associated coronary grafting, and preoperative left ventricular ejection fraction (LVEF) 30% (mean 25±4.6%). Main indications for surgery treatment were angina (81%), dyspnea (14%) and ventricular arrhythmias (5%). The mean New York Heart Association (NYHA) functional class was 3.4±1.3.The time-frame of the large anterior myocardial infarction was 5.8±3.3 months. All patients had low-dose dobutamine echocardiography before the operation. Left ventricular systolic function was assessed by wall motion score index at rest (WMSIr) and during low-dose dobutamine (WMSIId), also the extent of LV asynergy during low-dose (A%) was calculated as the sum of no contracting segments (akinetic+dyskinetic) divided by 16 LV segments and multiplied by 100.
Patients were followed-up after 1-year.
Results: Associated coronary artery bypass grafting was performed for all 37 patients (mean of bypass grafts were 3.6±1.7), mitral valve repair for 8 (22%) and mitral valve replacement - 1 (3%), tricuspid valve anuloplasty – 4 (11%), subendocardial resection and cryotherapy – 2 (5%), and postoperative intraaortic balloon counterpulsation was carried out to 10 (27%) of patients. Hospital mortality was 5/37 (13.5%).
After 1-year follow-up mortality was 2/32 (6.25%), and the mean functional NYHA class was 2.2±1.1.
Multivariate models Cox proportional hazards analysis showed that LVEF (odds ratio (OR) 1.18, *P*=0.0557), WMSIId (OR 0.578, *P*=0.0384), A% (OR 0.86, *P*=0.0086) were independent predictors for 1-year postoperative functional NYHA class.
Conclusions: Myocardial viability can predict expectation of functional NYHA class improvement in patients after endoventricular patch plasty for chronic anteroapical left ventricular aneurysm with associated coronary grafting, when their preoperative left ventricular ejection fraction was 30%.

C8-9
HEART TRANSPLANTATION FOR AL AMYLOIDOSIS
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Objective: We report on 144 patients with amyloidosis referred for evaluation for heart transplantation.
Methods: Seventy patients did not complete the evaluation: 18 were found to have too extensive disease, ten died during evaluation, one had new onset Hepatitis B, four had multiple myeloma, 22 patients' cardiac function was judged adequate for stem cell transplant, three were refused for age and general condition, five were refused for familial amyloid, two for recurrent amyloid after stem cell transplant, morbid obesity one, and four patients had insurance refusal or declined transplant. Thirty-one patients completed evaluation but were judged nontransplantable on the basis of too extensive systemic amyloidosis in 26, one underwent liver transplant, multiple myeloma in one, and insurance refusal in three. Forty-three patients completed evaluation and were accepted for heart transplantation. Of these 43, ten died waiting of bradyarrhythmic/EMD sudden deaths, six were removed from the list due to progressive amyloid disease, one received a liver-kidney transplant and one a heart transplant elsewhere, one was

delisted after myeloma diagnosis, one refused transplant and 22 have been transplanted.
Results: There were 11 males and 11 females transplanted with a mean age of 53 years. All were in NYHA class IV or had septal thickness >15 mm or an EF <45%. One and five year survival after transplantation is 85.0±8.0% and 61.7±11.6%, respectively. Thirteen patients died. Nine patients are currently alive at 4, 6, 18, 19, 31, 39, 90, 95 and 111 months after transplant. Two patients developed nephrotic syndrome. These two patients underwent successful kidney transplant 24 and 54 months after heart transplant and remained alive and well for 40 and 114 months after kidney transplant. Eleven patients had stem cell transplants 3, 3, 5, 7, 7, 7, 8, 12, 20, 21, and 24 months after heart transplant. Five are now alive and well at 15, 28, 34, 78, and 89 months – mean 24-h urine protein is 2110 mg (range 86–6454). Mean survival for the transplanted group is 46 months (range 4->111 months).
Conclusions: In this series, heart transplantation achieved improved longevity and quality of life in at least the intermediate time frame. Aggressive treatment of systemic amyloidosis after heart transplantation, including peripheral stem cell transplant, is indicated to treat the underlying systemic disease. We believe heart transplantation should continue to be offered to selected patients with end-stage cardiac amyloid disease.

C8-10
LONG-TERM RESULTS OF HEART TRANSPLANT WITH A FOLLOW-UP >15 YEARS: GRAFT SURVIVAL, POST-TRANSPLANT MORBIDITY AND RISK FACTORS FOR MORTALITY
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Objective: To determine the long-term outcome of patients who underwent heart transplantation 15 to 20 years ago in the ciclosporine era and identify risk factors for mortality.
Methods: A restropective analysis of 148 patients who had undergone heart transplantation between 1985 and 1991 at a single center. Operative technique and immunosuppressive treatment were comparable in all patients.
Results: Mean age was 49.0±12.7 years. Causes of end stage disease consisted of dilated cardiomyopathy, coronary artery disease, and other causes in 45.3%, 40.5%, and 14.2% of the cases respectively. Thirty three percent of patients reported a positive smoking history. Actuarial survival rates were 75% (*n*=111), 58% (*n*=86), and 43.9% (*n*=60) at 5, 10 and 15 years respectively. Mean follow-up was 12.1 years±5.6 for patients who survived more than 3 months after transplantation (*n*=131). The major causes of death were malignancies (35.8%) and cardiac allograft vasculopathy (24.7%). No death related to acute rejection was reported after the first post-operative month. Graft coronary disease was detected on angiography in 50.3% of the 131 patients. Of these seven had retransplantation. Malignancies are represented by skin cancers in 31, solid tumors in 26 and haematological malignancies in 14 patients. Twenty-seven patients (20.6%) showed renal dysfunction requiring dialysis or renal transplantation (*n*=6). By multivaraite analysis, the only pretransplant risk factor found to affect long-term survival was an history of d cigarette use ($P<0.0001$).
Conclusions: Long-term survival at 15 years after cardiac transplantation remains excellent in the ciclosporine era. Controlling acute allograft rejection can be achieved but seems to carry a high risk of cancers and renal dysfunction. History of cigarette use affects significantly long-term survival in our study.

May 19, 2007 3rd Congress Day
11:30-13:00
3rd Cardiovascular Scientific Session

CV3-1
AORTOESOPHAGEAL FISTULA: EXPERIENCE WITH 12 PATIENTS
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Objective: We report our experience of 12 patients with aortoesophageal fistulas (AEF) with special emphasis on the value of in situ aortic allograft replacement.
Methods: Twelve patients presenting AEF were observed between May 1988 and June 2005. There were five men and seven women with a mean age of 55.7 years (range, 27–78 years). Six patients presented secondary AEF following aortic repair including three stent-graftings for descending thoracic aortic aneurysms. Four patients presented primary AEF after rupture of an aneurysm into the esophagus. In the remaining patients, AEF was due to swallowing of a fishbone and erosion of an aberrant subclavian artery. In eight cases involving true AEF with a direct communication between the aorta and esophagus, massive exsanguinating hematemesis occurred. It was usually preceded by minor sentinel bleeding. Two patients presented esophagoparaprosthetic fistula (EPPF). Two patients presented primary AEF that was contained by a large thrombus in the communication. The clinical picture in these four patients involved severe sepsis without hemorrhage.
Results: Two patients died due to massive hemorrhage before assessment and surgical treatment could be undertaken. One 77-year-old woman presenting EPPF refused to undergo surgery and died due to infection. The remaining nine patients underwent surgical treatment with various outcomes. One man died during thoracotomy due to exsanguinating hemorrhage. One woman presenting EPPF was treated by exclusion followed by ascending aorta to abdominal aorta bypass grafting, removal of the prosthesis, esophageal exclusion, and directed esophageal fistula. She died of infection. The other seven patients were treated by in situ aortic allograft replacement. The damaged esophagus was repaired using the Thal technique in one patient who survived. In the remaining six patients subtotal esophagectomy was performed in association with cervical esophagostomy, ligation of the abdominal esophagus, gastrostomy and jejunostomy. One patient died of sepsis during the first 24 h after the operation. One patient died at four months of herpetic encephalitis. The other four patients underwent secondary esophagoplasty and survived with no further sign of infection. Mean duration of follow-up in the survivor group was 62 months (range, 19–105 months).
Conclusions: Our experience confirms that AEF is a rare but catastrophic disorder. In situ allograft replacement usually in association with subtotal esophagectomy appears to be an excellent salvage modality whenever emergency surgery is feasible. The role of stent-grafting remains to be determined, although it may be used as a bridge to conventional surgery.

CV3-2
IMPACT OF ENDOVASCULAR SURGERY ON THORACIC AORTIC ANEURYSM AND AORTIC TRAUMATIC RUPTURE TREATMENT
G. Siniscalchi, P. Tozzi, E. Ferrari, G. Codeluppi, B. Marty, P. Ruchat, L. Von Segesser, G. Siniscalchi
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Objective: Aortic traumatic rupture and aortic aneurysm can be successful treated with the endovascular approach. This procedure has been proven to be safe, effective and consistent. However, the procedure still hides few pitfalls that can potentially affect clinical outcome. Sharing our experience will probably help other surgeons to make the endovascular repair of descending thoracic aorta diseases a straightforward procedure.
Methods: From January 2000 to January 2006, 48 patients underwent endovascular repair of descending thoracic aorta diseases: 18 patients suffered of traumatic aortic rupture and 29 of aortic aneurysm, one patient received open repair of abdominal aortic aneurysm and endovascular repair of thoracic aortic aneurysm. Diagnosis of aortic disease was confirmed in all patients with CT-scan. Criteria for the endovascular repair of aortic traumatic rupture were: isolated intimal lesion, aortic wall haematoma and aortic rupture involving less 1/3 of aortic diameter with or without type B aortic dissection. Criteria for the endovascular repair of aortic aneurysm were: aortic neck smaller than 44 mm and residual aneurysm lumen smaller than 55 mm. Endoprothesis was deployed under intravascular ultrasound and fluoroscopy control. The criteria for successful procedure were the occlusion of thoracic tears, the complete exclusion of the aneurysm and the absence of endoleaks according to the thoracic CT-scan 1 week after the procedure.
Results: Fifty-one endovascular procedure were realize in 48 patients. Mean age was 32.6 years (14 to 77). In one patients uncovered tip was deployed into the brachio-cephalic trunk without causing cerebral lesions and was removed 8 weeks later; two patients suffered of diffuse cerebral embolism; subclavian artery origin was occluded in four patients, none received immediate subclavian artery revascularisation; two patients had laceration of the vascular access that required vascular reconstruction; one patient had endoprosthesis disconnection causing endoleak type IV. Four patients had endoleak type I that required, in two cases, late endovascular correction. One patient developed subclavian steal 1 year after

the occlusion of the left subclavian artery and will receive a carotido-subclavian artery bypass.
Conclusions: Preoperative accurate sizing of the arterial access and in situ introducer sheath dilatation can avoid vascular lesions due to the introduction of the delivery system. Positioning of the guide wire into the left ventricle and identification of all supra aortic trunks help to reduce the endograft misplacement. Small endoleak type I do not necessarily require immediate treatment, because they often disappeared after few months. Longer endoprostheses could avoid disconnection of multiple implants.

CV3-3
ENDOVASCULAR TREATMENT OF AORTIC ISTHMIC RUPTURE; MID-TERM RESULT
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Objective: Short- and mid-term results evaluation of endovascular management of traumatic aortic isthmic ruptures.
Methods: Between 2001 and 2007, ten patients (7 males; mean age 43 years) underwent an endovascular treatment of an acute aortic rupture.
Eight procedures were emergent with three hemodynamic instability with a Glasgow scale of 3, 5 and 7. Associated traumas were severe brain, liver and pelvic bone injuries. All procedures were performed with a TEE peroperative monitoring. The mean number of deployed stent graft was 1.1 per patient. We used 1 AneuRX, 1 Gore and 8 Medtronic Talent endografts.
Results: In nine patients, the stent graft deployment was successful. One patient experienced a distal migration of the deployed stent graft. One laparotomy was necessary to remove the migrated graft through the abdominal aorta.
All patients survived their traumatic isthmic rupture.
During the mean follow-up of 33 months (3 to 67) we have no late death and no endoleak.
The mean intensive care unit stay was 48 h (24 to 168 h). The mean hospital stay was 11 days (8 to 43 days).
Conclusions: The short- and mid-term results of endovascular treatment of acute traumatic aortic isthmic rupture are encouraging and are favourably compare to the surgical approach. More experience is needed to define the optimal timing of the treatment.

CV3-4
ACUTE AORTIC SYNDROME
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Objective: Acute aortic syndrome (AAS) is a number of symptoms developed at acute disorder of one or more aortic layers integrity, when only surgery is a way to preserve the patients' life. These symptoms include acute aortic dissection type A and aortic rupture.
Methods: Since December 2002 to December 2006 we have performed 105 operations for aneurysms of the thoracic aorta. Of those, 20 (19.1%) operations were performed for AAS. Etiological reasons were: in 13 – acute aortic dissection type A, two had aortic rupture due to aortic dissection type A, 1 – mycotic aneurysm, acute aortic dissection type B in 4. Operative treatment was performed during 17±10.2 (7–30) h since the admission to hospital. Patients were divided into two groups: I group - acute dissection type A without aortic rupture (13 cases), II group – patients with aortic rupture (7 cases).
In I group CPB was performed according to the scheme 'femoral artery - right atrium', or aortic arch was cannulated at being involved only in ascending aorta dissection (De Bakey type II). We performed operations: supracoronary prosthetics of the ascending aorta – 3, ascending aorta prosthetics with non-coronary sinus (Wolfe) – 1, Bentall procedure – 3, David operation -2. In five cases distal anastomoses were performed with circulatory arrest with temperature 19 grad.
In II group CPB was instituted via peripheral vessels with centrifuge pump Shtokert for active blood sampling and we began incision with temperature 19 grad. Supracoronary prosthetics of the ascending aorta and prosthetics of the discending aorta was performed.
Results: There were 1 (7.7%) death in the I group - polyorganic insufficiency. In the II group there were 3 (42.8%) hospital deaths (30 days): 1 bleeding, 1 polyorganic insufficiency, 1 acute MI.
Conclusions: 1. In patients with dissection type A urgent operations are followed with low mortality rate, and it is reasonable to apply valve-sparing techniques. 2. In cases with aortic rupture it is advisable to institute CPB according to definite schemes taking into consideration localization of the rupture; incision is performed after the CPB institution and patient's cooling.

CV3-5
STENT-GRAFT REPAIR OF ACUTE TRAUMATIC LESIONS OF THE THORACIC AORTA – A SINGLE-CENTER EXPERIENCE
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Objective: Approximately 15% of automobile accident fatalities are associated with thoracic aortic injury, and thoracic aortic trans-section is the second leading cause of death in fatal automobile accidents. Often the survivors have multiple injuries of other organs. The rupture is usually located in the isthmus of the aorta. The mortality rates reported for the open repair of traumatic rupture of the thoracic aorta are still high.
The aim of this present study was to report the experience in a single level one trauma centre with endovascular management of ten patients with acute traumatic thoracic pathologies and to evaluate whether endovascular treatment is a valuable in the emergency setting.
Methods: We prospectively collected the data of all patients between January 2000 and December 2006 in a level one trauma centre. The following parameters were studied: age, sex, Injury Severity Score, endovascular operation time, length of stay in the hospital, length of stay in the intensive care unit (ICU), and mortality, and follow-up data consisting of computed tomographic angiography.
Results: In a cohort of 80 endovascular thoracic aortic procedures, we treated ten patients (m:f=5:5; median age 46 [IQR, 29–68.5] years) with a acute traumatic thoracic aortic lesion endovascularly. Eight patients were primary trauma admissions, whereas two patients were transferred. No patient died before an intended endovascular repair, and no patient was denied treatment because of a dismal prognosis. All patients suffered severe traumatic injury, the median Injury Severity Score was 39.5 (IQR 37.3–43). All endovascular procedures were technically successful, and the median operating time for the endovascular procedure was 90 min (IQR, 65–120 min). The overall hospital mortality was 20% (n=2), and all deaths were unrelated to the aortic rupture or stent placement. No incidence of paraplegia was present. No intervention-related mortality occurred during a median follow-up of 14.7 months (IQR, 9.7–55.8 months).
Conclusions: On the basis of the worldwide experience in elective endovascular procedures, this minimal invasive approach might reduce the substantial mortality and morbidity of open surgery in traumatic thoracic aortic lesions. We conclude that immediate endovascular repair is a safe and feasible procedure for such repairs. The concomitant injuries are quite responsible for mortality, but open procedure related morbidity might be reduced. A delay in treatment is no longer necessary. Furthermore, paraplegia risk might be reduced. However, close and long-term follow-up of the relatively young patients is mandatory.

CV3-6
ENDOVASCULAR TREATMENT OF TRAUMATIC AORTIC RUPTURES
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Objective: Traumatic aortic rupture can be the reason of sudden symptoms or, when self-limiting, can be responsible for long-lasting, asymptomatic pseudoaneurysm. In the acute cases, but also in persistent ones open surgery is a procedure significantly burdened with high risk of morbidity and significant mortality.
Methods: In our Department between June 2002 and December 2006 endovascular repair of post-traumatic descending thoracic injury was performed in 14 patients. The group consisted of 13 males and 1 female aged between 16 and 54 years. In 12 cases the trauma was a result of a automobile accident and in two cases a fall from a hight. Six patient were admitted directly after the accident with multi-organ trauma and shock. The remaining patients were admitted after a varying amount of time after injury due

to pseudoaneurysm presence. Initial diagnosis in these patients was made during routine chest X-ray examination or echocardiogram.
Pre-operative assessment consisted of spiral computed tomography and in four cases preoperative angiography. In all cases thoracic lesion was placed below the ostium of the left subclavian artery.
Results: All patients underwent endovascular repair using straight tube commercial stentgrafts – Talent (6) and Zenith (8). The procedure was conducted under regional epidural anaesthesia except two cases with local and two with general. Upon completion we observed no surgical or neurological complications. Mean follow-up of 18 months was uneventful with CT-surveillance postoperatively, in 6th, 12th month and annually thereafter in all cases.
Conclusions: Stent-graft implantation is the method of choice in treating patients with post-traumatic, thoracic aortic rupture. Minimal invasion during this procedure allows to avoid severe complications which can burden open thoracotomy and clamping of the thoracic aorta. In long-time follow-up it is a safe and effective technique.

CV3-7
ENDOVASCULAR REPAIR OF ACUTE THORACIC AORTIC SYNDROMES
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Objective: Thoracic endovascular aortic repair (TEVAR) of acute thoracic aortic syndromes is an attractive alternative to open conventional repair.
Methods: From January 1999 to December 2006, 181 patients underwent TEVAR at our Institution. Nine acute type B dissections, 4 penetrating aortic ulcers -PAU-, 2 intramural hematomas -IH- and 3 localized isthmic ruptures -LisR- were urgently treated. Indication to urgent repair was based on rapidly expanding aortic diameter, aortic related-pain, hemothorax, and other clinical signs of impending rupture. A total of 22 thoracic endografts (Excluder-W.L.Gore; TX2/TXD-Cook, Talent-Medtronic; Endofit-Endomed) were deployed. Features of the patients, intraprocedural variables, outcomes and complications have been respectively recorded. Follow-up consisted of pre-discharge angio TC, and at 6, 12 months and yearly thereafter.
Results: Correct endograft deployment was achieved in all cases with primary covering of the proximal tear in type B dissections and of the pathological aortic site in the cases of PAU, IH and LIsR. We did not report primary conversions, neither malperfusion syndromes. In the group of type B dissections the perioperative mortality was 22.2% (one case of retrograde aortic dissection with aortic arch rupture and one major stroke) with one case of paraplegia. At a mean follow-up of 29.9 months we did not observe late rupture but distal false lumen enlargement in three patients, still followed. In the PAU, IH and LIsR we reported complete regression of symptoms and of peri-aortic hematoma/hemothorax in all the cases without mortality, significant morbidity or need for reinterventions.
Conclusions: The TEVAR in acute thoracic aortic syndromes is feasible but often limited by the hemodynamic instability of the patients and by the lack of availability of endografts in emergency. In our experience, indication to urgent TEVAR have been reserved to selected patients at high risk of impending rupture not suitable for the traditional surgical approach. In type B dissection we reported significant perioperative mortality and morbidity and significant rates of late enlargement of the untreated distal aortic segments. Patients with localized aortic pathology (PAU, IH and LisR) experienced a greater benefit from TEVAR, with encouraging long-term results. The evolution of materials with development of specific endografts allowing effective tears exclusion, distal flap stabilization and false lumen thrombosis seems to be required to improve the outcomes of TEVAR in acute type B aortic dissections.

CV3-8
COVERED CHEATHAM-PLATINUM STENTS FOR AORTIC COARCTATION: IS THIS AN OPTIMAL THERAPEUTIC PROCEDURE IN ADULTS?
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Objective: The aim of this study is to evaluate if percutaneous transcatheter angioplasty is the best option for repair of aortic coarctation in patients older than 16 years of age.
Methods: Between July 2004 and March 2006, seven patients (aged 16–41 years, mean 24 years; weight 55–81 kg, mean 67 kg) with diagnosis of aortic isthmic coarctation and typical symptoms (systemic hypertension and significant transisthmic arterial pressure gradient) underwent primary stenting. A transfemoral surgical access was used to implant Cheatham platinum (CP) stents, introduced on a Mullins system of 14 F and expanded up to four atmospheres. Mean duration of fluoroscopy was about 20 min. All procedures have been performed in general anaesthesia.
Results: The postoperative outcome was free of complication; anyway all patients presented paradoxal systemic hypertension, treated with a-ßblockers and vasodilators. Hospitalization length was a mean of 7 days, ranging from 5 to 8 days. Follow-up was performed on 5 of 7 patients, with Angio-CT scan demonstrating the patency of the stent. Clinically valid femoral pulses were found in all patients, and 6 to 12 months later 50% of them did not required antihypertensive therapy. All of them turned back to normal pressure values.
Conclusions: The CP stent is suitable for the treatment of aortic coarctation in adults and can be considered an effective procedure with low incidence of complications and low invasivity and hospital stay. Whether these good results will be stable in the long-term needs to be investigated.

CV3-9
ENDOVASCULAR MANAGEMENT OF ACUTE OR CHRONIC TYPE B AORTIC DISSECTION
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Objective: The preferred treatment in uncomplicated Stanford type B dissection involving the descending aorta is conservative with meticulous control of blood pressure. Complicated Stanford type B dissection can be treated with open or endovascular techniques. However, endovascular repair of a complicated Stanford type B dissection has several benefits compared to open surgery. Thoracotomy, extracorporal circulation or aortic cross-clamping and single lung ventilation can be avoided, and minimal anticoagulation is sufficient.
Methods: Twenty-seven patients, ASA-classification III – IV, with symptomatic or progressive type B dissection underwent a thoracic aortic endovascular stent graft procedure between November 1997 and December 2006. Nineteen procedures were performed as acute and eight as elective procedures. Patients were assessed postoperatively by routine CT-angiography within 48 h. Further follow-up investigations were performed after 3, 6, 12 months and annually thereafter.
Results: Stent graft placement was successful in all 27 patients. In hospital mortality rate was 15% including 1 stroke, 2 multiorgan failures, and 1 respiratory failure (4/27). Total mortality rate was 30% including 2 retrograde type A dissections, 1 myocardial infarction, and 1 cerebral hemorrhage (8/27). A total of six patients experienced complications resulting in secondary procedures in four patients. Two patients declined further therapy. Conversion to an open procedure was performed in three patients, 1 due to type I endoleak, and 2 due to retrogarde type A dissection. One additional stent-graft procedure was performed due to type III endoleaks. Further complications included one stroke and two access complications. The cumulative survival rate 1, 2, 3, and 4 years after endovascular therapy was 79%, 79% and 73% and 63% for complicated Stanford type B dissection. Mean follow-up was 43 months (range 2–82 months).
Conclusions: Endovascular stent-graft repair for complicated Stanford type B dissection repair is feasible, although potentially severe complications resulting in secondary procedures, acute or delayed may occur. Indication for endovascular procedures has to be well selected and strong.

May 19, 2007 3rd Congress Day
11:30-13:00
5th Vascular Scientific Session - Abdominal Aorta Aneurysms

V5-1
HISTOLOGICAL CHARACTERIZATION OF AORTIC ABDOMINAL ANEURYSM: INFLUENCE OF DIAMETER AND INTRALUMINAL THROMBUS
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Objective: AAA is characterized by disruption of medial elastin and gross medial collagen deposition. Furthermore, neovascularization is a striking

feature for which hypoxia of the vessel wall as a underlying mechanism has been implicated. Normal aortic intima and inner media are oxygenized by diffusion from the aortic lumen and in this respect intraluminal thrombus (ILT) is thought to cause hypoxia of these layers. We investigated how histological characteristics correlate to clinical characteristics of AAA, including size (Dmax) and ILT-thickness. Furthermore, we directly tried to demonstrate any hypoxia of the aortic wall by means of hypoxia inducible factor 1-a (HIF-1a).
Methods: Thirty-five AAA-patients undergoing conventional aortic reconstructive surgery were included. AAA characteristics were collected from CTA images. Dmax was determined as the cross-sectional maximal anterior-posterior diameter. ILT-thickness was determined as the minimal distance between the aortic lumen and the anterior wall at Dmax. Tissue was collected from the anterior aneurysm wall at Dmax, conserved in formaldehyde and embedded in paraffin. Sections were stained for elastine (Elastine van Gieson, EvG), fibrine (Martius/Scarlet/Blue, MSB), collagen (Sirius red), SMC (a-smooth muscle cell actin, a-SMA) and hypoxia (HIF-1a). Medial thickness was determined by two observers by means of an in-house developed programme for Quantimet. Linear regression analysis was performed.
Results: Mean Dmax and mean ILT-thickness were 70.4 (50.0–80) mm and 25.6 mm (2.2–50.0), respectively. EvG and aSMA staining showed total destruction of elastic laminae and absence of SMCs in the medial layer. Sirius red staining confirmed that this layer consisted of collagen of several grades of maturity. The intimal layer was thickened by fibrin, remarkably no SMC were identified here. All sections showed positive staining for HIF-1a. Mean media thickness was 198.3. Using linear regression analysis no significant relation was found between media thickness, the degree of elastine destruction, collagen deposition, absence of SMC or positive staining for HIF-1a and Dmax and ILT thickness.
Conclusions: Our results suggest that on a histological level infrarenal AAA can not be classified in analogy to clinical characteristics. Furthermore, all sections stained positively for HIF-1a, suggesting hypoxia. As all AAA had ILT, it is possible that even a minimal amount of ILT disrupts diffusion of oxygen from the aortic lumen to the aortic wall. In future studies the oxygen demand of the aortic wall will be estimated and the diffusion capacity and maximal diffusion distance of ILT can be calculated by means of the first law of Fick.

V5-2

PREDICTORS OF HOSPITAL MORTALITY IN PATIENTS WITH RUPTURED ABDOMINAL AORTIC ANEURYSM

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Objective: Recently, the results of elective surgery for abdominal aortic aneurysms have become safety, whereas those of emergency surgery for cases of rupture remain high mortality rate. In the present study, we investigated the risk factors of surgery for a ruptured abdominal aortic aneurysm.
Methods: We studied 51 patients (36 males, 15 females; aged 73.4±9.8 years old) who underwent emergency surgery for a ruptured abdominal aneurysm from January 1979 to December 2006 at Toyama University Hospital. We analyzed age, previous diseases (hypertension, diabetes mellitus, hyperlipidemia, chronic obstructive pulmonary disease, chronic renal failure, ischemic heart disease), preoperative presence of shock (blood pressure lower 70 mmHg), and preoperative hemoglobin and base excess levels in arterial blood as preoperative factors, operating time, amount of bleeding and blood transfusion during the operation, and time from start of surgery until aortic clamping as intraoperative factors, and the organ failure as a postoperative factor. The factors were analyzed using univariate analysis, and stepwise logistic analysis.
Results: Fourteen patients died (hospital mortality 27.5%). Significant differences were observed between the fatal and surviving groups for diabetes mellitus (P=0.017), hyperlipidemia (P=0.048), preoperative shock (P=0.011), amount of bleeding during operation (P=0.0066), amount of blood transfusion (P=0.0246), preoperative hemoglobin (P=0.0419), preoperative base excess in arterial blood (P=0.0046), and postoperative organ failure (P=0.001). The factors were examined using stepwise logistic analysis to investigate hospital deaths in cases with a ruptured abdominal aortic aneurysm, which revealed that intraoperative bleeding of 5000 ml or more (odds ratio 6.756, P=0.039), preoperative base excess in arterial blood of -5 or lower (odds ratio 9.238, P=0.008), and diabetes mellitus (odds ratio 9.024, P=0.062) were factors of hospital mortality. Further, those results showed that the occurrence of postoperative organ failure similarly indicated preoperative shock (odds ratio 6.124, P=0.032) and diabetes mellitus (odds ratio 16.2368, P=0.028) as risk factors.
Conclusions: In the present study, intraoperative bleeding of 5000 ml or more, preoperative base excess of five or lower, and diabetes mellitus were found to be factors of hospital mortality in patients with a ruptured abdominal aortic aneurysm. In addition, it was revealed that the postoperative organ failure was an independent factor for hospital mortality, while preoperative shock and diabetes mellitus were factors that induced organ failure. For improving the surgical outcome in cases with a ruptured abdominal aortic aneurysm, we concluded that prevention of bleeding and immediate surgery before the preoperative shock are important.

V5-3

RUPTURED ABDOMINAL AORTIC ANEURYSM: FACTORS INFLUENCING SURVIVAL AFTER SURGERY

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Objective: To determine variables that could be used to predict survival in patients with ruptured abdominal aortic aneurysm (RAA).
Methods: From January 1997 to July 2005, 133 patients underwent operations for RAA. For each patient, 44 variables were recorded, analyzed and divided into: preoperative, intraoperative and postoperative. In the preoperative subgroup the analysis was completed with the Glasgow Aneurysm Score and APACHE II classification systems. Data were analyzed by both univariate and multivariate methods.
Results: The univariate analysis showed that predictors of an early death were: hypotension and low levels of haemoglobin on admission in the emergency department (P=0.002), a pre-existing peripheral vascular disease (P=0.016), the level of HCO3 (P=0.001), the Apache II score <18.5 (P=0.0003), the rupture location (worse if intraperitoneal P=0.001), total amount of blood transfused (P<0.001), the intraoperative fluids infusion (P<0.001), the intraoperative diuresis (P<0.001), the cardiac complications (P<0.001), the intestinal ischemia (P=0.03) and the days on ventilation (P<0.001). Multivariate analysis confirmed a statistical significance for coexisting peripheral vascular disease (P<0.001), diastolic blood pressure at admission <60 mmHg (P=0.039), APACHE II score <18.5 (P=0.025), HCO3- <21 mg/dl (P<0.001) and intraperitoneal rupture of the aneurysm (P=0.011) as predictors of death.
Conclusions: Results of the study suggested that a coexisting peripheral vascular disease, a diastolic blood pressure at admission <60 mmHg, an APACHE II score <18.5, HCO3- <21 mg/dl and an intraperitoneal rupture of the aneurysm can be useful factors in identifying those patients whose operative risk is prohibitive.

V5-4

POTENTIAL USE OF 18FDG PET - CT IN CLINICAL EVALUATION OF SUSPICIOUS INFLAMMATORY VASCULAR PROSTHESIS

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Objective: PET – CT is a unique imaging tool, as it combines the well known morphologic diagnostic performances of CT (used as anatomical reference in this context) with the unprecedented sensibility of metabolic imaging. So far, the technique has known an increasingly wide use in the oncologic field; however, the same basic principle of oncologic imaging holds true for inflammation/infection, as the increase in glycolitic demands is comparable both in neoplastic and inflammatory cells. Aim of this paper is to consider the diagnostic potential of the technique in evaluating possible inflammatory status in surgical patients who underwent vascular prosthesis implantation with unclear clinical and instrumental picture.
Methods: A group of 12 patients (11 males, 1 female, age 41–82, avg 67.7), who previously underwent vascular surgery for prosthesis implantation, (5 aortoiliac, 3 aortobifemoral, 2 iliac-femoral, 1 femoral- femoral crossover) was selected: inclusion criteria to the group were the presence of clinical conditions highly suspicious for presence of inflammatory post-surgical disease, fever, resistance to common specific therapy, and ill defined or negative results at the conventional imaging diagnostics. All patients underwent PET – CT scan with 18FDG ranging from 3-month to 6 years after primary surgery, after conventional diagnostic imaging (eco, CT, RM) proved not conclusive. PET – CT scans were evaluated by two independent expert readers; presence, extension and entity of hypermetabolism were evaluated. Clinical observation was considered the golden standard.

Results: Eleven patients had a clearly positive scan (ranging from moderate to intense in extension/gradient), with good topographical definition of the inflammatory process; one case was rated as positive but inconclusive because of temporal proximity with secondary surgery. All patients with positive scan resulted affected by inflammatory disease at following clinical workup (coltural evidence was obtained in nine cases); the sensitivity may therefore be considered, at worst, of 91%.
Conclusions: PET – CT has proved to be very reliable in properly defining clinical cases where conventional imaging had failed or resulted inconclusive. Even on the basis of such preliminary results as ours, its use in such cases seems appropriate.

V5-5
MANAGEMENT OF ABDOMINAL AORTIC GRAFT INFECTION: REPLACEMENT USING A CRYOPRESERVED OMOLOGOUS AORTIC GRAFT
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Objective: Management of abdominal aortic graft infection.
Methods: From 1999 until 2006 in our operative unit of vascular surgery have been performed 21 interventions because of graft infection in patients with abdominal aortic reconstruction. 19/21 patients were treated in another vascular centre with a conventional approach without benefit. All patient received a regrafting using a complete human cryopreserved arterial graft.
Results: Six patients, died (mof 3, massive bowel ischaemia 1, shock in emergency 1, septic shock 1) 15 patients were discharged from the hospital with a long-term antibiotic therapy after a CT scan and after 5 years 12 patients are still alive. The follow-up and mortality graft related or not are presented.
Conclusions: In our experience this approach seems satisfactory and could be an alternative for the in situ reconstructions in the treatment of infected graft.

V5-6
TREATMENT OPTIONS OF GRAFT INFECTIONS AFTER ABDOMINAL AORTIC SURGERY
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Objective: Aortic grafts infection is a devastating and often fatal complication, following 1–2% of aortic and aorto-femoral reconstructions. Treatment includes infected graft removal, followed either by extra-anatomical reconstruction or by 'in situ' bypass grafting with synthetic or biological grafts (autologous vein, homograft). In the last decade endovascular treatment was proposed as a 'bridge-solution'. The aim of this study is to report the outcome of patients with aortic graft infection treated at our Institution with different techniques.
Methods: Between January 1993 and December 2006, 65 patients underwent surgery for aortic graft infection, associated with aorto-enteric fistula (AEF) in 46 cases (71%). Previous surgery was performed at another Institution in 29 patients (45%). Mean interval between the first procedure and the reoperation was 4 years (range 1–16). Emergent surgery was performed in 33 cases. Removal of 56 infected grafts and three endo-grafts was necessary in 59 patients (91%), followed by debridment of the infected site. Extra-anatomical reconstruction was done in 36 cases (61%) and 'in situ' reconstruction in 23 cases (39%, silver-coated prosthetic graft in 13 cases, cryopreserved homograft in ten cases). Two patients underwent simple drainage of perigraft collection followed by repeated washings. Endovascular treatment was used in four patients with AEF. In case of AEF, simple duodenal repair was performed in 32 cases (69%) and resection with primary anastomosis in 14 cases (31%). Mean follow-up was 49 months (range 2–142).
Results: 30-day mortality was 22% (14/65). Graft occlusion occurred in seven patients (11%), treated with thrombectomy. In two cases a major amputation was required. Early mortality and morbidity rates were 35% (8/23) in the 'in situ' reconstruction group and 33% (12/36) in the extra-anatomical group (P=NS). AEF and emergency were found to be independent predictors of mortality (28% vs. 5%, P=0.05; e 33% vs. 6%, P=0.01, respectively). At 36 months, mean survival rate was 38% (22/58). No statistical differences were found between 'in situ' reconstruction with prosthetic graft, with homograft or extra-anatomical reconstruction. 8/10 patients treated with implantation of a cryopreserved homograft died at follow-up; of the two surviving, one patient underwent reoperation for graft infection.
Conclusions: Mortality after surgery for aortic graft infection is high and mainly related to the presence of AEF. Based on our experience, there are no differences between 'in situ' and extra-anatomical reconstruction in terms of mortality and morbidity rates. Cryopreserved homografts do not seem to provide significant advantages on long-term survival.

V5-7
THE FATE OF ABDOMINAL AORTA IN PATIENTS TREATED FOR ISOLATED ILIAC ANEURYSMS
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Objective: The aim of the study was to prospectively evaluate early and late results of open and endovascular repair of isolated iliac artery aneurysm (IAA) and to assess the changes in abdominal aorta's diameter during follow-up.
Methods: From January 1996 to December 2006, 39 patients with primary IAA were electively operated; in 32 cases OR was performed, as seven patients had endovascular treatment of their IAA, in two cases with tube cover stent-graft and in five cases with bifurcated endografting; these five last cases were excluded from this analysis, which included 34 patients. Measurement of diameters of abdominal aorta and iliac arteries were obtained by means of angio computed-tomography scans in preoperative evaluation and during follow-up. Early and late results in terms of mortality, major morbidity, reinterventions and graft-related complications were recorded. Mean pre and postoperative diameters of abdominal aorta were compared.
Results: The site of IAA was common iliac artery in 27 cases (10 bilateral), internal iliac artery in six cases and external iliac artery in one case. Preoperative mean abdominal aortic diameter was 22.1 mm (S.D. 6.7). Surgical intervention consisted of aneurysmectomy and tube graft in 27 cases (10 bilateral); in ten cases aneurysmectomy with end-to-end anastomosis was performed, one patient had aneurysmorraphy with proximal and distal ligature of its internal iliac artery aneurysm and in two cases endografting with tube endoprosthesis and hypogastric coil embolization was performed. There were no perioperative (<30 days) deaths; two major complications (retroperitoneal bleeding and acute limb ischemia) occurred. Mean duration of follow-up was 37.7 months (S.D. 28, range 1–120). Estimated 60-month survival rate was 81.5%. No reinterventions, graft thrombosis and graft related complications were recorded during follow-up. Mean abdominal aortic diameter at 36 months was 23.2 mm (S.D. 4.3), with no significative differences with respect to preoperative values (P=0.2, 95% CI -3.2/0.94)
Conclusions: Surgical treatment of IAAA is safe and provides good early and long-term results. During follow-up the diameter of abdominal aorta tends to remain stable, suggesting IAA to be a localized aneurysmal disease and warranting the effectiveness of a surgical approach limited to the affected iliac artery.

V5-8
CAN OPEN AORTIC REPAIR (OAR) BE COMPETITIVE WITH EVAR USING A MINI-INVASIVE SURGICAL PROTOCOL?
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Objective: EVAR trial-1 is a paradigmatic example of various studies which proved the advantages of EVAR on OAR in the perioperative period. We present a retrospective study comparing EVAR with OAR when the OAR patients are managed using a global mininvasive protocol, which we report.
Methods: An attentive evaluation of the perioperative risk and an exhaustive imaging examination are performed in all patients for selectioning the suitable treatment. ASA = II patients or ASA III aged <75 years were addressed to OAR, while ASA IV patients or ASA III aged more than 75 years were assigned for EVAR. In case of unfavourable anatomy for EVAR or other contraindications, patients are treated with OAR. Peculiarities of our global mininvasive protocol consist in: blended anaesthesia (general anaesthesia with continuous epidural analgesic drugs infusion), auto-blood transfusion methods (self blood units storage, cells salvage system during surgery), transperitoneal paraumbilical minilaparotomy (length <12 cm) without evisceration and/or forced tractions on the viscera, fast track protocol in

the postoperative period. We employed a *t*-test for the analysis of continuous variables and a χ^2 test for non parametric data.
Results: Between January 2006 and September 2006, 119 patients were treated for AAA. Twenty-six patients underwent EVAR (group A), 93 received OAR. We have been able to employ a global mininvasive protocol in only 49 patients (group B). Group A patients were elder (78.2±6 vs. 71.6±8; *P* .0007), more frequently female (19.2% vs. 4.1%; *P* .045), and they presented a worst respiratory status (FEV-1: 2.16±0.44 vs. 2.66±0.44; *P* .0001) than the group B. Between two groups we failed to define statistical differences in allogenic blood cells transfusions (0.15 units for patient vs. 0.08), time of intestinal canalization (2.2±1.5 days vs. 2.2±0.9), time of food resumption (1.5±1.6 days vs. 1.9±0.6), length of stay (5.4±5.6 vs. 6.4±2.7), and perioperative complications, except for fever which was more frequent in the group A (57.7% vs. 28.6%; *P* .013). Mortality was null in each group.
Conclusions: OAR appears comparable with EVAR in the perioperative period too if a global mininvasive surgical protocol is used and an attentive patient's selection is respected. Our protocol requires Surgeons, Anaesthesiologists, and Nurses specifically trained.

V5-9
DIAGNOSTIC ACCURACY OF SIGMOIDOSCOPY COMPARED TO HISTOLOGY FOR COLON ISCHAEMIA AFTER AORTIC ANEURYSM REPAIR
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Objective: Clinically relevant rates of ischaemic colitis (IC) causing diarrhoea, systemic involvement, colon necrosis and ultimately death by multiple organ failure only affect 2.7% to 3.3% of patients after aortic reconstructions. The key of treating and saving patients with this complication remains early detection and consequent treatment. The aim of this retrospective analysis of prospectively collected data was to compare the diagnostic accuracy of colonoscopy for detecting postoperative ischaemic colitis compared to histology and to evaluate the inter-observer difference of two experienced surgeons.
Methods: One hundred patients with infrarenal aortic aneurysms, operated electively from March 2001 to December 2003, who had on postoperative days 3 to 6 a sigmoidoscopy by two independent surgeons and histological sample of the sigmoid mucosa, were included in the study. All patients gave written informed consent. The study was approved by the institutional review board.
Results: Histological examination of the sigmoid mucosa revealed IC in 13 patients. The combined sensitivity of both investigators for detecting IC by sigmoidoscopy compared to histology was 84%, the specificity 92.0%, the positive predictive value 61.1%, the negative predictive value 97.6% and the diagnostic accuracy 91.0%. There was no statistically significant difference between investigator one and two (*P*=1.0) and between both investigators and histology (*P*=0.380).
Conclusions: Histology has a higher sensitivity for diagnosing IC after aortic surgery compared to endoscopy. Sigmoidoscopy, however, is an excellent diagnostic tool for detecting clinically relevant IC (grade II and III); only clinically unapparent IC (grade I) is underdiagnosed by sigmoidoscopy. Therefore, sigmoidoscopy remains of utmost importance for clinical decision making after aortic reconstructions.

V5-10
ISOLATED ILIAC ARTERY ANEURYSM, ENDOVASCULAR AND SURGICAL TREATMENT
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Objective: Isolated iliac artery aneurism are rare, <2% of all the arterial aneurysm and can involve any portion of the iliac artery. They are mainly atherosclerotic, and at high risk of rupture. The aim of this study is to assess the indications and the best treatment of this pathology.
Methods: The records of 33 patients treated for true isolated iliac aneurysm between January 1997 and March 2006, have been reviewed; they were 30 male and 3 female (mean age 73 years, range 58–85). Following ASA classifications, 12 were in class 2, 18 ASA 3 and 2 ASA 4.
Two were treated in emergency, one because of rupture and another for iliac-cava fistula.
All the patient operated electively had duplex ultrasound and angio-CT evaluation, to detect the feasibility of an endovascular treatment (EVAR).
Twelve patients underwent open surgical treatment, and 23 EVAR with endograft; four hypogastric aneurysm were treated with coil embolization and one with glue. No needed conversion to open surgery.
The indications to treatment were: diameter larger than 35 mm or abdominal pain.
Patients were evaluated at follow-up by duplex ultrasound and/or angio-CT.
Results: The pre-treatment aneurysm size ranged from 35 to 80 mm in diameter (mean 47 mm); the ruptured one measured 8 cm and that with iliaco-caval fistula 6 cm.
In open surgery we recorded two perioperative deaths, (1 for aneurysm rupture and 1 for cardiac failure, and complications: 1 gluteal ischemia due to embolism after aorto-bifemoral bypass; 1 groin haematoma,1 intestinal sub-occlusion. Following EVAR we observed 1 distal embolization with gluteal ischemia and bottock claudication, and 1 deep venous thrombosis due to vein compression.
The median postoperative length of stay was 3.1 days for EVAR and 7.2 for open surgery.
At a mean follow-up of 22 months (range 3–101 months) we did not record treatment-related complications.
Conclusions: A definite diameter cut-off for indication to treatment of iliac or hypogastric artery aneurysm is not reported; however many studies report ruptures in peritoneum, sigma or in the bladder with high mortality rate and complications.
Based on our experience and currently available evidence we can assume that iliac artery aneurysm larger than 35 mm should be considered for operative repair.
The results of EVAR of iliac artery aneurysm, and exclusion of hypogastric aneurysm showed that EVAR is effective and that can be considered the best approach.

May 19, 2007 3rd Congress Day
11:30-13:00
6th Vascular Scientific Session - Cerebrovascular Insufficiency II

V6-1
ELEVATED COMPLEMENT C3 IS ASSOCIATED WITH EARLY RESTENOSIS AFTER EVERSION CAROTID ENDARTERECTOMY
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Objective: Early restenosis following carotid endarterectomy (CEA) is an inflammatory process leading to myointimal hyperplasia of smooth muscle cells. The risk of restenosis is increased in homozygous of the normal (A) allele of mannose-binding lectin (MBL2) gene. We studied the associations of C3 and as control three non-complement acute-phase reactants (APRs) with early restenosis following CEA.
Methods: Concentrations of APRs were determined by radial immunodiffusion or immunoturbidimetric methods in 64 patients who underwent CEA and were followed up with carotid duplex scan (CDS) examinations for at least one year. MBL2 genotypes were determined by a PCR-SSP method.
Results: C3 levels increased during follow-up and correlated with the percentage of restenosis detected by CDS at 14 months postoperatively, in MBL2A/A allele carriers. Patients with high C3 levels had nearly five-fold higher odds for the presence of significant restenosis even after adjusting for MBL2 genotype, age and gender. By contrast, no such associations were detected between the non-complement APRs and early restenosis.
Conclusions: C3 is associated with and might have a direct role in the development of an early restenosis following CEA which is partially related to an intact MBL lectin pathway, thus determining C3 levels might have clinical importance. On the other hand, our results indicate that the regulation of C3 differs from non-complement APRs.

V6-2
DOES THE TYPE OF CAROTID ARTERY CLOSURE INFLUENCE THE MANAGEMENT OF RECURRENT CAROTID ARTERY STENOSIS? RESULTS OF A 6-YEAR PROSPECTIVE COMPARATIVE STUDY
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Objective: Consensus has not yet been established on the best treatment for severe recurrent carotid stenosis (RCS) after carotid endarterectomy (CEA).

Recently carotid artery stenting (CAS) has emerged as a potential alternative to CEA. Different studies showed that a low echogenicity of the carotid plaque is associated with an increased risk of embolism during CAS.
The purpose of this prospective comparative study was to evaluate the results of redo surgery and CAS in cases of RCS in which the treatment selection was decided on the basis of the echogenicity of the carotid plaque and to compare the Relevant Neurologic Complication Rate (RNCR= fatal + disabling stroke) of all RCS (redo surgery + CAS) and of primary CEA performed during the study period.
Methods: A 6-year (from January 2000 to December 2005) prospective study was performed. Eligible patients were those with symptomatic or asymptomatic RCS >80% at a preoperative angiography or angio-CT. The carotid plaques were classified at a preoperative ultrasound scan, according to the five type classification proposed by Geroulakos with vessel lumen (hypoechogenicity) and periadventitia (hyperechogenicity) as reference structures: type 1 (uniformly echolucent); type 2 (predominantly echolucent; 50% of the structure of the plaque); type 3 (predominantly echogenic; 50% of the structure of the plaque); type 4 (uniformly echogenic); and type 5 (unclassified plaques owing to calcification and producing acoustic shadows). Patients with type 1 and 2 (predominantly echogenic and purely echogenic) carotid plaque were not considered for CAS due to the high risk of embolism during the procedure and therefore underwent redo surgery.
Results: Fifty-six patients with RCS >80%, were enrolled. Fifteen patients with a type 1–2 plaque underwent redo surgery, 41 with type 3–4 plaque underwent CAS (intention to treat). In 90.6% of primary closure a type 3–4 carotid plaque was found; a type 1–2 was observed in 84.5% of the PTFE patch closure group. No statistical difference for the 30-day and the 6-year stroke-free rate was observed, similarly no statistical difference emerged for the 30-day and the 6-year relevant neurological complication rate between the primary CEA performed in the same period and the all procedure performed for RCS (redo surgery+CAS).
Conclusions: CAS is an acceptable alternative to surgery in the management of RCS. An accurate patient selection is required. Restenosis after CEA and direct closure is mostly associated with fibrous material: in these cases CAS might be the best choice.

V6-3
USEFULNESS OF CERVICAL ACCESS AND FLOW INVERSION IN CAS
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Objective: The cerebral protection with filter or balloons during carotid artery stenting (CAS) decrease the embolic neurological complications and the non-protected CAS had 3.9 time more stroke than protected CAS.
Nevertheless the incidence of new ischemic lesions at RMN after transfemoral approach (fCAS) is observed in 20–30% of the cases because the protection is not complete especially during vessels catheterization and crossing the lesion and, on the other hand, the cervical access (cCAS) may reduce the cerebral embolism.
Some reports indicate that the carotid proximal occlusion and flow inversion seems to be the better method to reduce the cerebral microembolism.
The aim of this paper is to ascertain if the combination of cervical access and flow reversal are a useful and safe technique to perform CAS.
Methods: Ninety patients with a carotid artery stenosis were submitted to CAS: 46 via femoral approach and 43 via cervical access. In all these patients the occurrence of cerebral embolism was ascertained by means of transcranial Doppler (TCD) and DW-RMN pre and postoperatively.
Results: The microembolic signal (MES) were 332 in fCAS and 80 in cCAS.
The positive new brain lesion were 32% in fCAS and 11% in cCAS.
Conclusions: the CAS via cervical access seems useful because:

- avoid difficult aortic catheterization
- allows a cerebral protectio during the entire procedure
- the carotid lesion is dilated at low pressure
- the flow inversion is safe and effective.

V6-4
CAROTID ARTERY STENTING IN A NON-SELECTED POPULATION USING THE ACCUNET PROTECTION DEVICE AND THE ACCULINK STENT DEVICE: EARLY AND MID-TERM OUTCOME
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Objective: Carotid artery angioplasty with stenting (CAS) has been used as an alternative to endarterectomy receiving wide acceptance in the recent years. Cerebral protection devices have largely contributed to the efficacy of this method. The purpose of this study is to investigate the feasibility, safety and mid-term outcome of endovascular treatment for extracranial cerebrovascular disease with the elective use of the Accunet protection device and the Acculink stent device of Guidant®.
Methods: Between January 2004 and November 2006, 153 consecutive patients with 169 carotid stenosis were treated with CAS (124 males and 29 females, mean age 67±6 years). Of the 169 lesions, 104 were symptomatic and 65 asymptomatic. Seventeen patients had a GSM between 30 and 90. Patients with GSM <15 were excluded from the study. The mean stenosis was 85±10%. Follow-up was performed by clinical examination and by triplex ultrasonography at one, three and six months after the procedure and annually thereafter. Each patient received dual antiplatelet therapy before the procedure.
Results: Angiographic success was achieved in 156 lesions with residual stenosis of 20–35% in twelve patients. In-hospital neurologic complications occurred in one patient (one global neurologic defect probably due to contrast material). No patient had a stroke or died during the follow-up period. During the same period there were no instances of recurrent stenosis >50%.
Conclusions: This study is highly suggestive of the optimum results of carotid artery stenting with the use of the Accunet protection device and the Acculink stent device in patients with extracranial cerebrovascular disease.

V6-5
CAROTID ANGIOPLASTY AND STENTING UNDER PROTECTION IS BECOMING THE GOLD STANDARD TREATMENT OF CAROTID STENOSIS IN HIGH AND LOW RISKS PATIENTS
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Objective: Carotid Angioplasty and Stenting (CAS) is emerging as a new alternative treatment for a carotid artery stenosis. Cerebral protection devices should be routinely used during the procedure to reduce distal embolization of debris, which may result in neurological deficit. Recent studies have shown that CAS has superior short-term outcomes than Carotid Endarterectomy (CEA) in high surgical risk patients (HR). It is not clear however, whether low surgical risk patients (LR) are also at lower risk. We compared short-term outcomes of CAS in HR and LR patients.
Methods: We analysed all CAS performed under protection devices. HR factors included age=80 years, post surgical restenosis, prior neck surgery or radiation, contralateral occlusion, low or high anatomic lesion, unstable or severe coronary or heart diseases, severe commorbidities. Patients were followed for 30 days.
Results: In our series of 831 CAS, 644 were performed under protection devices in 601 patients (M: 453, F: 148). Mean age: 70.9±9.2 years using occlusion balloon (*n*=334), filters (*n*=305), and reversal flow technique (*n*=6). Four hundred and ten (65%) were found to be at HR and 234 (35%) at LR 64% of the lesions were symptomatic. HR and LR patients had similar success rate of protection device deployment (99% both), and stent placement (100% both).
There was no statistical difference between occlusion balloon and filter for 30-day death and stroke rate (0.3% vs. 0.7%, *P*=ns) and embolic events (1.4% vs. 2%, *P*=ns).
The 30-day outcomes were as follows:

- High-risk patients:
  - TIA: 4 (1%)
  - Minor stroke: 2 (0.5%)
  - Major stroke: 1 (0.3%)
  - Retinal embolus: 2 (0.5%)
  - Hyperperfusion syndrome: 2 (0.5%)
  - Death and stroke: 5 (1.2%)
  - M.I.: 1 (0.3%)
  - Embolic events: 9 (2.2%)

- Low-risk patients:
  - TIA: 2 (0.9%)
  - Retinal embolus: 2 (0.9%)
  - Hyperperfusion syndrome: 1 (0.4%)
  - Death and stroke: 1 (0.4%)
  - Embolic events: 4 (1.7%)

Conclusions: CAS under protection is safe with favourable low event rate in HR and LR patients. LR patients have a trend toward lower death and stroke rate after CAS. compared to CEA, but it is not statistically significant. CAS should be enlarged to LR patients. CAS is becoming the gold standard treatment of a carotid stenosis.

V6-6

NEW DISTAL EMBOLIC PROTECTION DEVICE USING A 3-DIMENSIONAL FILTER

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Objective: Atheroemboli are the rule in any intervention in atherosclerotic disease and the leading cause of complications during PCI, carotid and probably after renal angioplasty. All embolic protection devices (EPDs) have limitations, which could be addressed by a new EPD, the FiberNet™ (Lumen Biomedical Inc, USA).
Methods: The system consists of 3-dimensional expandable filter of unique fibers, which expand radially to fill the lumen, mounted on a 0.014 wire with aspiration. The filter can fill vessels to 7 mm without requiring a disease free landing zone. FiberNet can capture particles as small as 40 microns without compromising the flow.
Results: Forty-nine lesions treated in 48 patients. Male 34/48. Age: 69±10. Average stenosis 84.6%±4.5 (70–99). FiberNet crossed 48/49 lesions. One lesion treated with FilterWire. Average deployment time: 12.4 min±4.5 (7–23). Technical success: 48/49 (98%). No stroke or death within 30 days. Two cases permanent amaurosis. Serious adverse events: 2 MI (not device related). No change noted in 30-day follow-up in 34 patients controlled with CT/DW MRI. All samples visually contained significant amounts of emboli. Preliminary analysis indicated a mean particle size ranged from 28 to 6839 microns with an average of 65.8% of the particles <100 microns, an average surface area of 64 mm² (38–108). Comparisons have been made with other EPDs. Surface area of debris caught in other filters was 12 mm² (3–34), five times less than with FiberNet.
Conclusions: First human use of this new novel EPD in carotid and renal artery stenting is encouraging. The FiberNet was easy to use and confirmed the ability to capture particles <100 microns. Additional patients will demonstrate the overall performance of this new EPD device.

V6-7

THE BENEFIT OF CAROTID ENDARTERECTOMY VS. CAROTID STENTING IN THE OCTOGENARIAN PATIENT: A SINGLE CENTRE EXPERIENCE

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Objective: To compare early outcome of carotid endarterectomy vs. carotid artery stenting in patients older than 80 years.
Design: Retrospective monocentric study by querying last four years of our divisional database.
Methods: One hundred and three patients >80 years old over 770 were found. Seventy (68%) were submitted to carotid endarterectomy and 33 to protected carotid artery stenting. Retrieved data were analysed for type of treatment and for sex, risk factors, co-morbidities, preoperative neurologic status, ultrasound findings, preoperative neuro-imaging, mortality rate, neurologic and cardiac morbidity rates.
Statistical analysis: χ^2 test, Fisher's exact probability test, Mann-Whitney test were used to compare the two populations of patients according to treatment. Stepwise logistic regression was performed to evaluate the variables that significantly and independently predict perioperative complications. A P value <0.05 was considered statistically significant.
Results: There were no differences between the two groups concerning sex, symptoms, risk factors and co-morbidities except for fibrous lipid carotid artery stenosis by US in the CEA group 49 (70%) vs. 5 (15.2%) (P<0.0001). Mortality was 1.4% for carotid endarterectomy. No death occurred in the group of stenting. Cumulative neurologic morbidity was 4.3% vs. 18.2% (P=0.0287) while cardiac morbidity was 4.3% vs. 12.1% (P=ns) for endarterectomy and stenting respectively.
Conclusions: This series shows that carotid surgery for octogenarians is less risky than carotid stenting. Despite its less invasiveness carotid artery stenting has higher perioperative morbidity in elder patients. Stenting can not be offered as a valid alternative to surgery. It must be still scrutinized by large randomized clinical trials specifically in this growing population of old patients.

V6-8

DUPLEX ULTRASOUND CRITERIA IN THE FOLLOW-UP OF CAROTID ARTERY STENTING AND CORRELATIONS WITH THE MORPHOLOGIC RESULT

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Objective: Restenosis is an open question for Carotid Artery Stenting (CAS) and endarterectomy (CEA). Many studies expressed unpredictability and complexity to determine the certainty of restenosis threshold after CAS at Duplex Ultrasound (US). This study aims to compare the incidence of restenosis after CAS (in-stent restenosis, ISR) and after CEA and to determine the US Criteria for assessment of ISR.
Methods: From December 2000 to December 2006, 1035 consecutive CAS procedures (937 patients) and 1589 CEA (1368 patients) were performed in our center. Peak systolic velocity (PSV), end-diastolic velocity (EDV), internal carotid artery to common carotid artery ratio (ICA/CCA) and geometric stenosis measurement (NASCET method) by duplex US were recorded immediately after the procedure (base line value), at 1, 3, 6 and 12 months post-op and then yearly. Every suspected restenosis = 70% was double-checked by angiography. The correspondence between the two exams suggested using the US criteria for the evaluation of ISR after CAS.
Results: The incidence of restenosis after CAS and CEA in our study was, respectively, at 1 year, 2.45% and 2.04% (P=0.63). Moreover the values of PSV, EDV, ICA/CCA in stented arteries (US compared with angiography) for stenosis =70% were 250±30 cm/s, 110±15 cm/s and 3.4±0.3.
Conclusions: In an high-volume center of carotid interventions, ISR is similar to restenosis after CEA. A local validation of the US criteria is crucial to find a new ISR: the base line velocity criteria can reduce the rate of false positive during the follow-up. Waiting for larger studies, we must raise the threshold of PSV, EDV, ICA/CCA to increase the sensibility and specificity of US in determining restenosis.

V6-9

IS DIABETES MELLITUS A RISK FACTOR FOR CAROTID ANGIOPLASTY AND STENTING?

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Objective: Several investigators have noted an increased rate of perioperative neurologic and cardiac morbidity in diabetic patients undergoing carotid endarterectomy. In the last years carotid angioplasty and stenting (CAS) has been proposed as an alternative to surgery at least in some subgroup of patients (high risk, hostile neck, etc.).
Our aim is to assess the perioperative outcome (30 days stroke/death rate and cardiac morbidity) of CAS in diabetic patients vs. non-diabetic patients in a consecutive series.
Methods: Between December 2000 and December 2006, 1035 consecutive CAS procedures in 937 patients were performed. The procedure was conducted by several types of stents (cobalt-alloy frame, nitinol frame) and of embolic protection devices (filter-wire, proximal endovascular clamping device) applied to specific lesion and/or anatomies. The two groups (diabetic group-DM; n=321, 30.98%; non-diabetic group-nDM; n=714, 69.02%) were matched for demographic factors and clinical presentation.
Results: DM patients were significantly more likely than nDM patients to have cardiac disease and lower limb ischemia. No differences were noted in other recorded demographic or intraoperative factors between two groups.
The procedural success was achieved in 1027/1035 cases. The overall perioperative complications rate was <2%. No differences between the two groups were found in stroke/death rate complication (DM 1.7% vs. nDM 1.2%, P=NS) and cardiac morbidity (DM 1.3% vs. nDM 0.7%, P=NS) at 30 days follow-up.
Conclusions: Patients with diabetes who undergo CAS are more likely to have coexisting cardiac disease, which may contribute to a higher incidence of postoperative cardiac morbidity.
In our experience diabetes mellitus alone, however, is not a risk factor for postoperative cardiac morbidity and neurological complications in patients who undergo carotid stenting. Our data indicate that CAS can be performed in diabetic patients with excellent perioperative morbidity and mortality rates that are comparable with those recorded in non-diabetic patients.

May 19, 2007 3rd Congress Day
14:30-16:00
9th Cardiac Scientific Session - ESCVS Young Cardiac Surgeon Prize

C9-1

HIGH THORACIC EPIDURAL ANESTHESIA REDUCES MORBIDITY AND MORTALITY IN HIGH RISK HEART VALVE PATIENTS

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Objective: Heart valve surgery in high risk patients (Patients) is associated with a considerable morbidity and mortality. High thoracic epidural anesthesia has been proposed as a technique to improve the perioperative results. Object of this study was to determine postoperative survival impact of epidural anesthesia with and without mechanical ventilation vs. standard general anesthesia and (2) to explore postoperative complications' freedoms within groups.
Methods: From January 2002 to August 2006, 144 high risk patients with a calculated Additive EuroSCORE >7 underwent elective heart valve surgery. Fifty-five patients underwent surgery with the aid of high-thoracic epidural-anesthesia and were matched to 89 patients on general anesthesia. The patients were comparable on mean age, pre-operative clinical status, and comorbidities (left-ventricle ejection fraction <30%, chronic-renal-failure, pulmonary-hypertension, cerebral-event, myocardial-infarction). Perioperative and postoperative outcomes were compared between matched groups.
Results: Epidural- patients had a lower rate, although not significant, of renal failure (43% vs. 56%), prolonged ventilation (16.3% vs. 27%), and indeed they showed a better myocardial preservation with a lower low-output-syndrome rate (mean Tn-I value (21 vs. 29 g/l)). Patients undergoing heart valve surgery on general anesthesia had comparable in-ICU length of stay (3.4 vs. 3.2 days), atrial fibrillation rate (51% vs. 47%), sternal complications rate (1% vs. 0.5%), and A-V block requiring pace-maker placement (1% vs. 1%). Postoperative mortality was comparable between groups (16.3% vs. 15.6%) and it was quite lower than the predicted by the EuroSCORE (26% and 28.8% in general and epidural group, respectively). Among the epidural group, 16 patients underwent aortic valve surgery without using mechanical ventilation. After matching by propensity scores, awake patients, despite an higher Additive EuroSCORE (awake 11.4 vs. general 10.8), showed in comparison with general group a lower rate of: mortality (6.2% vs. 15.7%: P=0.02), new cerebrovascular events rate (P=0.005), acute renal failure rate (P=0.018); indeed, they showed an abbreviated ICU length of stay (P=0.0008). Moreover, they had a better postoperative myocardial preservation with a significantly lower mean Tn-I detection (P=0.005). Any morbidity epidural-catheter-related has been detected.
Conclusions: Heart valve surgery by using high thoracic epidural anesthesia is feasible and safe. The avoidance of general anesthesia and mechanical ventilation significantly reduces the in-hospital morbidity and mortality in this high-risk subset population.

C9-2

FEASIBILITY AND SAFETY OF ENDOSCOPIC RADIAL HARVESTING WITH A NOVEL VESSEL SEALING SYSTEM

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Objective: Endoscopic radial harvesting faced a recent upsurge thanks to the consistent technological advances in the field of vessel sealing systems. We therefore aimed to assess the feasibility and safety of endoscopic radial artery harvesting (ERAH) with the Enseal device, a novel nanoscale-controlled bipolar radio frequency endoscopic instrument, and a resterilizable, stainless steel retractor.
Methods: Sixteen patients scheduled for coronary surgery underwent ERAH combining the Enseal device with a reusable retractor (Endovein retractor, Karl Storz, Germany): the Enseal is a 5 mm large, 35 cm long rotatable shafted grasper. A 2 cm incision is performed at the wrist crease; endoscopic dissection around the radial artery is carried out just by means of the Enseal; finally, a 1.5 cm counterincision is performed near the antecubital space. A functional evaluation of the in situ radial artery was performed by means of transit time flow measurements (TTFM) before conduit harvesting (Flow#1), once ERAH was completed (Flow#2) and after 10 min of topical papaverine application (Flow#3). Finally, fixation with 6% neutral formalin of a radial artery sample was performed, and paraffin embedding used for histology. Five micron sections were stained by means of haematoxylin-eosin, Masson trichrome and acid orcein. A semiquantitative 0- to 4-point scale was used for histology.
Results: ERAH was successfully performed in all patients (mean harvesting time: 33±7 min); no bleeding was observed from the sealed side branches. No complications requiring conversion to the open technique occurred. No considerable charring or sticking were macroscopically evident. TTFM showed a Flow#1 of 5.6±0.9 ml/min, Flow#2 of 8±3.2 ml/min, Flow#3 of 10±2.7 ml/min. At histology, endothelial loss was 0.9±0.7, loss of internal lamina elastica was 0.5±0.8, advential hemorrhage was 0.5±0.5, vasa vasorum heat associated damage and margination of white blood cells were 0.1±0.5 and 0.2±0.5 respectively. No postoperative hand neurological impairment, vascular compromise or haematoma were reported.
Conclusions: ERAH combining the Enseal and a reusable retractor is a feasible procedure. The Enseal device proved to be safe and effective with negligible damage to the harvested conduits at functional and histological analysis. This novel, cost-effective approach adds to the surgical armamentarium for ERAH, thus filling a definitive need in the field of minimally invasive conduit harvesting.

C9-3

HYPERBARIC OXYGEN PRECONDITIONING COST-EFFECTIVELY IMPROVES MYOCARDIAL FUNCTION AND PROMOTES PULMONARY VASCULAR FLOW WHILE PROTECTING THE ENDOTHELIUM FROM ISCHEMIC REPERFUSION INJURY

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Objective: Ischemic reperfusion injury (IRI) occurs during (CABG) coronary artery bypass graft surgery. While hyperbaric oxygen (HBO) post IRI limits myocardial, pulmonary, and endothelial damage, this study assessed the effects of HBO prior to IRI i.e. HBO preconditioning, on their function.
Methods: This randomised control study of patients having first time CABG using cardiopulmonary bypass (CPB) consisted of 40 and 41 patients in Groups A (Control Group) and B (HBO Group), respectively. HBO preconditioning occurred 4 h prior to CABG for 90 min at 2.4 ATA using 100% oxygen. Venous blood was taken pre HBO, 5 min after onset of CPB, 5 min post IRI, 2 and 24 h post CPB. Right atrial biopsies were taken post induction, 5 min after onset of CPB, 5 min post IRI, and 5 min post CPB. Serum soluble intercellular cell adhesion molecule (sICAM)-1 and Troponin-T and, Myocardial endothelial nitric oxide synthase (eNOS), were analysed using a quantitative sandwich enzyme linked immunosorbent assay. Using a pulmonary artery catheter, hemodynamic measurements were taken post induction, 5 min, 2, 4, 8, 12 and 24 h post CPB.
Results: Post IRI, Group B had a significant rise in (P=0.03) sICAM-1. Post CPB, Group B showed a significant increase in stroke volume (SV) (P=0.01), left ventricular stroke work (LVSW) (P=0.005) and left ventricular stroke work index (LVSWI) (P=0.02). Prior to the onset of CPB, Group B had a significantly lower pulmonary vascular resistance (PVR) (P=0.03). There was no significant difference in serum Troponin-T and myocardial eNOS. However, following CPB, there was a smaller rise in serum Troponin-T in Group B than Group A and, during the period of ischemia and reperfusion there was a rise in eNOS in Group B but a fall in Group A. Post CABG, each patient in Group B spent 6 h less in the Intensive Care Unit (ICU), saving a total of £9949.33 (€15,087.30).
Conclusions: HBO preconditioning prior to IRI improves myocardial SV, LVSW, and LVSWI whilst promoting pulmonary vascular flow by reducing PVR. This could be due to increased sICAM-1 which impairs neutrophil-endothelial adhesion, thus attenuating microvascular stenosis and protecting endothelium from neutrophil mediated IRI. As HBO preconditioning limited post CPB Troponin-T release and increased post IRI eNOS expression, this indicates that it provides some degree of myocardial protection while also cost-effectively reducing post CABG ICU stay.

C9-4

EFFECTS OF SEVOFLURANE, ISOFLURANE AND PROPOFOL ON ISCHEMIA/REPERFUSION MEDIATED FREE RADICAL INJURY AND OXIDATIVE STRESS DURING CABG OPERATION

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Objective: Study was undertaken to compare the in vivo effects of isoflurane, sevoflurane and propofol anesthesia on ischemia/reperfusion mediated free radical injury and oxidative stress during CABG operation and to compare the effects of these anesthetic agents on levels of end products of lipid peroxidation and nitric oxide in human right atrial tissue and blood with hemodynamic effects of these agents.
Methods: Sixty patients were randomly allocated to receive either propofol (group A), isoflurane (group B), or sevoflurane (group C) anesthesia as three different anesthetic protocols. Patients were allocated to receive either a complete intravenous anesthetic regimen, based on propofol. In all groups, a continuous infusion of remifentanil was administered throughout the operation. Muscle relaxation was obtained with vecuronium bromide. In group A, anesthesia was induced with a bolus of remifentanil followed by a continuous infusion of and a target-controlled infusion of propofol. In group B, anesthesia was induced with a bolus of remifentanil combined with diazepam followed by a continuous infusion of remifentanil. In group C anesthesia was induced with a bolus of remifentanil followed by a continuous infusion of, sevoflurane was initially started at, and when the patient was asleep, it was lowered to a concentration of.
Samples of right atrial appendage was harvested from patients before and after exposure of the heart to blood cardioplegia and short-term reperfusion under conditions of CPB.
In all patients, blood was sampled for determination of cardiac troponin I, TBARS CuZn-SOD and GPX activities and nitric oxide.
Results: There were no significant differences in patients' characteristics. Complete revascularization was performed, and surgery was uneventful in all patients. MAP, MPAP, CVP, PCWP, and SVRI were kept stable throughout in all groups. Troponin I values were similar in all groups at base (start of anesthesia) measurement. Troponin I increased transiently with all used anesthetic regimens, but this increase was significantly lower in the groups B and C. Lipid peroxidation in the propofol group was lesser than both the isofurane and sevoflurane groups after clamp removal. Although there were not any statistically significant differences in terms of tissue TBARS and SOD levels between three groups, propofol significantly lowered NO production in the atrial tissue after clamp removal and induced less NO production than sevoflurane.
Conclusions: The results of present study has shown that inhalation anesthetics such as isoflurane and sevoflurane preserved cardiac function in coronary surgery patients after CPB with less evidence for myocardial damage than with propofol.

C9-5

NEOANGIOGENESIS AFTER COMBINED TRANSPLANTATION OF SKELETAL MYOBLASTS AND ANGIOPOIETIC PROGENITORS LEADS TO INCREASED CELL ENGRAFTMENT AND LOWER APOPTOSIS RATES IN ISCHEMIC HEART FAILURE

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Objective: We previously reported that combined transplantation of skeletal myoblasts and AC-133+cells leads to improved left ventricular function, reduced infarct size and myocardial apoptosis in a model of chronic ischemia. The aim of this study is to elucidate on the possible mechanisms and to assess new implications in increasing cell therapy efficacy in chronic ischemia.
Methods: Heart failure was induced by LAD-Ligation in nude rats (a) homologous skeletal myoblasts (SM), (b) human derived AC-133+ cells (SC), (c) combination of both cells (Comb) and (d) culture medium (CM) were injected in the infarct and peri-infarct area, respectively 4 weeks after infarction. Cell engraftment was detected by fluorescence microscopy and confirmed by immunohistochemical techniques. Cell survival was quantified by RT-PCR. Immunohistochemical analysis was used to define the fate of injected cells. Cardiac gene expression levels of VEFG-A, cardiac Troponin, ACTA2, SDF-1, TGF-beta 1, were assessed by RT-PCR.
Results: Both cell types were detected in the injection areas 4 weeks after cell transplantation. AC-133 progenitors were identified not only in the border zone, but in the infarct area, as well, suggesting migration to the scar. Double cell therapy led to increased cell engraftment (SM: $52\pm13/mm^2$, SC: 45±8 in the combination group vs. SM: 31±9 and 23±7 in the monotherapy groups, P=0.007). This effect was confirmed using PCR. Apoptotic index among engrafted cells was significantly lower in the Comb group (Comb: 0.53±0.12 for myoblasts and 0.34±0.09 for SC, vs. SM: 0.76±0.19 and SC: 0.63±0.16, P=0.013). Expression of cardiac troponin was higher in the combination group in the peri-infarct area suggesting higher survival rates of cardiomyocytes in the border zone. Evaluation of capillary density revealed increased angiogenesis in the combination group (Comb: 12.3±2.3, SM: 5.2±1.2, SC: 8.3±1.8, P=0.002). Neoangiogenesis was associated with higher levels of VEGF-A and TGF-beta 1 in the injection areas as detected by RT-PCR. The higher SDF-1 expression in the injected areas implies an increased secretion of chemoattractants by the injected cells, which suggests that the effect of combined cell transplantation is mainly associated with paracrine mechanisms.
Conclusions: The mechanism of functional improvement after combined transplantation of skeletal myoblasts and AC-133+ progenitors in ischemic heart failure is mainly associated with increased angiogenesis based on paracrine factors which leads to improved survival and lower apoptosis rates of the injected cells.

C9-6

POSTERIOR PERICARDIOTOMY SIGNIFICANTLY REDUCES THE INCIDENCE OF ATRIAL FIBRILLATION AFTER CORONARY ARTERY BYPASS GRAFTING

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Objective: Atrial fibrillation (AF) is the most common arrhytmia in the general population world-wide. For unknown reasons, the frequency of Atrial Fibrillation increases markedly after cardiac surgery, affecting between 25% to 40% after coronary artery bypass graft surgery (CABG). The etiology of AF is likely multifactorial. The aim of this study was to demonstrate the effect of posterior pericardiotomy on the incidence of Atrial Fibrillation after CABG.
Methods: Three hundred patients who underwent elective, isolated and first time CABG were divided into two groups; each group included 150 patients. A 4-cm longitudinal incision parallel and posterior to the left phrenic nerve, extending from the left pulmonary vein to the diaphragma was performed to group I patients while posterior pericardiotomy was not performed to group II patients.(control group).
Results: Atrial fibrillation developed in 7 (4.7%) patients in the posterior pericardiotomy group and in 22 (14.0%) patients in the control group (P<0.009). There was no statistically significant difference between group I and group II considering the chest drainage (551.20±372.712 vs. 535.33±325.666; P=0.695) and transfusion (1.41±1.056 vs. 1.23±0.993; P=1.44). The postoperative length of hospital stay and intensive care unit stay were not significantly different in both groups.
Conclusions: Posterior pericardiotomy significantly reduces the incidence of Atrial Fibrillation occuring after CABG. We seriously recommend this safe, easy and effective technique to all cardiac surgeons for a comfortable postoperative period. Posterior pericardiotomy has to become a routine procedure for all CABG operations.

May 19, 2007 3rd Congress Day
14:30-16:00
10th Cardiac Scientific Session - Aorta II

C10-1

THE CHOICE OF THE OPTIMAL METHOD OF VALVE-SPARING PROCEDURE IN PATIENTS WITH PATHOLOGY OF THE ASCENDING AORTA AND AORTIC INSUFFICIENCY

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Objective: To evaluate the results of aortic valve-sparing operations in patients with pathology of the ascending aorta and aortic insufficiency.

Methods: From January 1998 to December 2006 in our center were performed 202 operations in patients with aneurysm of ascending aorta. Among these, in 86 patients with degenerative aneurysm of ascending aorta and aortic insufficiency were performed valve-sparing operations. There were 69 men and 17 women. The mean age was 53.1±10.7 years.
Based on surgical technique all patients were divided into three groups: 1st group (*n*=51) - aortic aneurysm resection with supracoronary replacement, 2nd group (*n*=10) - replacement of ascending aorta and noncoronary sinus (Wolfe technique), 3rd group (*n*=25) extravalvular replacement of the ascending aorta with reimplantation of coronary ostia (David technique).
On Echo data, in 1st group the mean diameter of aortic annulus was 25.9±1.4 mm; at sinuses Valsalva level – 43.3±16 mm, sinotubular junction – 52.3±24 mm, diameter of ascending aorta – 60.6±26 mm; in 2nd group- 25.7±1.9 mm, 47.1±6.6 mm, 58.6±24 mm, and 64±16 mm; 3rd group- 28.7±2.1 mm, 63±18 mm, 63±18 mm, and 71.3±21 mm, respectively. The mean grade of aortic insufficiency in 1st group was 1.9±0.2, in 2 group – 2.5±0.4, and in 3 group – 3.1±0.5.
Results: There were positive dynamic data in decrease of aortic insufficiency based on TTE in postoperative period: in 1st group - from 1.9±0.2 grade to 0.5±0.2 grade, in second - from 2.5±0.4 grade to 0.6±0.3 grade, in 3rd - from 3.1±0.5 grade to 0.7±0.3 grade ($P<0.05$). In normal aortic annulus with moderate aortic insufficiency and dilatation of sinotubular junction there is indicated to perform supracoronary replacement. In patients with moderate dilated aortic annulus predominantly due to noncoronary sinus – Wolf operation. In severe dilatation of the aortic annulus and severe aortic insufficiency – David operation.
The hospital mortality was 8.1% (seven patients). Three patient died due to progressive heart failure, two patients –from fatal rhythm disturbances, two patients from stroke.
Conclusions: The results of this study can provide the good clinical and haemodynamic data in patients with aneurysm of ascending aorta and aortic insufficiency, whom were performed aortic valve-sparing surgery. Aortic valve-sparing operations in patients with degenerative aneurysm of ascending aorta can correct concomitant aortic insufficiency and avoid complications due to aortic valve replacement.

C10-2

CRUCIAL ROLE FOR TENASCIN-C IN REMODELING OF THE ASCENDING AORTA LEADING TO ACUTE DISSECTION TYPE A AND CHRONIC DILATATION

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Objective: The extracellular matrix molecule tenascin-C (TN-C) plays an important role in embryonic development, wound-healing, cancer invasive fronts and myocardial remodeling by loosening the linkage between connective tissue and cells lying within.
As there is clear evidence for an involvement in vascular remodeling as well, we hypothesized TN-C being a mediator in the pathogenesis of chronic dilatation of the ascending aorta and acute aortic dissection.
Methods: Ascending aortic wall specimens were obtained from patients undergoing aortic reconstruction due to chronic dilatation of the ascending aorta (*n*=12) and acute aortic dissection Stanford Type A (*n*=10). Specimens of patients (*n*=5) undergoing aortic valve replacement with a macroscopically normal aorta served as controls. Formalin-fixed paraffin-embedded specimens were morphologically evaluated by hematoxylin-eosin staining and immunostaining for TN-C expression.
Results: There were no differences in clinical characteristics concerning age and gender between patients with acute dissection, chronic dilatation and control. Patients with a known connective tissue disorder or bicuspid aortic valve were excluded from the study. Histologic examination showed a clear difference between chronic dilatation and acute dissection. In chronic dilatation TN-C staining was homogenously distributed throughout the media parallel to the orientation of vascular smooth muscle cells. In contrast specimens in acute aortic dissection showed a focal strong positive staining especially surrounding vasa vasorum and sites of intramedial hemorrhage and subsequent dissection throughout the whole vessel wall with TN-C negative areas in between. Whereas in control aorta TN-C expression was almost absent.
Conclusions: These data suggest a role for TN-C in the remodeling of the ascending aorta leading to chronic dilatation and Type A dissection. Keeping in mind the differences in TN-C expression between chronic dilatation and acute dissection one may speculate that changes of the vascular wall leading to aortic dissection are mediated or at least accompanied by a change in TN-C distribution.

C10-3

FATE OF THE RESIDUAL AORTA FOLLOWING REPAIR OF ACUTE TYPE A AORTIC DISSECTION

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Objective: The natural history of the residual aorta following repair of acute type A aortic dissection is incompletely understood.
Methods: Over a 22-year period, 201 patients underwent repair of acute type A dissection by 25 surgeons. For 168 operative survivors, mean late follow-up for reoperation or death was 6.5±5.5 years and was 100% complete. Late blood pressure and medication history were available for 136 patients. Overall, 412 CT scans were analyzed for segmental diameter and false lumen patency from all patients who underwent more than two follow-up imaging studies at our institution (*n*=69).
Results: Freedom from reoperation at 10 years was 79±5% (21 reoperations, 1–170 months). A non-resected primary tear ($P=0.015$), Marfan syndrome ($P<0.001$), and elevated late systolic blood pressure ($P=0.003$) were predictors of late reoperation while ß-blockers were protective ($P=0.008$). Aortic growth between consecutive CT scans was detected in 18% (62/343) intervals affecting 49% (34/69) patients with mean growth rate of 5.3±4.5 mm/year. Onset of enlargement was unpredictable and occurred 59±45 months postoperatively (range, 1–167). Risk factors for growth included aortic diameter ($P<0.001$), elevated late systolic blood pressure ($P=0.04$), and patent false lumen ($P=0.05$). Descending aortic diameter <35 mm predicted growth in 11% of intervals, 35–49 mm in 22%, and >49 mm in 39% ($P<0.001$). Different proximal or distal surgical strategies did not affect aortic growth or need for reoperation ($P>0.17$).
Conclusions: Thus, optimal long-term outcome of patients with acute type A dissection demands rigorous antihypertensive therapy (systolic blood pressure <120 mmHg) and lifelong radiographic follow-up since aortic enlargement can initially present more than a decade postoperatively.

C10-4

SEVEN-YEAR FOLLOW-UP OF ASCENDING AORTOPLASTY

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Objective: Ascending aortoplasty is a feasible technique which presents various advantages as it is less radical than aorta replacement. We report 7-year follow-up of this technique.
Methods: From January 1998 to December 2006, 92 patients underwent aortic valve replacement and reduction aortoplasty. The mean age was 62.63±11.87 years. Fifty-seven patients were male (62%).
We performed a preoperative echocardiography and a computed tomographic scan of the chest to evaluate the diameter of the ascending aorta in all patients. The mean preoperative aortic diameter was 48.8±6.8 mm (range 34–70). Aortic valve disease was present in all patients. Other associated cardiac procedures have been performed in 29% of our patients: coronary artery bypass graft in 18 cases, mitral valve replacement in four cases and mitral valve repair (prosthetic annulus implantation) in another five cases.
Follow-up ranged between 1–84 months and was 100% complete.
Results: There has been no perioperative morbidity and one perioperative death (1.08%) for acute dissection of the aortic arch. Four patients died at follow-up, one for cerebral infarction, one for pulmonary cancer and two for prostates cancer. One patient had a transient cerebral ischemia at 16 months, with no actual neurological damages.
Kaplan–Meier survival was 81.%±1.9% at 84 months, while freedom from cardiac-related was 92%±5.7.
At follow-up five patients underwent aortic redilatation and three of them needed reoperation.
Freedom from redilatation was 75.5±9.8, while freedom from reoperation at 84 months was 82.4±9.3 at 84 months. Lox regression analysis performed to identify risk factors for redilatation, identified only preoperative diameter >55 mm as risk factor.

The evaluation of aortic diameter at follow-up demonstrated a significant, as expected, decrease respect to baseline after surgery, while no further changes in aortic diameter documented at follow-up.
Conclusions: Our experience demonstrates that ascending aortoplasty can be a feasible technique, when the preoperative diameter is lower than 55 mm. Five year follow-up points out low mortality and morbidity. A preoperative ascending aorta diameter >55 mm is a risk factor of redilatation after surgery.

C10-5

IDEAL GEOMETRIC AORTIC ROOT MODEL. FINITE ELEMENT METHOD IN DIASTOLIC AND SYSTOLIC LEAFLET STRESS CALCULATION

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Objective: Precise knowledge of the stress magnitude and distribution in normal aortic valve is important for the problems of bioprosthesis implantation and aortic valve reconstruction. For the mathematical calculations we have created the ideal geometric model of the aortic root.
Methods: In autopsy we measured dimensions and proportions of aortic cusps and sinuses. With 2D transthoracic echocardiography were measured dimensions and dynamics of aortic root. Stereometric construction was used to build the ideal geometric aortic root model. Valve stresses ware calculated with finite element method.
Results: Valve leaflets with Valsalva sinus and interposed arch of the fibrous ring constituted the unclosed hollow sphere. The external 1/2 part of its surface constituted Valsalva sinus and low internal part of the surface constituted the leaflet. As the sphere diameter served the line that connected the intersection of the fibrous ring arch with the adjacent arches (mean 22 mm).
By the 2-D echocardiography mean diameters of the aortic ring and sinotubular junction were 22.4±1.9 mm and 25±2.3 mm.
According to the stereometric construction the aortic root was composed of three spherical structures which had the tilting angle 62.3°.
The diastolic stress calculation required the modified Laplas equation. The meridional stress was constant. The radial and the summary stresses depended on the point coordinate.
The maximal summary stresses for the leaflet (just under the zone of coaptation) and sinus were 272 kPa and 85 kPa. The minimal stresses (at the insertion to the fibrous arch) were 196 kPa and 62 kPa.
Systolic leaflet stress had impulse regimen and depended on the aortic ring distensibility, which determined time of acting of the peak load and orifice form. The peak systolic load was 40 kPa. The load was maximal at the nadir of the fibrous ring and minimal in free margin. The mean load depended on the orifice form. We have got equations for the radial, circumferential and summary leaflet stresses.
Conclusions: The Valsalva sinuses are critically important for the AV diastolic stress. The aortic ring distensibility is critically important for the systolic leaflet stress.

C10-6

CONSERVATIVE AORTIC VALVE SURGERY: S. ANNA HOSPITAL EXPERIENCE

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Objective: To report clinical and echocardiographic outcomes in conservative aortic valve surgery.
Methods: From June 2002 to December 2006, 120 consecutive patients (Patients) underwent a conservative aortic valve operation. An aortic root aneurysm was present in 75 patients: (81% male; Age (mean± S.D.): 63±10 years; 'Type A' dissection: five patients; N.Y.H.A. III–IV: 20 patients). Echocardiographic data: E.F.: 50.6±9.2%; Bicuspid valve: two patients; Annular diameter (mean ∅±S.D.): 28.4±3 mm, root ∅: 46.8±3 mm, sino-tubular junction (S.T.J.) ∅: 47.9±6 mm, Ascending aorta ∅: 52.8±6 mm. Aortic insufficiency: mild (22 patients), moderate (24 patients), severe (29 patients). Eccentric jet: 36%. Valve sparing techniques: (A) 'Reimplantation': 40 patients (mean graft ∅±S.D.: 30.6±3 mm); Concomitant sub-commissural annuloplasty: eight patients, cusp repair: 12, Gore-tex reinforcement: 20. (B) 'Remodeling': 35 patients (mean graft ∅±26±2 mm); Single sinus replacement: 13 patients, double: two patients, complete: 20 patients; Concomitant sub-commissural annuloplasty: five patients, Gore-tex reinforcement: three. An isolated aortic regurgitation was present in 45 patients: (53.5% male; Age: 66.5±11 years; 'Type A' dissection: five patients; N.Y.H.A. III–IV: 21 patients). Echocardiographic data: E.F.: 50.5±9%, Bicuspid valve: four patients; Annular ∅: 24.2±3 mm, root ∅: 35.9±5 mm, S.T.J. ∅: 38.9±8 mm, Ascending aorta ∅: 45±9 mm. Moderate-severe aortic insufficiency: 31 patients. Valve repairing techniques: sub-commissural annuloplasty: 45 patients; Concomitant rafe resection: two patients (bicuspid valve), Gore-tex reinforcement: 12, cusp shaving: three. Other surgical procedures: ascending aorta replacement (19 patients), cabg (11 patients), mitral procedure (seven patients). Follow-up: 16.5±12 months (range: 1–53), 100% complete. During last month, all patients had a new echocardiographic study.
Results: Operative mortality rates: overall: 5% (six patients); elective procedures: 2.9%*; urgent/emergent: 15.7%*, (*P<0.001). Intraoperative failure (more than mild aortic regurgitation or eccentric jet at post-CPB transesophageal echo): five patients. Follow-up: five late deaths (four cardiac-related); no thromboembolism or anticoagulation-related events; 1 endocarditis; N.Y.H.A. I–II: 104 patients. Echocardiographic study: moderate-severe aortic regurgitation: 11 patients (six after 'remodeling', four after valve repair, one after 'reimplantation'). Six patients required aortic valve replacement (three after 'remodeling', two after repair, one after 'reimplantation').
Conclusions: In our experience, conservative aortic valve surgery has good operative results.
At Follow-up, 'reimplantation' seems to have more stable results than 'remodeling'. Longer Follow-up is necessary to assess effectiveness of isolated valve repair.

C10-7

QUANTIFYING AND COMPARING MECHANICAL RISK FACTORS IN INITIAL AND PROGRESSING AORTIC DISSECTIONS

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Objective: An aortic dissection is an acute emergency situation, with mortality rates of 1–2% per hour if left untreated. While the initial occurrence is linked to a wide range of factors (medical history, genetic predisposition, trauma etc.), the progression of the dissection is a product of the local mechanical environment (aortic root motion, dissection location, hypertension and local interaction with blood flow). Our objective is to quantify the contribution of each of these forces to the mechanical environment they constitute, and link to those conditions promoting dissection propagation.
Methods: Finite-element models were constructed to represent a three-layered aortic wall, the baseline case having lumen-intima, intima-media, media-adventitia, and outer adventitia radii of 12.5, 12.7, 13.9 and 14.5 mm respectively. An adequately short (20 mm), straight and circular aortic section was modelled. Baseline wall properties were taken from published data, giving stiffness values of 2.98 MPa for the intima and adventitia, and 8.95 MPa for the media. A Poisson's ratio of 0.3 was used in all cases, and the wall layers treated as elastic and isotropic.
Two types of dissection were modelled; these being intramural haematoma and the classic dissection tear. Intramural haematoma is represented by a projected circular area of radius between 10–80% lumen radius at depths ranging from 0.1–1.0 mm from the intima-media interface. The classic dissection tear is simulated for circumferential lengths of 10–180° for a total depth of 0.8 mm (0.2 mm intima, 0.6 mm media), and depths within the media of 0.1–1.1 mm (plus 0.2 mm total intima tear) for a tear length of 30°. Boundary conditions of axial strain between 0–0.1, circumferential twist between 0–15°, and static internal pressure of between 80–200 mmHg were prescribed.
Results: Computation simulations of the nature conducted in this study yield a wealth of quantitative information. Preliminary results highlight the greater dependence of wall stress on the angle of twist than other parameters, both in shape and magnitude of the stress distribution. We shall present further results connected with the relationship between physiological parameters listed above and resultant stress state, quantifying the effect of root motion vs. dynamic pressure variation and vs. imposed dynamic fluid loads.
Conclusions: The method proposed can indeed be used to show areas of stress concentration within the wall, and distribution through the layers of intima, media and adventitia. The relationship between stresses imposed on the wall and concentration in the tear is highlighted, as is the importance of including the different mechanical properties of the wall layers.

C10-8

SURGICAL MANAGEMENT OF THE AORTIC ARCH ANOMALIES

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Objective: To study patterns of the diagnosis and surgical treatment of the aortic arch anomalies forming vascular rings.
Methods: We have an experience of the examination of more then 200 patients with aortic arch anomalies. In 34% of cases aortic arch anomaly was presented by the vascular ring and caused trachea-esophageal compression (which is the characteristic syndrome of this pathology) that required surgical treatment.
Double aortic arch was diagnosed in 50% of cases; right aortic arch with vascular ring forming- in 45% cases and left aortic arch with vascular ring in 5% of patients. Aortic arch anomalies without vascular ring were found in 66% of patients. Patients age varied from 1 month to 60 years.
We analyzed 30 patients with different types of aortic arch anomalies who underwent surgical procedure.
Profound vascular ring was found in 26.7% of cases (eight patients). In six of them characteristic symptoms of trachea-esophageal compression was present.
Double aortic arch was diagnosed in three patients (37.5%); right aortic arch with vascular ring - in five patients (62.5%).
Aortic arch anomaly without forming profound vascular ring was found in 73.3% (22 patients).
Aberrant subclavian artery was present in most of the cases – 15 patients (68.2%).
Right aortic arch without vascular ring (with a mirror-image fashion of great vessels) was present in two patients (9.1%); left subclavian and common carotid arteries originated as one truncus – in three patients (13.1%); left common carotid artery originated as truncus bicaroticus – in one patient (4.5%); in one patient (4.5%) left common carotid artery originated as a first truncus from aortic arch.
Results: All patients with marked symptoms of trachea-esophageal compression underwent surgical intervention.
The main task in managing double aortic arch is to detect and divide constrictive arch.
In the case of double aortic arch mostly division of the smaller arch is performed (in 70–80% of cases – left arch).
In the case of right aortic arch we also divided ligamentum arteriosum, and if needed performed aberrant subclavian artery dissection.
In the case of left aortic arch we divided ligamentum arteriosum and right aberrant subclavian artery. Aberrant subclavian artery was reimplanted into ascendant aorta or common carotid artery. Surgery type varied depending on the congenital heart anomalies.
Conclusions: All the patients with marked symptoms should undergo surgical intervention at the time of diagnosis - trachea-esophageal decompression by dividing constrictive vascular structure.

C10-9

OPTIMAL APPLICATION OF FIBRIN GLUE FOR A DISSECTED AORTIC WALL: INFLUENCE OF COMPRESSION AND COMPRESSION TIME

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Objective: In the surgical treatment of aortic dissection, adhesives are widely used to fix the dissected wall. Fibrin glue has been used to facilitate hemostasis, provide suture support, and seal tissues in a variety of surgical procedures. A few reports have described the use of fibrin glue to reinforce an acutely dissected aortic wall and avoid redissection, however, the optimal method to apply this glue has not been established. Purpose of this study is to evaluate the influence of compression time and compression force on the adhesive strength of fibrin glue in a porcine model of aortic dissection.
Methods: The dissected aortic wall of a pig was cut into segments of 1 cm^2 each and then joined with fibrin glue. These samples were subjected to non-compression (n=6), an initial compression of 1000 g for 1 min (n=13), 3 min (n=14), and 5 min (n=13); then they were mounted on a tensile tester to measure maximum load and toughness.
Results: In the compression groups, the maximum load significantly increased in relation to the compression time (mean±S.E. 1.64±0.24 N in the 1-min group, 2.07±0.33 N in the 3-min group, and 3.06±0.27 N in the 5-min group, P<0.05). The toughness also increased significantly in the compression groups (mean±S.E. 1.74±0.53 J in the 1-min group, 3.43±0.64 J in the 3-min group, and 4.34±1.13 J in the 5-min group, P<0.05). The maximum load and toughness significantly decreased in the non-compression group (mean±S.E., 0.84±0.09 N, 0.22±0.09 J, P<0.05).
Conclusions: Compression and prolonged compression time can enhance the adhesive strength of fibrin glue used to reinforce a dissected aortic wall.

May 19, 2007 3rd Congress Day
14:30-16:00
11th Cardiac Scientific Session - Coronary II

C11-1

TOTAL ARTERIAL REVASCULARIZATION WITH DOUBLE MAMMARY Y GRAFT: EARLY AND LATE RESULTS IN 380 CONSECUTIVE PATIENTS

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Objective: Nowadays is world wide accepted the benefit of total arterial revascularization in term of survival and grafts patency rate in the treatment of ischemic heart disease. A lot of different surgical techniques for total arterial grafting have been reported. We analyzed the results of double mammary Y-graft for total arterial revascularization in the treatment of multivessels heart disease.
Methods: Between January 2003 to December 2006 380 patients underwent myocardial revascularization with double mammary Y-graft. The mean age was 59.9 years (range 34–83 years). Three hundred and forty eight patients were male, 32 patients were female. The preoperative data were collected retrospectively. The in hospital mortality and morbidity were reported. Univariate and multivariate factors for in hospital and late mortality were analyzed. The patients were followed with treadmill test and re-catheterization in case of inducible ischemia or new onset angina.
Results: The 48% of patients were operated in urgency, and 9.2% had preoperative implantation of intraaortic balloon pump (IABP). The mean number of anastomosis for patients was 3.6. In the 1.3% of patients valvular surgery was associated.
There were two (0.5%) death within 30 days surgery. The incidence of preoperative infarction was 0.2%, reoperation for bleeding 7%, deep sternal infection 0.5%. The actuarial survival rate was 97.6% at three years, the freedom from re-catheterization was 96% and the freedom from reintervention was 100%.
In patients that underwent re-catheterization the cause of inducible ischemia or new onset angina was the progression of the coronary disese without arterial grafts stenosis.
Conclusions: As previously described the use of one or two arterial conduits provide increasing survival benefit for coronary grafting and reduce the risk of reintervention even in older patients.
In our experience the use of double mammary Y-graft provide a simple technique that allow us to obtain a complete revascularization in multivessels disease with a very low risk of perioperative myocardial infarction, reoperation for bleeding, as well a low rate of neurological complication and deep sternal infection even in the older population. The follow-up of our patients confirmed the effectiveness of the procedure in term of survival, reintervention and symptoms relief.

C11-2

EARLY AND MID-TERM RESULTS OF MYOCARDIAL REVASCULARISATION USING BILATERAL INTERNAL THORACIC ARTERIES. SINGLE UNIT'S 13-YEAR EXPERIENCE

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Objective: We assessed the balance of the peri-operative risk against the potential long-term benefits of increased life expectancy in 1.419 consecutive patients who underwent CABG with the use of bilateral internal thoracic arteries (BITA) by the same surgical team.

Methods: Between July 1993 and December 2006, all patients undergoing coronary artery bypass grafting receiving both internal thoracic arteries in our unit were included in the study. All demographic, peri-operative and post-operative data were prospectively recorded in a spreadsheet. All patients are followed-up clinically, echocardiographically, with 12 min ECG stress test (Bruce protocol), Thalium myocardial scintigraphy and some with coronary angiography when required. Cummulative and event-free actuarial survival were calculated in total and in risk stratified subgroups of the cohort.
Results: A total of 1419 consecutive patients with mean age of 56, two years and 1357 (95.6%) male received BITA (mean of 2,3 arterial grafts/patient) during the study period. Four hundred and thirty-nine patients (31%) had a pre-op LVef <45%.
Standard cardiopulmonary bypass with cold blood cardioplegic arrest was used. Near all right thoracic arteries were anastomosed as free grafts. Saphenous vein and/or radial artery was utilised when more than two grafts were required. The LITA was used for the LAD artery and the RITA for the larger intermediate or marginal branch of the circumflex artery.
There were 38 combined procedures (valve surgery, resection of aortic aneurysms, arterioplasty of the LMCA) and 40 re-operations.
Thirty-day mortality was 0.56% (eight patients). Major complications were recorded at 1.3%, including six patients (0.4%) with deep sternal wound complications and mediastinitis. Complete follow-up is currently available on 1285 (90.5%) of these patients. At mean follow-up of 7.2 years 89% of them remain in NYHA class I and cumulative survival is 94.2% while major event free survival is 91.1%. At mean follow-up of 8.4 years 102 patients underwent coronary angiography which demonstrated 94 of 96 LITAs to LAD (97.9%) and 90 of 95 free RITAs to Cx territory (94.7%) patent.
Conclusions: We demonstrate in a large cohort of patients who received BITA grafting of the left coronary territory low early morbidity and mortality. Use carries a low peri-operative morbidity and mortality. Early and mid-term results are excellent. Probability for re-hospitalisation, re-operation and unexpected late death is extremely low. This strategy of revascularisation maximises all the long-term benefits with minimal early morbidity and morbidity risk.

C11-3

MIDTERM OUTCOME AFTER CORONARY ARTERY RECONSTRUCTION IN EXTENSIVE DIFFUSE CORONARY DISEASE

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Objective: We previously described the technique of coronary artery reconstruction which is indicated in extensive coronary disease. It is a long arteriotomy all over the diffuse lesions and up to the distal healthy segment of the coronary artery. This arteriotomy is closed with an only patch of internal thoracic artery in such a way so that the atheromatous plaques are excluded out of the lumen of the reconstructed vessel. The aim of this study is to assess the mid-term results of this technique.
Methods: All patients who underwent coronary artery reconstruction between 1995 and 1998 were included in this study. This yielded a total of 235 patients. The mean age was 62±10 years. Two hundred and eighty-three coronary artery reconstructions were performed within 519 coronary bypass grafts. The mean length of the coronary artery reconstruction was 4±2 cm (from 2–12 cm). Hospital mortality was 2.5% (six patients). Patients were followed by their referring cardiologist and contacted by our institution in June 2003. In case of patients lost of follow-up, the town council of birth locality was contacted to know if the patient has been dead.
Results: The mean follow-up was 73±20 months. The late mortality was 8.7% (20 patients). The actuarial survival was 89.3% after seven years (134 patients). The univariate predictors of reduced survival were chronic obstructive pulmonary disease, peripheral vascular disease, systemic hypertension, history of cancer, atrial fibrillation, left ventricular ejection fraction <50%, length of coronary artery reconstruction >5 cm on the left anterior descending artery; and the independent predictors were atrial fibrillation, left ventricular ejection fraction <50%, length of coronary artery reconstruction >5 cm on the left anterior descending artery. At the end point study, 20 patients were lost of follow-up (8.7%). Of the 189 contacted patients, 171 were free of angina (90%) and 18 were in NYHA angina class II (10%).
Conclusions: Mid-term results of coronary artery reconstruction are similar with those known for coronary artery bypass graft on non-diffusely diseased coronary artery. It could be a safe alternative to extensive stenting in case of diffuse coronary disease.

C11-4

CORONARY ARTERY ENDARTERECTOMY: OFF-PUMP OR ON-PUMP?

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Objective: We aimed to compare early and long-term results of coronary artery endarterectomy performed either by on- or off-pump coronary artery bypass grafting surgery.
Methods: Between 1992 and 2006, 576 patients underwent coronary artery revascularization and concomitant coronary endarterectomy for different coronary arteries. The operation was performed on-pump in 528 (91.6%) patients (Group A) and off-pump in the remaining 48 (84%) patients (Group B). The mean age was 59.2±10.1 years in Group A, 58.8±9.8 years in Group B. In Group A, 401 (75.9%) patients were male and 127 (24.1%) were female. In Group B, 44 (91.7%) patients were male and four (8.3%) were female. The endarterectomy was performed on the left anterior descending artery (LAD) in 245 Group A patients (46.4%) and in 22 Group B patients (45.8%), on the circumflex artery (Cx) in 111 Group A patients (21%) and one Group B patient (2.1%), on the right coronary artery (RCA) in 197 Group A patients (37.3%) and 13 Group B patients (27.1%). Demographic data, preoperative risk factors, early postoperative complications, control angiographic results, graft patency and survival analyses were performed and compared in both groups.
Results: Postoperative myocardial infarction was observed in 11 (2.1%) patients in Group A, but none in Group B. Complete revascularization was achieved in 411 Group A patients (77.8%) and in 30 Group B patients (62.5%). Early postoperative CK-MB levels, erythrocyte suspension usage, duration of intensive care unit and in hospital stay were found to be significantly higher in Group A (P<0.001). Late morbidity (congestive heart failure, renal dysfunction, ventricular arrhythmias, myocardial infarction) analysis revealed no significant difference between the two groups. Control angiography was performed in 100 patients. Graft patency rate was found to be 75% and 91.7% in LAD anastomosis, 43.5% and 71.4% in RCA anastomosis, 55.6% and 100% in Cx anastomosis in Group A and Group B, respectively. There was no statistically significant difference between two groups related to the graft patency. Ten-year survival was found to be 87.2% and 94.4% in Group A and Group B respectively.
Conclusions: Coronary artery endarterectomy can be performed with similar major complications, mortality and acceptable outcome by on- or off-pump coronary artery bypass grafting surgery.

C11-5

ARE CORONARY ANGIOGRAMS OF VALUE IN THE RISK STRATIFICATION OF PATIENTS UNDERGOING CORONARY ARTERY BYPASS SURGERY?

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Objective: None of the risk scoring systems used to date use angiographic data to attempt the prediction of peri-operative mortality following coronary artery bypass graft surgery (CABG). This study will assess the value of coronary angiography in predicting peri-operative mortality following CABG.
Methods: Fourteen patients who died following first time isolated CABG surgery were identified. These were matched with 14 patients who are alive, of similar age, sex, LV function and EuroSCORE. A panel of 25 Clinicians were given details of the patients' age, sex, diabetic status, family history, smoking history, hypertensive status, lipid status, preoperative symptoms, LV ejection fraction and weight and shown the coronary angiograms of those patients. They were asked to predict the outcome following CABG for each patient.
Results: Receiver operating characteristic curves were constructed and the area under the curves calculated and analysed using a commercially available statistical package (PRISM). The area under the curve for the group of clinicians was 0.6820. Consultant clinicians achieved an area of 0.6789 vs. their trainees 0.6844 (P=NS). The cardiologists achieved an area of 0.7063 vs. the cardiothoracic surgeons 0.6491 (P=NS).
Conclusions: Despite the EuroSCORE predicting equal risk for the two groups of patients, clinicians are able to identify individual higher risk patients by assessing the patient's coronary vasculature preoperatively. Although the clinicians were able to predict individual patient mortality better than EuroSCORE, the area under the curve indicates that it is not a robust method and clinicians, with clinical information to hand, are only moderately good at predicting the outcome following coronary artery bypass surgery.

C11-6

TRANSMYOCARDIAL REVASCULARIZATION WITH A CO_2 LASER IN PATIENTS WITH END-STAGE CORONARY ARTERY DISEASE: 10-YEAR EXPERIENCE

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Objective: Transmyocardial revascularization (TMR) has emerged as an alternative therapeutic mode of treatment in patients with end-stage coronary artery disease refractory to conventional therapy. However, this treatment strategy with different types of lasers remains controversial and its long-term outcomes are largely unknown.
We present the results of 480 TMR operations performed with high-power CO_2 laser.
Methods: From April 1997 to December 2006 480 patients underwent TMR. Isolated TMR was performed in 140 patients. Three hundred and forty patients underwent combined CABG with TMR. In 114 of those cases TMR was conducted in combination with beating heart CABG. TMR in combination with application of human gene VEGF165 was performed in 38 cases, aECGF- in 20 cases.
Results: Overall hospital mortality was 1.9%. During the last 350 operations there were only two hospital deaths (0.6%). There was no hospital mortality in the last 250 operations and there were only six late deaths. Overall mortality rate was 3.1%. Actuarial survival of 9-year follow-up was 95.4%. Freedom from major cardiac events was 93.1%. This was associated with increased exercise tolerance, significant reduction of angina class and improvement in quality of life. Postoperative tallium scan controls (SPECT) after TMR demonstrated significant improvement in stress- induced ishemia in majority of patients. Positron emission tomography (PET) study revealed restoration of segments with hibernating myocardium. In long-term periods after TMR no death from cardiac or TMR – related reasons were documented. In comparison with medical therapy TMR significantly increased life expectancy and decreased the risk of cardiac complications.
Conclusions: TMR performed with CO_2 laser is safe and effective procedure. In stable «no option» patients (angina III–IV by CCS) TMR can significantly reduce the angina class. TMR effectiveness was determined by improvement of regional myocardial microperfusion. At 9-year follow-up TMR showed significant functional improvement as well as improvement of quality of life. TMR definitely increased of life expectancy and decreased the risk of cardiac complications.

C11-7

PREDICTING VARIABLES FOR HOSPITAL MORTALITY AFTER ISOLATED CABG – THREE YEARS EXPERIENCE WITH 3825 PATIENTS

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Objective: Coronary artery bypass grafting (CABG) is an established therapy in the treatment of coronary artery disease (CAD). Despite the higher mortality and morbidity in the elderly population, operative results in CABG have continued to improve. On the other hand a particular mortality after isolated CABG remains, which addresses the question of predicting variables for hospital mortality after isolated CABG. For risk analysis we performed a retrospective study in a consecutive cohort of patients undergoing isolated CABG.
Methods: Computerized data of 3825 patients (3009 male, 816 female, 68±9 years), who received isolated CABG in a three year period were collected. To identify predictors of hospital mortality a multivariate analysis by forward stepwise logistic regression of 51 perioperative variables was performed.
Results: Overall hospital mortality of the consecutive cohort was 2.1%. Of the variables entered into the multivariate model, five variables (age [P=0.03], diabetes [P=0.03], prolonged ventilation [P=0.0002], new onset of dialysis [P=0.0004], blood transfusion [P=0.0002]) were found to be predictors of increased hospital mortality. Within these variables age and diabetes were found to be of significant higher predictive impact on mortality than all other variables (P<0.001). The applied surgical technique (on-pump vs. off-pump) had no predictive effect on mortality.
Conclusions: Despite low overall mortality in CABG patients, an increase of mortality must be expected due to a greater proportion of elder and diabetic patients. Since the applied surgical technique has no impact other measures have to be taken to deal with a changing patient population.

C11-8

SYMPTOMATIC MYOCARDIAL BRIDGES: VARIANTS OF TREATMENT

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Objective: To determine the principles of treatment for patients with symptomatic myocardial bridges.
Methods: Forty-two patients (35 men, 7 women) with symptomatic myocardial bridges (MB) in the age from 18 till 56 (mean 37+19) years were observed. All patients had angina pectoris. Twenty-two (52, 4%) patients had myocardial infarction. The following clinical studies have been done for all the patients: standard electrocardiogram in 12 leads, echocardiography and coronary angiography.
Results: The obtained data have showed that MB was settled down at the midportion of LAD at 40 (95.2%) patients and only at one (2.3%) above the diagonal branch of left coronary artery, and above RCA also at one (2.3%) patient. The degree of systolic narrowing changed differently for each patient (from 30–100%), on the length of 22–30 mm. The combination of MB with vasospasm has been noted in seven (16.6%) patients. The tactic for patients care was based depending on the compression level for tunneled part of the coronary arteries (CA), the presence of atherosclerotic plaque, accompanying heart pathology, and level of their conditions. In studied group, 23 (54.8%) patients received the conservative treatment. Three (7.1%) aged patients with large atherosclerotic plaques of a coronary artery above MB underwent coronary artery bypass grafting with the use the left internal mammary artery. Direct drug-eluting stents implantation of the tunneled artery was carried out for 15 patients (35.7%). The one-stage defect correction and supracoronary myotomy in conditions of the artificial blood circulation was performed in a 26-year-old woman, who had a combination of MB and a congenital heart disease. All the patients have significant improvement in state of their health independently of the chosen method of their treatment.
Conclusions: (1) The conservative therapy has to be prescribed at the level of slight compression of CA (<50%), (2) The supracoronary myotomy or CABG is expedient at the combination of MB and accompanying heart pathology, (3) Off-pump CABG is possible for cases refractory to medication and with compression of the tunneled CA for more than 50%.

C11-9

OFF-PUMP CORONARY BYPASS GRAFTING (OPCAB) SHOULD NOT NEGLECT MODERATE ISCHEMIC MITRAL REGURGITATION

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Objective: Off-pump coronary bypass grafting (OPCAB) can be performed in the presence of mild to moderate ischemic mitral regurgitation (IMR). Whether residual IMR could influence the long-term has not been well documented. The aim of this study was to review the long-term prognosis of the untreated IMR patients who underwent OPCAB.
Methods: We prospectively followed 1000 consecutive and systematic OPCAB patient data between September 1996 and March 2004, with a 97% complete follow-up. Sixty-seven patients (6.7%) with mild to moderate IMR were identified at the time of OPCAB. Preoperative risk factors, operative mortality, actuarial survival and major adverse cardiac event (MACE) free survival were compared to assess the effect of IMR.
Results: Average follow-up was 57±26 months. IMR patients were on average five years older than no-IMR patients (69.4±7.6 vs. 64.1±10.2, P<0.001). Women were more affected than men (11% vs. 3%, P<0.001). IMR patients had a higher prevalence of diabetes (P=0.03), congestive heart failure (CHF) (P<0.001), chronic renal insufficiency (P<0.003), and emergent surgery (P=0.002). Cox regression analysis model showed that age (relative risk, RR=1.07), congestive heart failure (RR=1.7), peripheral vascular disease (RR=1.7), carotid disease (RR=1.6), left ventricular ejection fraction (RR=0.17), and incomplete revascularization (RR=2.08), but not IMR (P=0.48) were significant risk factors for long-term survival. Similarly, PVD (RR=2.0), chronic renal failure (RR=2.5), incomplete revascularization (RR=1.8) but not MRI (P=0.09) were significant risk factors for MACE-free long-term survival. However after breaking down each cardiac adverse event, IMR was a significant cause of re-hospitalization for congestive heart failure (CHF) (P=0.03).
Conclusions: OPCAB patients with mild to moderate IMR had a higher incidence of preoperative risk factors. IMR did not significantly affect long-term survival, but was a significant cause of readmission for CHF.

C11-10

DO LONGER OPERATIVE TIMES AND SINGLE LUNG VENTILATION INFLUENCE THE PERIOPERATIVE RESPIRATORY STATUS AFTER ROBOTICALLY ASSISTED TOTALLY ENDOSCOPIC CORONARY ARTERY BYPASS GRAFTING?

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Objective: Robotically assisted totally endoscopic coronary artery bypass grafting (TECAB) is associated with longer operative, cardiopulmonary bypass and aortic occlusion times. Additionally the need for single lung ventilation in order to enable thoracoscopic access to the mediastinum may cause intraoperative lung injury. The aim of our study was to analyze the effect of longer operative time and single lung ventilation on the early postoperative respiratory status of patients undergoing the TECAB procedure.
Methods: Seventy-eight patients were prospectively scheduled for a TECAB according to the intent-to-treat principle. The operation could be completed in an endoscopic fashion in the majority of the patients, while only 12 of them (15%) needed to be converted to standard sternotomy. Correlation analysis included preoperative lung function parameters, operative times, intraoperative respiratory parameters including single lung ventilation and early postoperative respiratory outcome. Correlation coefficient was calculated using the Spearman's rho test.
Results: Although 16 (21%) of the patients had an impaired preoperative lung function, the preoperative lung function tests did not correlate with the postoperative respiratory status. History of smoking was associated with a worse course of blood gas analysis during the early postoperative period (r^2=0.338, P=0.013). Longer total operative times were associated with longer intubation times (r^2=0.438, P=0.001), worse course of blood gas analysis (r^2=0.329, P=0.033), and higher rates of postoperative respiratory insufficiency (r^2=0.279, P=0.027). Cardiopulmonary bypass and aortic occlusion time were only associated with longer intubation times (r^2=0.311 and 0.298, respectively, both P=0.02). Single lung ventilation time did not correlate with any parameter of the postoperative respiratory outcome.
Conclusions: Preoperative respiratory status and single lung ventilation time do not affect postoperative outcome in highly selected patients. However, longer operative times are correlated with increased but reversible lung injury after TECAB.

C11-11

EFFECTS OF NORMOTHERMIC ORGAN BATH AND VERAPAMIL – NITROGLYCERINE SOLUTION ALONE OR IN COMBINATION ON THE BLOOD FLOW OF RADIAL ARTERY

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Objective: Radial artery pedicle tissue cooling during harvesting is one of the major causes of vasospasm. We aimed to compare the effects of the pedicle rewarming method, normothermic organ bath and one of the mostly preferred topical antispasmodic agents, verapamil - nitroglycerin solution alone or in combination on the blood flow of radial artery.
Methods: Consecutively randomized patients (n=80) undergoing coronary bypass were organized as equal sized four groups. In the control group (group I) no antispasmodic agent was performed, the radial artery pedicle was kept in a gauze soaked with normal saline solution at room temperature. Effects of normothermic organ bath (group II) and topically performed verapamil - nitroglycerin solution (group III) alone or in combination (group IV) on the blood flow of radial artery were investigated. Free flows were measured at three stages as initial flow after minimal distal harvesting, post-harvesting flow after total harvesting and post-treatment flow following a waiting period after the application of the antispasmodic protocol. At each stage flows were measured, hemodynamic parameters, pedicle and esophageal temperatures were also recorded.
Results: After harvesting, pedicle tissues decreased significantly in all groups (P<0.001). While normothermic organ bath effectively rewarmed the pedicle in groups II and IV, pedicle tissues decreased significantly (P<0.001) in groups I and IV. Free flows decreased significantly (P<0.001) after harvesting in all groups. Normothermic organ bath, topical verapamil - nitroglycerin solution treatment and their combination increased flow significantly (P<0.001, from 40.3±10.48 to 64.3±18.8 in group II, from 38.9±13.91 to 62.75±15.23 in group III, from 41.4±11.19 to 75.4±15.32 in group IV). The initial levels were reached in the post-treatment flows in the combined procedure group (P>0.05), whereas the difference between the initial and the post-treatment flows were significantly different (P<0.05) in the normothermic organ bath and verapamil – nitroglycerin groups.
Conclusions: Hypothermia plays an important role in radial artery vasospasm. The combined application of topical verapamil - nitroglycerin solution and normothermic organ bath is more effective than the alone application of the methods.

May 19, 2007 3rd Congress Day
14:30-16:00
7th Vascular Scientific Session - Abdominal and Thoracic Aorta

V7-1

THE CHOICE OF TYPE FOR RECONSTRUCTION IN PATIENTS WITH SIMULTANEOUS LESION OF ABDOMINAL AORTA AND RENAL ARTERIES

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Objective: Estimation of the results of surgical operations in patients with lesion of abdominal aorta and renal arteries.
Methods: In our clinic 230 elective patients with pathology of renal arteries underwent surgical operations. From them 90 patients had simultaneous lesion of abdominal aorta and renal arteries, etiology of lesion was atherosclerosis in 75 patients. Thirty-nine patients suffered from Leriche's syndrome and 36 patients had aneurysm of the abdominal aorta. The nonspecific aortoarteritis was the etiological reason of lesion in 15 patients. The majority of patients had long-existent renovascular hypertension.
Results: For resection of abdominal aorta and reconstruction of renal arteries we prefer to use thoracophrenolumbotomy as the retroperitoneal operative approach in patients with lesion of aorta and left renal artery. We performed this vascular approach in 60% of cases, in others – laparotomy.
The choice of type for reconstruction of renal artery depended on length of arterial lesion. In short lesion of renal artery we used transaortic endarterectomy, in long lesions we performed renal artery bypass grafting. If both renal arteries were involved we performed left thoracophrenolumbotomy for simultaneous transaortic endarterectomy and resection of aorta with bypass grafting.
In early period in patients with nonspecific aortoarteriitis and lesion of aorta and both renal arteries we performed simultaneous transaortic endarterectomy from both arteries. Analysing our long-term results after interventions we found the occlusion of right renal artery in a few patients. Therefore in recent patients we have not used simultaneous transaortic endarterectomy from both renal arteries, we performed surgery in a two stages.
Method of transarterial endarterectomy we have not ever used.
Investigation of long-term results demonstrates: surgical treatment of patients with simultaneous lesion of abdominal aorta and renal arteries better to divide into two stages.
In early period we used only open surgical operations. In recent series in patients with atherosclerotic stenosis of renal arteries we prefer to use firstly endovascular method – dilatation and stenting of renal arteries. Opened surgery on renal arteries is the method of choice in patients with nonspecific aortoarteritis.
Conclusions: In the present time if we found indications (atherosclerotic stenosis), we prefer endovascular interventions on renal arteries.

V7-2

REVASCULARIZATION FOR AORTOARTERITIS

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Objective: In the last 22 years 35 patients (the age ranged from 6–41) observed in department of vascular surgery, of these 28 were treated surgically (42 operations) and 9 - PTA.
Brachiocephalic ischemia due to occlusive changes of innominate (3), subclavian (8) and carotid arteries (4) has been recognized after CT-, MR- or conventional angiographic investigation. Five of those 15 patients with the exception of subclavian arteries occlusions, have multiple aortic arch branches lessions and five additional patients have abdominal aorta or iliac arteries occlusive disease.

Methods: For arterial hypertension due to stenoses of renal arteries, atypical abdominal aortic coarctation four patients received bypass procedures, four - PTA and additional two patients - thoracoabdominal reconstructions: first we perform AAA repair and second - thoracoabdominal bypass for descending aorta dissection. Two patients have additional small intracranial, renal arteries aneurysms.
Indications for revascularization were only symptomatic occlusive lessions or aneurysms. The active inflammatory processes were contraindication for surgery or PTA.
Results: We have not complications or death earlier period after operations. One acute retroperitoneal hemorrhage after renal artery PTA two month later resulted with a nephrectomy. In surgical group in a long-term period one patients after aortobifemoral reconstruction and later CABG receive a leg amputation and three patients died with cerebrovascular complications. We detect one proximal anastomotic aneurysm after descending aorta bypass to carotid and subclavian arteries.
Conclusions: Our experience show that better results can be achieved in patients without recurrences of inflammation and if that is possible to control a hypertension.

V7-3
THE INFLUENCE OF PERIOPERATIVE FACTORS ON THE RESULTS OF VASCULAR GRAFT INFECTIONS TREATMENT
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University Hospital, Department of Surgery, Pilsen, Czech Republic

Objective: Vascular graft infections belong to the most serious complications in the reconstructive vascular surgery with high morbidity and mortality. Except the early diagnosis and target treatment there are many factors with the direct influence on the patients morbidity and mortality. The aim of our prospective non randomised study was to evaluate prognostic factors on morbidity (high amputations) and mortality of patients with vascular graft infections.
Methods: Thirty-eight patients with vascular graft infection were admitted at the Department of Surgery, University Hospital in Pilsen between 2001 and 2006. The basic diagnostic methods of vascular graft infection were ultrasonography, computed tomography, magnetic resonance imaging and pozitron emission tomography. The method of treatment was excision of infected vascular reconstruction in 73.7% cases, tissue debridement with immediate extraanatomical reconstruction (36.8%) or in situ reconstruction (18.4%) with the use of autologous vein, PTFE prosthesis or silver-coated prosthesis. Immediate vascular reconstruction after extraction of infected prosthesis was performed in 39.5%, delayed in 15.8% patients. The basic component of treatment was long-term antibiotic therapy. Various factors (age, type of primary reconstruction, type of infection, positive hemoculture, diabetes mellitus, co-morbitidy -e.g. malignancy, chronic pancreatitis, C- reactive protein, leucocytosis, repeat interventions) were evaluated by multifactorial analysis. The end points were high extremity amputations or mortality. Statistical analysis was performed by Statistical Analysis Software release 8.02.
Results: The high extremity amputation had to be performed in 10.5% patients. The mortality was 13.2%. One, respectively three years patients survival was 91.3, respectively, 80.6%. The important (P<0.06) factors from the point of view of mortality or high extremity amputations were infections of aortobifemoral grafts. The statistical significant factors were C-reactive protein levels >90 mg/l (P<0.01) or leucocytosis >13x109 (P<0.001) in the time of admission. Non significant factors were: age, type of infection, positive hemoculture, diabetes mellitus, co-morbidity, time of infection origin or repeated interventions due to vascular graft infection.
Conclusions: Our study demonstrated the significance of admission levels of C-reactive protein and leucocytosis for patients morbidity and mortality. In these patients we recommend an aggressive and early therapeutical approach for solution of vascular graft infections.
The study was sponsored by Research Project MSM 00 216 208 19.

V7-4
TEMPORARY AXILLO-FEMORAL BYPASS OPERATION IN INFECTED GRAFT OF AORTO-ILIAC AND AXILLO-BI-FEMORAL BYPASS
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Objective: The evaluation of the axillo-femoral bypass operations performed in the treatment of infected graft of aorto-iliac bypass operation.
Methods: Twenty-one patients developed graft infection between 1992–2006 were included in this study among the patients carried out aorto-iliac and aorto-femoral bypass operation due to aorto-oclussive disease. Before infected graft was removed, axillo-femoral bypass operation was conducted. After infection had been recovered, aorto-iliac or aorto-femoral bypass operation was reconstructed again.
Results: Mean age of the patient was 59±5. Three patients were died owing to septisemia and multi organ failure. In the early period, one patient had hematoma of the pectoral muscle. Two patient was found to have reduced flow of radial and unlar artery without any ischemia. At the end of the 21±4 mounts follow-up time, all grafts were proven to be patent at the DSAs.
Conclusions: We concluded that axillo-femoral bypass operations are the best choice of treatment for infected aorto-iliac bypass graft.

V7-5
SURGICAL TREATMENT OF VISCERAL ARTERY ANEURYSMS
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Objective: Aim of this study was to evaluate the results of open surgical treatment of visceral artery aneurysms (VAAs) in our experience.
Methods: From January 1980 to December 2005, 49 patients (29 males, 59.2%, and 20 females, 40.8%) underwent open surgical treatment of 53 VAAs. The site of aneurysmal disease was splenic artery in 25 cases, common hepatic artery in seven cases, renal artery in seven cases, posterosuperior panchreaticduodenal artery in four cases, celiac trunk in three cases, superior mesenteric artery in two cases and gastroduodenal artery, inferior mesenteric artery, middle colic artery and right gastrohepiploic artery (one case for each artery). Two patients had multiple VAAs. Perioperative results were assessed.
Results: In five cases a concomitant abdominal aortic aneurysm was present. In all but two cases elective intervention in asymptomatic patients was performed. Two patients had ruptured of their panchreaticduodenal and middle colic aneurysms. There were no perioperative deaths. No major complications occurred, except for a limited, asymptomatic, splenic infarction in a patient operated on of splenic arterty aneurysm.
Conclusions: Open surgical repair in patients with VAA is safe and effective. Good perioperative results and low complication's rates warrant the need for elective treatment in asymptomatic patients.

V7-6
DIFFERENT VARIABLES AFFECTING OUTCOME AFTER RUPTURED ABDOMINAL AORTIC ANEURYSM SURGERY
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Objective: Rupture of aortic abdominal aneurysm still remain as dramatic event despite an early diagnosis, rapid surgical repair and progress in anesthesia and intensive care. Many different factors have been reported to be associated with mortality rate. A retrospective study was performed at our institution to evaluate if any variable in the clinical history or in preoperative and intraoperative finding may be considered predictive of mortality in these patients.
Methods: During a period of 7 years, from December 1999 to December 2006, perioperative variables of a consecutive series of 86 patients undergoing surgery for ruptured abdominal aortic aneurysm were analyzed from retrospective chart review. Demographic, clinical and strumental data were collected: age; gender; coexisting medical conditions such as diabete, hypertension, coronaropathy; chronic renal failure, chronic obstructive pulmonary disease; laboratory findings at arrival such us haemoglobin and hematocrit level; lowest preoperative systolic blood pressure (pSBP); loss of consciousness; intraoperative systolic blood pressure (iSBP). The 30-day mortality of all patients taken to the operating room was documented. Two different groups were compared: - group A (59 patients) included all patients survived from surgery and discharged from the hospital - group B (27 patients) included all patients not survived, died during surgery or in the postoperative period within 30 days. Univariate and multivariate statistical analysis were performed using χ^2 or Fisher's exact test for categorical data and the Student t-test for the numerical data and a P<0.05 was considered a significant statistical difference between the two groups.

Results: The perioperative mortality rate was 31.6%. Statistical analysis identified four highly significant independent predictors of mortality: shock, haemoglobin value, preoperative hypotension and post-clamping hypotension.
Conclusions: Statistical analysis identified vary risk factors that were significant on uni or multivariate analysis. These risk factors have been noted in numerous studies and have been combined with operative and postoperative factors to determine final outcome. In our study four highly significant independent predictors of mortality were recognized: shock, haemoglobin value, preoperative hypotension and post-clamping hypotension. But it may be considered that many important variables are intraoperative and often seems to be more useful in comparing studies than in selection patients to candidate to surgery. No risk factor and preoperative variable alone or in association can predict in a definitive way the outcome of a patient with RAAA. Our opinion is that an attempt to surgical repair of RAAA should never be denied.

V7-7
DIAGNOSTIC APPLICATIONS OF SERUM CYSTATIN C IN PATIENTS WITH ABDOMINAL AORTIC ANEURYSM
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Objective: Size of abdominal aortic aneurysm (AAA) is usually the prime determinant of subsequent operative intervention. We hypothesize that AAA rupture risk relates to an increased aneurysmal 'activity' resulting from connective tissue metabolism deregulation. Serum Cystatin C (sCC) is an endogenous low molecular weight protein better known as a sensitive renal marker. As the most abundant cysteine protease inhibitor however, sCC should play a central protective role in aortic wall turnover and its deficiency in AAA patients has already been suggested. The aims of this work were to confirm sCC as a reliable renal index in the AAA population and also whether its serial measurement could detect progressive aneurysmal activity which may in turn predict rupture.
Methods: A prospective two-limbed study of AAA patients recruited over a 6-month period from May 2002. Study Group 1 (SG1) were small AAA patients under six-monthly ultrasound surveillance followed up for 1 year. Study Group 2 were cases of AAA rupture confirmed by an admitting CT scan prior to repair. Aneurysmal factors recorded were maximal size and expansion. Renal function was assessed by creatinine clearance measurement (Cockroft-Gault) and sCC quantified using latex-particle enhanced turbidimetric immunoassay. Correlation between sCC and renal function, AAA size and expansion was evaluated by linear regression analysis (Pearson co-efficient, r). AAA rupture data was compared using the 2-sample *t*-test.
Results: In the study period 47 patients with a median age of 75 years (range 54–87 years) were recruited. Thirty-one patients were small AAA under ultrasound surveillance (SG1, M:F; 26:5) and the remaining 16 cases were AAA ruptures (SG2, M:F; 12:4), P=NS. Median presenting AAA size was 45 mm (SG1) and 69 mm (SG2), $P<0.05$. There was a significant correlation of sCC to creatinine clearance in SG1 patients ($r=+0.66$, $P<0.001$). Regression analysis revealed a poor relationship between sCC and AAA size ($r=+0.10$) and aneurysm expansion ($r=-0.32$), both P=NS.
Conclusions: The diagnostic applications of sCC in aortic aneurysmal disease remain unclear. Although its measurement for the evaluation of renal function appears justified, the role of sCC in the pre-operative setting for AAA surveillance and prediction of rupture is unproven.

V7-8
EMERGENCY REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSMS (RAAA). ROLE OF GLASGOW ANEURYSM SCORE AND SOFA SCORE IN PREDICTING OUTCOME AFTER TREATMENT
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Objective: Purpose of this study is to test the Glasgow Aneurysm Score and SOFA score as pre and postoperative predicting factors of poor outcome in patients with ruptured abdominal-subrenal aortic aneurysm. Is a retrospective study of the entire experience of the Cardiovascular Surgery Unit of Cannizzaro Hospital, Catania in that given period.
Methods: From July 2001 to July 2006: 38 consecutive patients with RAAA were admitted to the operating room of Cardiovascular Surgery Unit of Cannizzaro Hospital, Catania, Italy. Open technique repair or endovascular exclusion (ratio: 35/3) of RAAA were performed.
Results: 30-day mortality was 26.3% (10/38); patients a lived at 48 h were 33/38 (86.8%); 30-day mortality for patients a lived at 48 h, was 15.1% (5/33). No statistical differences between surgical and endovascular treatment for GAS, SOFA Score 48, 30-day mortality, postoperative complication. In the multiple logistic regression analysis SOFA score at 48 h ($P<0.01$) and preoperative GAS ($P<0.01$) were independent predictors of late postoperative mortality. In our series GAS = 100 was the cut-off value to predict mortality ($P<0.01$); SOFA Score at 48 h=15 was the cut-off value to predict mortality ($P<0.01$).
Conclusions: GAS and SOFA score are useful to predict poor outcome, and are important not only for the decision whether or not to operate, but also to identify and study factors that may rise the value of these scores and influence mortality.

May 19, 2007 3rd Congress Day
14:30-16:00
8th Vascular Scientific Session - Research and Miscellaneous

V8-1
COMPARATIVE ANALYSIS OF LONG-TERM MORPHOMETRIC DATA FROM CANINE AORTA AFTER ENDOLUMINAL STENTING, STENT-GRAFTING, AND STENT-GRAFTING WITH BALLOON DILATATION
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Objective: We hypothesized that there are morphometrically significant differences in the long-term healing characteristics of various endovascular devices and procedures.
Methods: A total of 32 bare and covered stents were placed in the thoracoabdominal aorta of 16 mongrel dogs. Ten animals harboring 20 devices (12 bare-stents, 4 stent-grafts, and 4 stent-grafts with post-deployment adjunctive balloon dilatation) underwent a one-year follow-up. Aortic wall morphometry with comparative statistical analysis was performed in the three groups (Bare Stent, Stent-Graft, and Stent-Graft with Balloon Dilatation) with regard to medial thickness, luminal neointimal thickness, combined neointima and graft thickness, total wall thickness, number of medial lamellar units and medial smooth muscle cell density. Tissues were harvested from multiple sites within the same device to strengthen the statistical analysis.
Results: No dissection, dilatation, or stenosis of the aorta occurred in any group. At one year, aortic media in the Stent-Graft with Balloon Dilatation group was considerably thinner compared with that in the Stent-Graft and Bare-Stent groups (Balloon Dilatation group; 371±35 μm, Stent-Graft group; 548±68 μm, $P<0.0001$ at mid-device area). The number of medial lamellar units, however, showed no significant difference among the three groups. Neointima was the thickest in the Stent-Graft with Balloon Dilatation group and thinnest in the Bare-Stent group (Balloon Dilatation group; 570±274 μm, Bare-Stent group; 251±27 μm, P=0.004 at proximal device area). Qualitative aortic wall histology in the three groups was comparable.
Conclusions: Despite a comparable qualitative histology, certain aortic wall morphometric parameters showed important differences among the Bare-Stent, Stent-Graft, and Stent-Graft with Baloon Dilatation groups at one year. Proper understanding of these differences may help in the selection of appropriate device and procedure for a given lesion.

V8-2
PARAGANGLIOMA SYNDROME: SDHB, SDHC AND SDHD MUTATIONS IN HEAD AND NECK PARAGANGLIOMAS
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Clinic of Vascular and Endovascular Surgery, Padova, Italy; Endocrinology, Padova, Italy; Oto-Surgery, Padova, Italy

Objective: Paraganglioma syndrome includes head and neck paraganglioma (HNP) and pheocromocytoma, and is classified according to the three susceptibility genes involved, SDHB, SDHC and SDHD.

This study assessed the prevalence of germ-line mutations in SDHB, SDHC and SDHD genes in a consecutive population admitted to Padova Hospital.
Methods: Twenty patients with HNP (Endocrinology one multiple paraganglioma, Oto-surgery 11 jugulotimpanic paraganglioma, Vascular Surgery Unit 8 carotid body tumor).
Carotid body tumors surgical resection has been performed in nine patients (one bilateral, one multiple paraganglioma, seven single carotid tumors) without carotid cross clamping or arteries reconstruction. None of our patients underwent preoperative angiographic embolization as an adjunct to surgical resection.
Results: Major stroke or important cranial nerves lesions didn't occur in any case. Reversible cranial nerves lesions occurred in two patients; intraoperative limited blood loss in one subject. Any evidence of malignant carotid body tumors has been identified in our group.
Mutations were identified in the three genes in four affected individuals, three sporadic cases and one with family history of HNP.
The novel SDHB p. R242C mutation was identified in a sporadic monolateral carotid body tumor.
The SDHC p. Q147X mutation, the first to be described in Italy, was detected in a sporadic monolateral jugulotimpanic paraganglioma.
The SDHD p. Y114C mutation was identified in two unrelated patients, one familial case of bilateral carotid body tumor and one in multiple paraganglioma.
Conclusions: In conclusion, in a cohort of 20 patients consecutively referred with sporadic HNP, we identified four carriers of a mutation in one of the paraganglioma syndrome susceptibility genes, resulting in a 25% prevalence of heritable forms. One patient with an SDHD mutation was only identified as a familial case after careful consideration of the family history, while two carriers of mutations (affecting SDHB and SDHC) had no primary evidence of syndromic HNP, being affected by sporadic, monolateral HNP of apparent onset in the fourth decade.
SDHB, SDHC and SDHD molecular screening enables the detection of potencially heritable cases with a diagnosis of paraganglioma sindrome and should be reccomended in cases of sporadic HNP too also for guide surgical way of treatment.

V8-3
PREDICTORS OF POSITIVE DOBUTAMINE STRESS ECHOCARDIOGRAPHY IN PATIENTS UNDERGOING VASCULAR SURGERY
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Objective: Cardiovascular risk assessment of patients undergoing major vascular surgery is highly recommended since perioperative and long-term morbi-mortality are correlated with the presence and severity of coronary artery disease (CAD). Dobutamine stress echocardiography (DSE), a non-invasive technique can be used on vascular patients with a limited exercise capacity. Nonetheless, DSE requires high-tech equipment, experienced echocardiographers and is time-consuming. Therefore, we wondered whether we could limit this test for a subgroup of patients to be identified.
The primary aim of this study was to determine predicting factors of a positive DSE in order to have a better indication of this test. The secondary aim was to determine the relationship between mortality and these predicting factors.
Methods: A retrospective study was based on perioperative and one-year outcomes after vascular surgery on patients getting preoperative DSE. We identified 113 patients with preoperative DSE prior to vascular surgery of whom 52 had a positive DSE.
Results: The three independent predictors of positive DSE were: history of CAD, abnormal wall motion at rest echocardiography, and diabetes mellitus. Most of cardiac deaths happened in the positive DSE group (16.7% vs. 3.4%; $P<0.02$). Cardiac death occurred in nine patients with any of the three predictors and a positive DSE, in one patient with any of the three predictors but a negative DSE and in one patient without any predictor and with a negative DSE. The presence of at least one of the positive DSE predictors had 81.8% sensitivity, 62.7% specificity, 19.1% positive predictive value and 97.0% negative predictive value for predicting cardiac death at 1 year, whereas preoperative DSE had a 81.8% sensitivity, 55.9% specificity, 16.7% positive predictive value and 96.6% negative predictive value for predicting cardiac death. If we had only selected for DSE those patients with any of the three predictors, the number of preoperative DSE would be reduced to 73 with a 25% economy of tests required, and with a risk of 3% for missing a high-risk patient.
Conclusions: In the absence of diabetes, history of CAD or abnormal rest echocardiography, DSE did not provide any additional prognostic information. According to this, we recommend a preoperative DSE only in the presence of one of those three factors.

V8-4
ASPIRIN RESISTANCE – FACT OR FICTION? FLOW CYTOMETRIC MEASUREMENT OF ASPIRIN-INDUCED PLATELET INHIBITION
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Objective: Numerous studies have indicated that some patient subpopulations do not respond to the antithrombotic effects of aspirin. Yet, neither the definition nor the mechanisms of aspirin resistance nor the ideal method for its detection have been unequivocally established.
The objective of this study was to establish and evaluate a method detecting aspirin-induced inhibition of platelet cyclooxygenase using a flow cytometric technique.
Methods: Eighty-six patients with a history of carotid endarterectomy under long-term medication of 100 mg aspirin daily and 29 age-matched patients with newly diagnosed carotid artery stenosis not on aspirin were included. PBS-diluted platelet rich plasma was incubated with arachidonic acid (ARA) at a final concentration of 80 μmol/l. After staining with PE-labeled anti-CD62p antibody, platelet CD62p-antigen (P-selection) expression was measured on a flow cytometer. Additionally, patients were studied using the PFA-100 platelet function analyzer.
Results: Flow cytometric measurement of ARA-induced platelet activation showed an inhibition of ARA-induced platelet stimulation in all patients under aspirin therapy while all but two controls (95%) showed expected platelet reactivity. In contrast, results of the PFA-100 were normal in 16% of aspirin-treated patients.
Conclusions: Flow cytometric measurement of CD62p expression on platelets after incubation with ARA proved to be a practicable tool to monitor aspirin-induced inhibition of platelet COX. Results in patients under long-term low-dose aspirin therapy show that inability of aspirin to inhibit platelet COX for both, symptomatic and asymptomatic patients with high grade ICA stensosis is a very rare event. So called aspirin resistance detected quite frequently by PFA-100 measurement is most likely based on COX -independent mechanisms.

V8-5
FIRST RESULTS OF LIMB WASHOUT WITH CELL SAVER TO PREVENT MYONEPHROPATHIC METABOLIC SYNDROME
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Objective: The aims of this study were to evaluate the effectiveness and the safeness of limb washout with a cell saver to reduce the risk of myonephropathic metabolic syndrome (also known as revascularization syndrome) after embolectomy in patients with acute ischemia of lower limbs due to peripheral embolism. Late emobolectomy is considered a high life-risk procedure because of the significant release of toxic metabolites, such as free myoglobin, potassium and free acid radicals, from the ischaemic limb after revascularization. Hemodialysis and ultrafiltration have not shown a real possibility to remove myoglobin from the patient's blood because myoglobin molecule is too big for the dialytic filter, so the incidence of postoperative oligo-anuria is very high.
Methods: During the last two years, five patients with severe late ischaemia of lower limbs were operated on with a regular periferal embolectomy with Fogarty catheter. In one case the embolism was bilateral, all patients showed an atrial fibrillation and all of them were admitted into our department within between 24 and 48 h after the embolism had started.
In all cases we performed a limb washout taking slowly about one litre of venous blood out of the common femoral vein at the reperfusion time and after the cell saver procedure we reinfused only the red cells in the patient keeping out myoglobin, potassium and any other toxic metabolite coming from the distal ischaemic mass.
Results: We took the first blood sample intraoperatively from the femoral vein and the others after any twelve hours. In the second sample the serum myoglobin level was in average 50% reduced and after two days practically normal. In four patients (single leg ischaemia) the potassium and diuresis were quite normal, no acidosis and no significant impairment of renal func-

tion was found. The bilateral ischaemic patient died in first day after a severe tachy-arrhythmia while potassium was normal.
Conclusions: The limb washout with a cell saver is effective for the prevention of hyperkalemia and removal of myoglobin and unknown moderate molecular weight pathogenic substances to prevent myonephropathic metabolic syndrome.

V8-6
PRINCIPLES, TECHNICAL ASPECTS AND INITIAL RESULTS OF ENDOVASCULAR CREATION OF INTERVASCULAR ANASTOMOSIS IN ANIMAL MODEL
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Objective: These are the initial results after the creation of intervascular connections with the usage of an exclusively endovascular approach. Connections of two vessels were performed in the thoracic and abdominal areas with the use of a kinematic needle without traversing a solid organ. The materials developed specifically for this technique are described.
Methods: The procedure was carried out in 11 dogs and consisted of bringing together two vascular structures with the use of magnets, performing a puncture from the lumen of one vessel to that of the other, and inserting a prosthesis between the two. The prosthesis has a biconical morphology and is made with a 0.016-inch monofilament of nitinol. Its most outstanding feature is that, when it is dilated with a balloon, it shortens and 'rolls up,' flattening its ends. This allows good fixation to the vessel wall, avoiding the protrusion of metal into the lumen of the native vessel.
Results: In four occasions, the aorta was connected to another nearby vessel: the abdominal aorta to the inferior vena cava (IVC; n=1), the ascending aorta to the trunk of the pulmonary artery (n=1), and the descending aorta to the left pulmonary artery (n=2). In other four occasions, two veins were connected: the portal vein and the IVC. Finally, in three cases, the right pulmonary artery was connected to the superior vena cava. The connection was safely and accurately performed with the passage of a guide wire in all cases. In two experiments, the prosthesis was too short and leakage with massive bleeding was observed after a successful initial deployment of the prosthesis.
Conclusions: Intervascular anastomoses created by an endovascular approach are feasible in the author's experimental model for several different vessel pairings.

V8-7
HOMOCYSTEINE STIMULATES MYOINTIMAL HYPERPLASIA IN WHOLE VEIN ORGAN CULTURE
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Objective: Elevated plasma homocysteine (HCy) is a risk factor for myocardial infarction and stroke and may be a more significant risk factor for peripheral arterial disease. The pathophysiology of these diseases is due to atherosclerosis which involves loss of the basement membrane, migration and proliferation of vascular smooth muscle cells and increased production of extracellular matrix that leads to thickening to the intima known as myointimal hyperplasia (MIH). The aim of this study is to investigate whether elevated HCy may stimulate MIH.
Methods: Long saphenous vein (LSV) was obtained from patients undergoing routine surgery for varicose veins. Minimally handled whole vein was cultured in medium containing 0–150 μmol/l HCy for 14 days. The vein was then fixed and histological sections were stained for elastin to demonstrate the internal elastic lamina used as a marker for the adventitial border of the intima. Intima/media thickness was measured using Scion image software and a ratio obtained for further analysis. Statistical analysis was performed using ANOVA and Students' t-test.
Results: After 14 days in culture there was no significant difference in intima/media ratio from vein assessed prior to culturing (P=0.32) and those cultured without HCy. There was a significant dose-dependant increase in intima/media ratio after culture in HCy at concentrations as low as 25 μm/l (ANOVA P<0.05). There was a significant relationship between HCy and intima/media ratio (ANOVA P=0.003).
Conclusions: Homocysteine stimulates myointimal hyperplasia in a dose dependant manner in cultured whole vein.

V8-8
ARTERIAL COMPLICATIONS OF THE THORACIC OUTLET SYNDROME
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Objective: Arterial complications of thoracic outlet compression have serious potential complications, although they are present in <5% of operations performed for thoracic outlet syndrome. They may in turn impair the function and even jeopardize the viability of the affected upper limb.
Methods: Between 1990 and 2006, prospectively collected data on 27 patients with arterial complications of the thoracic outlet syndrome, were analyzed. There were 17 female, and 10 male patients, with average age of 36.1 years. The causes of arterial compression were cervical rib (20), abnormalities of the first thoracic rib (3), soft tissue anomalies (2) and hypertrophic callus after clavicle fracture (2). Thirteen patients had subclavian artery aneurysms contained intraluminal thrombus, two arterial dilatation, and 12 subclavian artery stenosis with mural thrombus. Seventeen cases had distal arterial embolization. Presenting features included: hand ischemia (16), TIA (1), and claudication with vasomotor phenomena during the arm hyperabduction (10). In all cases combined supraclavicular and infraclavicular approach, were used for decompressive procedures and subclavian artery reconstruction. Decompression was achieved by cervical rib excision (13), combined cervical and first rib excision (7), and by first rib excision (6). Associated vascular procedures included: resection and replacement of subclavian artery (26), one subclavian-axillary and one axillary-brachial bypass, as well as 17 brachial embolectomy.
Results: The mean follow-up period was 7 years and 4 months (range 1–16 years). Two pleural entry, two transient brachial plexus injuries, and one subclavian artery retrombosis, were found. A complete resolution of symptoms with a return to full activity, was noticed in all cases.
Conclusions: Arterial injury is the least common of thoracic outlet syndrome, however mostly required surgical treatment. Operative management is focused on three goals: relief of arterial compression; resection of the diseased artery; restoration of distal perfusion. A combined anterior supraclavicular and infraclavicular approach which offers complete exposure to the subclavian artery, cervical and first thoracic ribs, as well as all muscular and fibrous bands, is recommended.
Arterial complications of thoracic outlet compression have serious consequences on functionality and viability of the upper extremity. The importance of prompt and adequate treatment of these complications cannot be overemphasized.

V8-9
SDH MUTATION IN PARAGANGLIOMA OF THE NECK (CAROTID BODY TUMOR)
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Objective: Recently genetic mutations have been detected in patients treated for paragangliomas and pheochromocytomas. For paraganglioma of the neck (carotid body tumors) a correlation with bilateral tumor affliction was reported. We analyzed our current preoperative diagnostic and interventional procedures as well as the follow-up strategy in patients treated for neck paraganglioma to evaluate the necessity for additive testing.
Methods: In 35 patients (pts.) operation for 41 paragangliomas (PGL) between January 1988 and December 2006. Clinical data and follow-up were collected prospectively and analyzed retrospectively. Statistical data are shown as mean values and standard deviation.
In larger tumors a preoperative interventional embolization was performed. Postoperatively patients were seen as outpatients once per year including ultrasound control.
Results: Of the 35 patients with a mean age of 53.6+15.5 years there were 26 female and nine male patients. In 18 patients the unilateral tumor was located on the right side, in 10 patients on the left side. At time of diagnosis seven patients (7/35 patients = 20%) presented with bilateral paraganglioma. Four of these seven patients were male.
Histological analysis showed benign paraganglioma in 34 patients and malignant paraganglioma in one patient.
After a follow-up of 1 to 188 months (mean 77.3+17.0 months) 32 patients were alive and well whereas three patients were lost to follow-up. Duplex ultrasound gave no evidence for recurrence of NPG in 32 patients.
The patient with the malignant tumor is alive and free of recurrence after 14 years and 5 months.

The most recent patient with bilateral paraganglioma tested positive for SDH-D Mutation. Two brothers and one sister of this patient were diagnosed with phaeochromocytoma.
Conclusions: In our patient group more female patients were affected than male patients. In male patients there was a higher incidence of bilateral paraganglioma of the neck.
Long-term survival in patients after surgical removal of neck paraganglioma appears not limited. Because of the possibility to identify mutations in the SDH-gene (SDHD, SDHB, SDHC) further testing of patients with bilateral paraganglioma is mandatory. Screening for phaechromocytoma in these patients and evaluation of patients' families is recommended.

V8-10
CIVILIAN AND MILITARY VASCULAR TRAUMA – LEBANON 2006
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Objective: To present our experience (level I trauma center) in civilian and military vascular trauma, diagnosis and treatment, during the recent Lebanon conflict (2006).
To compare our results to the literature and to a previous Lebanon conflict (1982).
Although the incidence of combat vascular trauma was 6.8% according to recent reports from Iraq, in other conflicts the reported incidence was approximately 4%.
A vascular trauma may be manifested by life threatening external or internal rapid bleeding, limb or organ ischemia and loss, pseudoaneurysm or arteriovenous fistula. These injuries are usually accompanied by severe soft tissue and bony damage and therefore assume a first treatment priority.
Methods: We have collected all the cases of vascular trauma admitted to the emergency room during the recent 33-day conflict (July 12-August 15, 2006). Means of diagnosis, treatment and results were compiled as well.
Results: A total of 511 wounded soldiers and civilians were admitted, to our emergency room, out of which 39 (7.6%) sustained a vascular injury. There were 306 soldiers (60%) and 205 civilians with a mean age of 29 years (range 20–73 years).
All injuries were penetrating secondary to high velocity missiles in direct combat, shrapnels or multiple pellets from long range missiles. The average injury severity score was 15.7.
The majority of vascular injuries were encountered in the extremities (28 out of 39, 72%), followed by injuries to great vessels in neck, head, pelvis and abdomen.
The diagnosis was made by a CTA scan in 26 cases (67%), angiography in two and a surgical exploration and treatment, without any preoperative imaging, in 11 cases.
Most injured arteries were repaired by a venous interposition graft (15 cases, 38.5%) followed by an end to end anastomosis (nine cases, 23%) and venous patch (six, 15.5%). In three cases, a small artery (radial or ulnar) was ligated. No synthetic graft was used. Endovascular technique was employed in five cases (13%).
There were no mortalities or amputations in these 39 patients. In the previous Lebanon conflict there was a 1% mortality and 2% amputation rate. Other postoperative complications were 5% thrombosis and 24% wound infection, in this series, compared to 9% and 39% in the previous conflict.
Conclusions: A high suspicion to a possible vascular injury and a liberal use of a CTA scan combined with a prompt aggressive but meticulous treatment (sometimes by a multi-disciplinary team) may lead to a greater life and limb salvage.

May 19, 2007 3rd Congress Day
16:30-18:00
12th Cardiac Scientific Session - Coronary II

C12-1
EXPERIENCE WITH A MINIATURIZED EXTRACORPOREAL CIRCUIT
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Objective: Initial experience reports with miniaturized extracorporeal circuits have documented their safety. By reducing hemodilution, miniaturized systems should decrease red cell transfusions. Not all reported series have demonstrated this result. The purpose of this paper is to evaluate the effects of a miniaturized extracorporeal circuit on transfusion rates intra and postoperatively in a large series of patients.
Methods: From April 2004 to December 2006, 700 patients underwent open heart surgeries maintained on cardiopulmonary bypass: 500 patients with a miniaturized circuit system and 200 patients on a conventional system. The surgeries included coronary artery bypass, aortic valve surgeries, mitral valve surgeries, and combined surgeries. Transfusion rates for these two groups were compared. Results from both groups were further analyzed based on preoperative hematocrit levels of greater or <35%.
Results: For all patients, regardless of preoperative hematocrit, the transfusion rates for the conventional and miniaturized system were respectively: intraoperatively 38% and 21%, postoperatively 55% and 24%, and overall (either intraoperatively or postoperatively) 63% and 35%. The transfusion rate for patients maintained on the conventional system was 3.2 units per patient, while the transfusion rate for patients maintained on the miniaturized circuit had a 0.85 unit per patient transfusion rate.
For patients with preoperative hematocrit ≤35%, the transfusion rates for the conventional and miniaturized system were respectively: intraoperatively 63% and 35%, postoperatively 69% and 35%, and overall (either intraoperatively or postoperatively) 85% and 53%.
For patients with preoperative hematocrit >35%, the transfusion rates for the conventional and miniaturized systems were respectively: intraoperatively 13% and 9%, postoperatively 41% and 15%, and overall (either intraoperatively or postoperatively) 43% and 20%.
Conclusions: These observations indicate a miniaturized extracorporeal circuit for maintenance of cardiopulmonary bypass for open heart surgeries is associated with a significant decrease in red cell transfusion rates both intraoperatively and postoperatively.

C12-2
A PROSPECTIVE RANDOMIZED STUDY TO EVALUATE CHANGES IN I-FABP AS A NOVEL MARKER OF INTESTINAL NECROSIS IN PATIENTS UNDERGOING CORONARY REVASCULARIZATION WITH AND WITHOUT CARDIOPULMONARY BYPASS
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Objective: Many studies have suggested that the gut is the motor of the inflammatory cascade associated with cardiopulmonary bypass (CPB). CPB induced vasoconstriction causes a drop in splanchnic blood flow during the operative and postoperative period leading to intestinal injury and thus facilitating bacterial permeation. We examined this hypothesis using a novel marker termed Intestinal - type fatty acid binding protein (I-FABP) in patients undergoing CABG with and without CPB (OPCAB). When intestinal ischemia is limited to a period <2 h only the villi are affected and there is rapid recovery of function. I-FABP is mainly expressed in the villi making it an excellent marker of intestinal ischemia.
Methods: Forty patients were randomized to either CPB (n=20) or OPCAB (n=20). Blood samples were collected from the radial artery into ethylenediaminetetraacetic acid (EDTA)-containing glass tubes shortly after anaesthetic induction, at the end of operation and 4, 8, 12 h postoperatively. The samples were immediately centrifuged in a refrigerated centrifuge to separate the plasma, which was subsequently frozen and stored at -70°C until assayed.
Results: There was a significant increase in I-FABP levels immediately postoperatively (P=0.0021) and at 4 h (P=0.0089). There after no statistical differences were noted between the two groups up to 12 h postoperatively.
Conclusions: To our knowledge this is the first study to document changes in I-FABP in this patient group. It adds further weight to the theory that CPB induced changes in the splanchnic circulation causes occult damage of the intestinal villi and is responsible for initiation of the systemic inflammatory response.

C12-3
HBA1C IN NON-DIABETIC AND DIABETIC PATIENTS UNDER CORONARY SURGERY
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Objective: Plasma Haemoglobin A1c (HbA1c) reflects glycaemia in the last 2–3 months. Patients, with and without diabetes with an elevated HbA1c have been described having an increased risk of adverse outcome following surgical intervention. Our objective was to determine if elevated plasma HbA1c level was associated with increased postoperative morbidity and mortality in patients undergoing coronary surgery.
Methods: Plasma HbA1c was measured prospectively in 200 consecutive patients undergoing emergency and elective coronary surgery procedures under CPB over a 12-month period. Patients were categorized into four groups depending on whether their plasma HbA1c was = 6%, 6.1–7%, 7.1–8% or >8% and clinical data was entered into a prospectively maintained database. Patients were also classified by diabetic status with suboptimal HbA1c in a patient without diabetes being >6 to = 7% and suboptimal HbA1c in a patient with diabetes being >7%. Patients with plasma HbA1c >7% were reclassified as having undiagnosed diabetes mellitus. Primary endpoints were all cause 30-day morbidity and mortality and all cause 12-month mortality. Secondary endpoints were adverse cardiac events, stroke, infection and mean length of hospital stay. All coronary operations were performed under CPB procedures. Statically, SPSS pack studies were applied.
Results: Of the 200 patients studied, 72 had diabetes and the remaining did not. The mean age was 68.7 years and 61% were male. Suboptimal HbA1c levels were found in 60% patients without diabetes and in 53% patients with diabetes. In patients without diabetes those with suboptimal HbA1c levels (6–7%) had a significantly higher incidence of overall 30-day morbidity compared to patients with HbA1c levels =6% (7.3 vs. 1.8%, $P<0.001$). Similarly, for patients with diabetes those with suboptimal HbA1c levels (HbA1c >7%) had a significantly higher incidence of 30-day morbidity compared to those with HbA1c levels =7% (5.7% vs. 2.6%, $P=0.001$). Multivariate analysis revealed that a plasma HbA1c level of >6 to =7% was a significant independent predictor of overall 30-day morbidity in patients without diabetes undergoing coronary surgery procedures.
Conclusions: We have a high diabetic prevalence level among our coronary artery surgery series. In patients without diabetes undergoing CPB coronary artery surgery, suboptimal HbA1c levels can play an adverse prognostic significance.

C12-4

DOES SODIUM NITROPRUSSIDE DECREASE THE INCIDENCE OF ATRIAL FIBRILLATION AFTER MYOCARDIAL REVASCULARIZATION?

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Objective: Atrial Fibrillation (AF) occurs often in patients after coronary artery bypass grafting (CABG) and can result in increased morbidity and mortality. The protective effect of Nitric Oxide (NO) on atrial fibrillation after coronary artery bypass grafting has not been studied. It was the aim of the present study to investigate whether Sodium Nitroprusside-SNP(as NO donor) can reduce post-coronary artery bypass grafting atrial fibrilation.
Methods: One hundred patients who had elective, isolated, first-time coronary artery bypass grafting were prospectively randomized into two groups. Control group (50 patients) were treated with placebo, whereas the SNP group (50 patients) were treated with SNP (0.5 μg/kg/min) at the rewarming periods and than with continuous SNP infusion during first 24 postoperative hours in the intensive care unit. The control group received dextrose 5% water at these periods. High sensitivity CRP levels were measured before surgery, on arrival at the intensive care unit, 24 and 48 h, and 5 days postoperatively. All patients postoperatively were monitored with telemetry. The primary end-point was the prevention of atrial fibrilation.
Results: The baseline characteristics were similar in both treatment groups. The cumulative occurrence of atrial fibrillation was 12% in SNP group and 27% in control group. The occurrence of atrial fibrillation was significantly lower in the SNP group ($P<0.05$). The duration of atrial fibrillation in the SNP group (5.33±1.86 h) was significantly shorter than that in the control group (7.55±1.94 h, $P<0.05$). A significant relationship was found between high C-reactive protein levels and incidence of atrial fibrillation ($P<0.05$). Postoperative AF significantly prolonged postoperative hospital stay ($P<0.05$)
Conclusions: The incidence of post-operative AF at the SNP group was significantly reduced. Further studies are needed to better delineate the anti-AF profile of the SNP.

C12-5

HISTOPATHOLOGIC EXAMINATION OF THE INTERNAL THORACIC ARTERY AND THE AORTIC WALL IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING

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Objective: Early graft failure and occlusion is still the major problem after CABG operations. In the first month after the operation the rate of graft occlusion has been reported as 5.4–17%. We examined aortic wall and internal thoracic artery (ITA) and investigated the histopathologic findings of these tissues in patients undergoing coronary artery bypass grafting by the use of transmission electron microscopy (TEM). Our aim was to correlate the histopathologic condition of the ITA and the aortic wall.
Methods: Forty patients who underwent elective CABG operations were randomly selected. The ITA was harvested in a standard fashion with the use of low voltage electrocotery and its distal end was cut prior to bifurcation. During the aortic cross clamping, 1 mm length of ITA ring was cut and saved in 2.5% Glutaraldehide solution for fixation and examination of TEM. The aortic wall was obtained before proximal anastomosis by aortic punching and saved in 2.5% Glutaraldehide solution for fixation.
Results: One anatomopathologist examined all specimens and described the endothelial integrity according to the score system proposed by Fischlein et al. using their criteria. In seven cases different degree of histopathologic findings (endothelial and/or adventitial) were recorded (17.5%). In 10 patients (25%) aortic wall pathology was seen. In one of the seven cases, isolated ITA pathology was observed. In the remaining six patients, ITA pathology was noted together with aortic wall histologic changes. The most important histopathologic findings of ITA and aortic wall were as follows: endothelial vacuolisation and intimal thickening and intimal seperation, subendothelial edema, swalloning of cytoplasma and mitocondria.
Conclusions: Herein, we present the largest number of cases examined by transmission electron microscope and ultrastructural tissue pathology. In previous studies, the rate of histopathological changes of ITA have been shown to be between 1–1.8%. However, the number of studies have been reported with the use of light microscopic examination. Ultrastructural changes of ITA has been reported with the use of electron microscopy in a limited number of studies. Our study results indicate that there are nearly ten fold more histopathological changes of ITA than the percentage of previously reported cases. Our study findings show that in 60% of patients with aortic wall pathogies are concomitant with ITA pathologies. Therefore, we are planning to perform traditional coronary angiography in these cases in the clinical follow-up.

C12-6

COMPARISON OF HOSPITAL MORTALITY AND MORBIDITY OF CARDIAC SURGERY IN OCTO/NONAGENARIANS IN LOWER AND UPPER AGE GROUPS

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Objective: Age is an independent determiner of mortality in cardiac surgery as suggested by many publications and by the EuroSCORE. The aim of this study is to evaluate and compare the surgical outcome and analyse the influence of the pre-operative risk factors and postoperative events on Octo/Nonagenarians in lower and upper age groups.
Methods: Retrospective hospital follow-up study of 249 consecutive patients who underwent cardiac surgery between April 2000 and March 2006, using prospective data from surgical database (Dendrite PATS). Comparisons of preoperative risk factors and outcome were made between two age groups: 80 to 84 (84.7%/211) and 85 to 92 years (15.3%/38). End points were 30 days mortality and morbidity. Statistical significance was assessed using Pearson χ^2 and Fisher's Exact Test.
Results: Baseline clinical characteristics were not statistically significant in both groups except for the EuroSCORE ($P=0.001$). There was no significant difference between the two groups in respect to the cumulative CPB and the cross-clamping times, duration of ITU admission, rate of re-admission to ITU, rate of re-operation, post-operative stroke and new haemofiltration/dialysis. Significant perioperative complication rates were noted in respect to occurrence of one or more complications ($P=0.017$), rate of pulmonary complications ($P=0.008$), infection rate ($P=0.044$) and GIT complications ($P=0.018$). Although the Intra-Aortic Balloon Pumps were used more frequently in lower age groups (7.1% to 2.6%) and the

mean ITU stay was longer (4.46 vs. 3.82 days), we could not identify a significant influence of age regarding these two parameters (P=0.544 and P=0.504 respectively). Mortality rate was nearly doubled in the older age group, 18.4% (7/38) compared to 9.5% (20/211), but without statistical significance (P=0.103). There was a significantly higher incidence of post operative complications amongst the older age group, 63.2% (24/38) to 42.2% (89/211) (P=0.017).
Conclusions: When appropriately applied in selected patients, cardiac surgery can be performed with acceptable mortality and morbidity in Octo/Nonagenarians. However above the age of 85 patient functional improvements are achieved at the cost of a higher mortality and morbidity. Decisions should be taken on an individual basis.

C12-7
CHANGES IN COAGULATION AND PLATELET FUNCTIONS DURING EARLY POSTOPERATIVE STATE FOLLOWING OFF-PUMP CORONARY ARTERY BYPASS GRAFTING
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Objective: Recently, it has been reported that postoperative cerebral infarction in off-pump coronary artery bypass grafting (off-pump CABG) tends to develop at a later stage than in CABG. We supposed that that tendency has been caused by increases in coagulation and platelet agglutinative functions in the early stage after off-pump CABG. In this study, we determined changes in coagulation and platelet functions following off-pump CABG until the second postoperative day.
Methods: This study was undertaken in 23 patients undergoing off-pump CABG via median sternotomy. Measurements were performed five times using a Sonoclot (TM), which simultaneously analyzes both coagulation and platelet agglutinative functions. For indices of coagulating function, active clotting time of a Sonoclot (sonACT) and clotting rate (CR), parameters of blood clot formative speed, were determined. Further, time to peak (TP), which indicates the time required until the completion of blood clotting, was determined as platelet agglutination. At the following time points: A was the time of anesthesia induction, B was the end of operation, C was the morning of the first postoperative day, D was the evening of the first postoperative day, and E was the morning of the second postoperative day.
Results: The sonACT was A; 230±49, B; 152±33, C; 181±37, D; 197±40, and E; 190±52 s. The sonACT was the significant shortest at the end of operation. The CR was A; 16.9±6.7, B; 24.8±6.1, C; 22.2±5.7, D; 20.1±6.1, and E; 23.5±11.8 s, which demonstrated a significant decrease in the evening of the first postoperative day. The number of platelets was decreased by approximately 60% at the end of operation, and then stabilized after surgery. The TP was A; 19.4±5.7, B; 12.2±4.1, C; 11.6±4.1, D; 18.2±9.2, and E; 15.3±7.1 min, which demonstrated a significant shorter at B and C. The shorter of TP suggested enhancement of platelet agglutinative function. Only 1 of the 23 patients developed postoperative cerebral infarction. In this case, sonATC, CR, and TP were marked increase at the onset of cerebral infarction.
Conclusions: Determination of coagulation and platelet functions with a Sonoclot revealed that both were increased at the end of operation. Thereafter, changes of each index over time varied with each subject and no specific tendency was found. In case of postoperative cerebral infarction, both coagulation and platelet functions with a Sonoclot were significantly increased at the onset of infarction. The analyses with a Sonoclot were useful for determining the anti-coagulation treatments required for high-risk cases.

C12-8
EARLY OUTCOME OF RE-OPERATIVE MULTI-VESSEL OFF-PUMP CORONARY ARTERY BYPASS GRAFTING
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Objective: Patients undergoing reoperative coronary artery bypass suffer from increased mortality and morbidity rates as compared to primary coronary bypass. The experience in applying off-pump techniques to coronary reoperations is limited. In this report, we report our experience in multivessel reoperative off-pump coronary bypass.
Methods: Between January 1996 and December 2005, coronary reoperations were performed on 538 patients at this institution, of which 332 patients underwent multivessel reoperative off-pump coronary artery bypass and 206 patients underwent reoperative coronary bypass using conventional techniques. Patients undergoing single vessel revascularisation or thoracotomy were excluded. The two groups were similar in preoperative characteristics. Data were collected retrospectively regarding the preoperative, intra-operative and postoperative clinical course of all patients.
Results: Early mortality in the off pump group was significantly lower than for those undergoing conventional coronary bypass (3.3% vs. 7.8%, P=0.036). Perioperative myocardial.
infarction was also lower in the off-pump group (4.8% vs. 7.3%, P<0.025). The off-pump group had less transfusion needs (P=0.001), less need for prolonged ventilation (P=0.001) or prolonged inotropic support (P<0.001), and had shorter intensive care (P<0.001) and hospital stays (P<0.001). The average number of grafts per patient was significantly higher in the conventional group (mean 2.51+0.66 vs. 1.75+0.74, P<0.001).
Conclusions: This ten-year experience of re-operative coronary bypass confirms that currently coronary reoperative can be performed either as redo-OPCABG or redo-CABG with low mortality and morbidity. Patients who undergo redo-OPCABG have a lower mortality rate and smoother course in hospital than those undergoing redo-CABG, at the cost of a less complete revascularisation.

C12-9
COMPARISON OF ON- AND OFF-BYPASS ENDARTERECTOMY: A PROPENSITY-MATCHED ANALYSIS
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Objective: Endarterectomy in off-pump coronary artery bypass grafting (OPCAB) is not a well-established procedure compared to on-pump approach (ONCAB) and is even regarded by some to be a contraindication to off-pump approach. This study was carried out to evaluate the outcome of OPCAB patients requiring endarterectomy compared to propensity matched ONCAB patients requiring endarterectomy.
Methods: Data were prospectively collected on 4150 patients undergoing isolated coronary artery bypass grafting (CABG) between April 1997 and March 2004. Endarterectomy was required in 24 out of 460 OPCAB patients and 179 out of 3684 ONCAB patients. Outcomes were compared between the two groups by matching the OPCAB patients with a unique ONCAB patient. In order to account for differences in the case mix a logistic regression model was used to develop a propensity score for off-pump patients. The propensity score included age, sex, body mass index, diabetes, peripheral vascular disease, cerebrovascular disease, respiratory disease, renal dysfunction, ejection fraction, extent of disease, prior cardiac surgery, and emergency surgery. The C statistic for this model was 0.75. The OPCAB patients were matched with the ONCAB patients with an identical 5-digit propensity score. If this could not be done, we then proceeded to a 4-, 3-, 2-, or 1-digit match.
Results: All 24 OPCAB patients were successfully matched to 24 ONCAB patients. Patient characteristics were very well matched in all variables listed above. The median EuroSCORE was similar between off-pump and on-pump (3 vs. 4; P=0.36). All 24 OPCAB patients were successfully matched to 24 ONCAB patients. Between the two groups patient characteristics were very well matched in all variables listed above. The median EuroSCORE was also similar between off-pump and on-pump (3 vs. 4; P=0.36). Propensity-matched in-hospital outcomes (in-hospital mortality, stroke, acute renal failure, deep sternal wound infection, reoperation for bleeding, atrial fibrillation, prolonged ventilation and mean postoperative stay) were also similar (P>0.05) (Table 1).

Table 1

	Off-pump (n=24)	On-pump (n=24)	P-value
In-hospital mortality	0%	8.3% (n=2)	0.15
Stroke	0%	8.3% (n=2)	0.15
Acute renal failure	0%	4.2% (n=1)	0.31
Deep sternal wound infection	0%	0%	-
Re-op for bleeding	0%	4.2% (n=1)	0.31
Atrial fibrillation	20.8% (n=5)	20.8% (n=5)	>0.99
Ventilation >24 h	0%	20.8% (n=5)	0.018
Median post-op stay	7 days	8 days	0.32

Conclusions: Endarterectomy in off-pump CABG patients is at least as safe as on-pump patients.

C12-10

EXPERIMENTAL EVALUATION OF COMBINED ON-PUMP/OFF-PUMP MYOCARDIAL REVASCULARIZATION USING THE MINIATURIZED DELTASTREAM©-BLOOD-PUMP-SYSTEM – EFFECTS ON BLOOD GAS METABOLISM

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Objective: The aim of the study to evaluate the effects of intermediate on-pump/off-pump myocardial revascularization on blood gas metabolism using the minaturized Deltastream©-blood-pump-system in comparison to standard myocardial revascularization employing a complete heart-lung-machine.
Methods: In a group of 8 mini-pigs combined on-pump/off-pump myocardial revascularization was performed using the Deltastream©-blood-pump-system as beating heart support for the on-pump part of the operation (group A). Seven other animals served as control-group and underwent standard myocardial revascularization with the same device as integrated pump of a complete heart-lung-machine (group B). Blood gas samples were taken out prior to ECC, at 50% ECC, at 100% ECC, under luxation and after the operation.
Results: There were neither significant differences of oxygenation prior to operation nor throughout the entire procedure. However, the concentration of lactate showed significant lower values at timepoint 100% ECC in group A (A: 2±0.5; B: 3.3±1.2, P=0.01), under luxation (A: 2.3±0.9; B: 3.2±0.8, P=0.048) and after ECC (A: 1.9±0.6; B: 3.5±1, P=0.001). pH-management had also run uneventful.
Conclusions: Intermediate revascularization could be performed with low risk in our current set-up. Concerning blood gas metabolism it might even be superior to conventional ECC and hence be an alternative for high-risk candidates concerning adverse events of a complete heart-lung-machine, which, however, are scheduled for complete myocardial revascularization. This is also an interesting aspect due to rising costs for a complete extracorporeal circuit or a full off-pump equipment.

May 19, 2007 3rd Congress Day
16:30-18:00
13th Cardiac Scientific Session - Experimental

C13-1

IN VITRO TRANSFORMATION OF ADULT HUMAN BONE MARROW MESENCHYMAL STEM CELLS TO A CARDIOMYOGENIC PHENOTYPE

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Objective: The aim of this study is to investigate the ability of adult human bone marrow mesenchymal stem cells to differentiate towards a cardiomyogenic phenotype in vitro. This could potentially enhance the engraftment efficiency in cellular transplantation studies and also reduce the possibility of differentiation of stem cells into undesired lineages.
Methods: Bone marrow samples were aspirated from 30 patients undergoing open heart surgery from the anterior iliac crest. Mesenchymal stem cells were isolated and cultured in medium enriched with stimulatory supplements. Selected surface antigens were analyzed by flow cytometry. After the second passage a group of cultured cells were treated with 10 μm 5-azacytidine for 24 h to induce cardiomyogenic differentiation. Morphologic characteristics of the differentiated cells were analyzed by confocal and electron microscopy. The expression of cytosceletal protein vimentin and muscle specific myocin heavy chain were analyzed by immunohistochemistry. Expression of cardiomyocyte specific genes a-cardiac actin, beta-myocin heavy chain and cardiac troponin-T was detected by reverse transcriptase polymerase chain reaction (RT-PCR).
Results: Mesenchymal stem cells were spindle-shaped with irregular processes and were positive for CD13 and CD105 (SH2) and negative for CD3, CD4, CD14, CD15, CD33, CD34, CD45. Cells treated with 5-azacytidine have assumed a stick-like morphology. They were connecting with adjoining cells forming myotube-like structures. With electron microscopy numerous myofilaments were detected in induced cells running in a parallel fashion without forming sarcomeres that were immunohistochemically positive for myosin heavy chain and vimentin. Uninduced cells were positive to vimentin only. The mRNAs of a-cardiac actin, beta-myosin heavy chain and troponin-T were expressed in both induced and uninduced cells.
Conclusions: These results indicate that adult human bone marrow mesenchymal stem cells can be differentiated towards a cardiomyogenic lineage in vitro. They have the intrinsic ability to express cardiomyocyte markers when cultured in specialized medium with stimulatory supplements. Five-azacytidine induces myogenic differentiation by enhancing morphologic changes and protein expression. These pre-differentiated adult mesenchymal stem cells can be potentially valuable in cellular transplantation studies.

C13-2

IMPROVEMENT OF CARDIAC FUNCTION AND TISSUE VIABILITY FOLLOWING EXPANDED AUTOLOGOUS MARROW-DERIVED CD133 STEM CELL TRANSPLANTATION IN PATIENTS WITH ISCHEMIC CARDIOMYOPATHY UNDERGOING CORONARY BYPASS SURGERY

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Objective: Ischemic cardiomyopathy comprises nearly two thirds of cases with heart failure. Coronary revascularization through surgical bypass grafting is nowadays routinely performed to improve life quality of such patients. Simultaneous transplantation of stem cells in patients undergoing CABG has been described in some recent studies with promising results. In present randomized controlled trial, we investigated short-term efficiency of stem cell transplantation on cardiac function as an adjuvant to conventional CABG technique in patients with congestive heart failure.
Methods: After institutional review and university approval, 20 patients with ischemic cardiomyopathy (NYHA class III or IV) and low ejection fraction (<35%) on basic echocardiography scheduled for coronary bypass grafting were randomized into two groups; group 1 (control) underwent surgery only where as in group 2 (stem cell), patients received via intramyocardial injections during surgery 25×1000000 autologous bone marrow-derived CD133+ stem cells expanded in their own serum by stem cell factors and TPO. Preoperatively, the patients underwent dobutamine stress echocardiography, thallium scan scintigraphy, and cardiac catheterization to identify ischemic regions of the heart and to guide in the selection of stem cell injection sites. Patients were followed-up clinically as well as with echocardiography and thallium scan scintigraphy 3 and 6 months later.
Results: All surgeries were performed successfully without any major peri-operational morbidity and mortality. There were no postoperative arrhythmias or neurologic or ischemic myocardial events in either group in the 6-month follow-up. NYHA functional class as well as data from exercise tolerance test and six-minute standard walking test revealed a significant improvement in patients in the stem cell group relative to those in the control group three and six months after surgery (P<0.01). On echocardiography 6 months later, the ejection fraction and regional wall motion of patients in the stem cell group was significantly higher than those in the control group (P<0.05). There was also a meaningful relative decrease in percentage of the nonviable area on echocardiography and scintigraphy in patients in the stem cell group comparing to those in the control group.
Conclusions: Expanded autologous CD133 stem cell transplantation led to significant improvement in cardiac function and tissue viability in patients undergoing CABG for ischemic cardiomyopathy. Further investigations are required to evaluate long-term effects and to quantify the optimal dosage of cellular therapy.

C13-3

CELL TRANSPLANTATION: EFFECTS OF MESENCHYMAL STEM CELLS IN THE TREATMENT OF ACUTE MYOCARDIAL INFARCTION

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Objective: Cell transplantation is a promising option to treat postischemic ventricular dysfunction. Several cell types have been experienced in the attempt to find the ideal cell to use. The aim of this study is to investigate the efficacy of mesenchymal stem cells, directly injected in the early stages of acute myocardial infarction in a rat model.

Methods: Bone marrow was collected by aspiration from lower limbs of male Wistar rats. Cells were cultured and plastic adherent cells were selected. Myocardial infarction was induced in female Wistar rats by left coronary occlusion. Thirty minutes later, rats received intramyocardial injection of mesenchymal stem cells (n=9) or culture medium, as control (n=11). Echocardiographic evaluation was performed at baseline and 30 days later, just before excision of the hearts. Real time PCR was performed on the excised hearts and the presence of chromosome Y, NKX2.5, troponin I, GATA4, VEGF-alpha, VEGF-R1 and kdr was investigated in the lesion area and in the untouched posterior wall (control area) in both groups.
Results: Comparing baseline and 30-day evaluation, we noticed a significative decrease in ejection fraction (46.6±16.2% vs. 35.6±16.0, P=0.03) and a marked increase in left ventricular end-diastolic (67.4±7.5 mm vs. 89.2±15.9 mm, P=0.01) and end-systolic diameters (53.2±9.9 mm vs. 74.7±16.8 mm, P=0.01) in the control group, while rats treated with mesenchymal stem cells showed no difference in left ventricle performance (36.8±12.1% vs. 44.8±12.3%, P=0.26) and size (LVEDD 79.2±8.9 mm vs. 77.6±13.4 mm, P=0.67; LVESD 66.5±11.5 mm vs. 62.13±14.2 mm, P=0.62). By real time PCR the presence of chromosome Y was detectable only in the lesion area of the hearts treated with mesenchymal stem cells. The expression of NKX2.5, troponin I, GATA4, VEGF-alpha, VEGF-R1, kdr was significantly higher in the lesion area of treated hearts.
Conclusions: Cell therapy with mesenchymal stem cells seems to be effective in the early stages of acute myocardial infarction, preventing worsening of the left ventricular function and remodeling. The injected cells give origin to both muscular and endothelial cells, with a prevalence of the angiogenic mechanism. It is still to clarify whether new cells directly derive from injected cells, or they origin from resident or circulating cells due to stimulation or chemotaxis.

C13-4
BONE MARROW MONONUCLEAR CELLS IMPROVE CARDIAC FUNCTION IN PATIENTS WITH ACUTE CORONARY SYNDROME
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Objective: We evaluated the possibility of autologous bone marrow stem cell (MSC) transplantation in patients with acute myocardial infarction (AMI).
15 patients with AMI received cell therapy after giving an informed consent
Methods: ECG and EchoCG revealed myocardial infarction (MI) in the region of the let anterior descending artery (LAD) in seven patients, in the region of the circumflex branch (LCx) – in three patients, and in the region of the right coronary artery (RCA) – in five patients. Patients older than 70, patients with acute heart failure and those who developed AMI more than 48 h ago, were excluded from the study. All the patients were male, aged 55.4±5.7 years, mean time from pain onset to the performance of myocardial revascularization was 12.4±7.5 h. Marrow mononuclear fraction was introduced into the infarction-related artery on the 5th–7th day after primary angioplasty and stenting. Marrow sampling and cell material introduction did not cause any complications.
Results: All the patients were re-studied 1 month after the MSC transplantation. All the patients' condition improved; no complications or side effects of the interventions were observed. Left ventricle ejection fraction increased from 42.9% to 51.4%; the average number of asynergic segments was 5.3±0.7 before the intervention and decreased to 2.6±0.7 (P<0.01) afterwards. Systolic velocity before the intervention was 2.5 cm/s, and after the procedure it increased to 4.6 cm/s in the segments submitted to isolated revascularization and to 6.1 cm/s – in segments where the intervention was accompanied by the introduction of MSC (P<0.01). Contrast EchoCG demonstrated an increase of myocardial perfusion in the area of cell therapy.
Conclusions: The chief results of the study are as follows: (1) autologous MSC transplantation in patients with acute coronary syndrome is a safe and well-tolerated procedure; (2) myocardial revascularization in combination with MSC introduction in AMI area improves total and local contractile myocardial function and normalizes diastolic filling process in the LV; (3) cell therapy improves myocardial perfusion.

C13-5
TRANSPLANTATION OF BONE MARROW MONONUCLEAR CELLS FOR REGENERATIVE THERAPY OF ISCHEMIC HEART DISEASE
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Objective: To evaluate the feasibility and clinical effectiveness of autologous bone marrow mononuclear cells (BMMC) transplantation in candidates for myocardial revascularization – patients with ischemic heart disease (IHD) and postinfarction scarring of the left ventricle (LV).
Methods: The study group included 48 male patients (mean age 58.7±8.1 years) with IHD and satisfying the following criteria: (1) history of myocardial infarction with scar formation; (2) class III–IV angina; (3) indications for endovascular or surgical intervention on coronary arteries. Study protocol included clinical examination, coronary angiography; dobutamine stress-echocardiography (DSE), myocardial contrast echocardiography (MCE) and tissue Doppler imaging (TDI) for assessment of segmental myocardial perfusion, systolic and diastolic left ventricular function, respectively. Bone marrow mononuclear cells were isolated by density gradient method with mean time between bone marrow aspiration and either intramyocardial (n=7) or intracoronary (n=41) injection of 110±15.1 min. The area of BMMC transplantation was limited to postinfarction scar with no viable myocardium according to low-dose DSE.
Results: There were no complications during bone marrow harvesting or administration of cellular material, neither perioperative complications of myocardial revascularization. The mean follow-up period was 27±4.8 months. All patients reported dramatic improvement of clinical status with no complications and adverse effects of the procedures: mean functional class of angina decreased from 3.4 to 1.5 (P<0.05); NYHA heart failure class – from 3.2 to 1.5 (P<0.05); LV ejection fraction increased from 38.7% to 54.3% (P<0.01); average number of asynergic LV segments decreased from 7.2±0.8 to 2.2±0.3 (P<0.01). Mean systolic velocity measured by TDI increased from 2.5 cm/s to 4.6 cm/s in segments subjected to isolated revascularization and to 6.7 cm/s in those subjected both to revascularization and administration of BMMC. MCE demonstrated augmented myocardial perfusion in regions exposed to cell therapy.
Conclusions: Intramyocardial or intracoronary injection of autologous BMMC is a safe and well tolerated procedure. Combination of myocardial revascularization with cell therapy into regions of postinfarction scars is associated with improvement of total and segmental myocardial contractility and LV diastolic filling, augmentation of myocardial perfusion in a previously non-viable tissue. This phenomenon could be related to neomyogenesis and angiogenesis following BMMC transplantation.

C13-6
EFFECTIVE COMBINED OFF-PUMP SURGICAL TREATMENT AND AUTOLOGOUS BONE-MARROW TRANSPLANTATION FOR END-STAGE ISCHEMIC CARDIOMYOPATHY
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Objective: To evaluate the safety and feasibility of combined off-pump treatment of end-stage cardiomyopathy consisting of revascualization of ischemic areas, external reshaping of the LV in order to restore near normal geometry and autologous mononuclear cell implantation.
Methods: Ten patients (mean age 58+8.9 years) underwent the above procedure. All patients were NYHA III–IV and four were transplantation candidates. They underwent standard laboratory evaluation, immunologic tests and biomarker evaluation, TTE, dipyridamole thallium scintigraphy (DTS) and cardiac MRI preoperatively and at 3, 6 and 12 months postoperatively. After revascularization and external LV reshaping, stem cells were injected into predetermined non-viable and hibernating areas.
Results: All patients survived during a follow-up period of 3–15 months. Ejection fraction improved from 21.7+7.4% to 34.4+2.5%, EDD was reduced from 66.1+4.9 mm to 60.4+4.5 mm. Previously non-viable areas on DTS were found to contain viable tissue and MRI showed hypokinesia in previously akinetic areas. NYHA class improved to I–II. No significant arrhythmias were noted during the follow-up period.
Conclusions: Combined off-pump surgical treatment and autologous bone-marrow transplantation for end-stage ischemic cardiomyopathy is safe and feasible and appears to improve the patients' functional status.

C13-7
NEW HUMAN BIOENGINEERED BLOOD VESSELS FOR CLINICAL USE
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Objective: It is a continuing goal of researchers to develop vascular protheses that can successfully be used in aortocoronary bypass operations when

there is a lack of sufficient bypass material. For this purpose we developed a innovative method for the production of a new matrix from human source to preserve strength, bioremodability and cell compatibility. The bioengineered graft protheses are used for direct implantation or as scaffolds for tissue engineering procedures.
Methods: The bioengineered graft protheses are prepared according to our patented protocol: tissue is stored steril for at least 6 months at 4 °C in the dark in a special solution. Multiple procedures for the outwash of debris were performed in this period. Bioengineered graft protheses from human veins were compared with native veins by the following tests: histological tests, biomechanical strength (burst strength, suture retention), bioremodability (protease stability), shrink temperature (used to monitor the extent of cross-linking in a collagenous material) and cell compatibilty (endothelializytion of inner graft surface, repopularisation of graft matrix with mesenchymal stroma cells).
Results: Bioengineered and native grafts show normal connective tissue wall structure, the bioengineered grafts are avital. Burst strength was equal (>200 kPa). Suture retention is well above 2 N in both groups. Protease stability, an indicator for bioremodelability, is comparable in both grafts. The shrink temperature of bioengineered grafts was significant higher, indicating a higher amount of collagen cross-linking. Bioengineered grafts were completely biocompatible, demonstrated by cell-seeding experiments. We already used our bioengineered grafts in aortocoronary bypass operations of five patients when there was an immediate lack of graft material.
Conclusions: The newly developed bioengineered graft prostheses show a high biomechanical stability, bioremodelability and cell compatibility comparable to native tissue. It is an ideal matrix for implantation or further procurement in tissue engineering.

C13-8
A PRELIMINARY EVALUATION OF CYCLING CELLS IN CRYOPRESERVED VALVULAR HOMOGRAFT
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Objective: Cryopreserved human valvular homografts represent an alternative to mechanical and biological prostheses in patients who undergo valvular replacement. One of the most important aspects of valvular viability is cell proliferation.
This preliminary study was designed to evaluate the percentage of cycling cells in cryopreserved valvular homografts with the use of monoclonal antibody against Ki-67 protein, a proliferation marker, in order to understand if cells can replicate after cryopreservation and thereby permit cellular renewal after post valve implantation.
Methods: Three human aortic valves were harvested from multi-organ donors whose hearts were not suitable for transplant. The specimens were cooled in a controlled-rated freezer and finally maintained in liquid nitrogen vapors (-180 °C).
The specimens were analyzed 4 h after thawing. Aortic valves were sectioned longitudinally. 5 μm thick sections obtained with cryostat were stained with hematoxylin and eosin as well as monoclonal Ki-67 antibody (DAKO, Glostrup Denmark). An avidin-biotin technique with biotinylated secondary antibody was used after incubation at room temperature for 2 h. Binding was revealed using a peroxidase-conjugate streptavidin (Bio Genex San Ramon, USA) and peroxidase was revealed by 3-3' diaminobenzidine. Light microscopic examination was performed under standard conditions. A minimum of one thousand cells were scored in each experiment and scoring of Ki-67 positive nuclei was reported as percentage of total cells. To obtain a negative control, the primary antibody was routinely omitted.
Results: No significant microscopic alterations were found in aortic leaflets or small fragments of cardiac muscle. Nuclei were regular in shape and dimension without chromatin condensation or fragmentation. Cytoplasm and cellular contour were similar to those generally observed in paraffin-embedded material.
The proportion of endothelial cells with Ki-67 positive nuclei was 1.80%±0.20%. The highest percentage of positive Ki-67 immunostaining was observed in endothelial cells along aortic lumen, often crowded in small groups, and in capillary endothelial cells localized in the peripheral aortic side of the leaflet. No differences in distribution were observed from basal to marginal sites. Few fibroblasts showed Ki-67 immunopositivity (0.10%±0.06%) while Ki-67 immunostaining was 0.80%±0.20% in myocytes.
Conclusions: This preliminary study is the first demonstration of persisting cycling cells in valvular homograft after cryopreservation.

C13-9
DEVITALISED ALLOGRAFTS (DVG®S): RESCUE GRAFTS IN CASE OF LIFE THREATENING LACK OF GRAFT MATERIAL
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Objective: Unexpected intraoperative need for an emergency graft is a major risk factor for survival of a CABG operation, especially since there is no qualitatively acceptable alternative graft available. Tissue-engineered graft have demonstrated good clinical results, but unfortunately need a long preoperative production time. We developed new tissue-modified alternative grafts, DVGs, which has proven to be very helpful in these desperate situations.
Methods: (a) Production: Donor veins are taken under sterile conditions and stored in Medium 199 in the dark at 4 °C until natural cross linking has taken place. There is a transmural outwash of debris by use of a specially developed biorector every 6 weeks for 6 month. After microbiological testing the DVG may be used (b) Quality assessment: Light and scanning electron microscopy. Burst pressure measurement. Cardio-CT follow-up (c) Treatment of seven patients who needed an emergency graft intraoperatively, DVG were in no instance first options for a rescue graft.
Results: (a) Production period for DVG at least 6 months, afterwards immediately available for clinical use. Morphological evaluation of DVG showed an intact extracellular matrix (b) Enzymatic testing demonstrated stable collagen cross-linking. Burst pressure higher than in fresh veins. Two patients died preoperatively due to myocardial infarction. Two patients died preoperatively due to myocardial infarction. Three months graft patency for surviving patients was 100%.
Conclusions: DVGs close the gap between autologous grafts and Tissue-Engineered grafts. They demonstrate excellent biomechanical stability and antithrombotic properties. Since DVGs are easily available they add to the patients safety if there is an inhouse DVG bank. Good midterm results may even allow a wider clinical.

C13-10
CAN AUTOLOGOUS VASCULAR ENDOTHELIAL CELL SEEDING INCREASE THE PATENCY RATE OF SMALL DIAMETER NO-REACT TREATED BOVINE INTERNAL MAMMARY ARTERIES: AN IN VIVO STUDY IN THE SHEEP MODEL
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Objective: This study was performed to evaluate the possibility of seeding No-ReactÔ treated bovine internal mammary arteries (SIMA) and to record any improvement in patency compared to non-seeded SIMA arteries.
Methods: During the in vivo part of the study, eight juvenile sheep received either a seeded or a non-seeded SIMA bypassing the carotid artery. In the seeded group (n=3), a piece of jugular vein was harvested to culture autologous endothelial cells. SIMA grafts were all coated with fibrin glue and seeded in a special bioreactor. In the control group (n=5) non-seeded SIMA grafts were implanted. No anti-coagulation was administered. Explantation was performed at 3 and 6 months post-implantation. Grafts were evaluated by gross examination, histology and immunohistochemistry.
Results: Mean endothelial cell density of the implanted seeded grafts was 2.35×105±0.04×105 cells/cm² showing a viability of 83.0%±7.8% at the start of the in vivo study. At explantation, seeded grafts showed less inflammatory reaction compared to non-seeded grafts. Gross examination showed a higher patency rate of among seeded grafts compared to non-seeded grafts. Histology showed a monolayer of endothelial cells on the inner surface of seeded SIMA's at 3 and 6 months follow-up.
Conclusions: Seeding of No-React treated SIMA arterial grafts with autologous endothelial cells increases the patency rate of these grafts.

C13-11
NEOVASCULARIZATION IN BLAND-WHITE-GARLAND SYNDROME
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Objective: Bland-White-Garland Syndrome (BWGS) is characterized by an anomalous origination of the left coronary artery from the pulmonary artery.

Under this condition the left ventricular ischemia after birth is prevented by extensive formation of collateral vessels that function fundamentally as an arteriovenous fistula (AVF). The main mechanism of collateral enhancement in BWGS is considered to be fluid shear stress between the right coronary artery and the pulmonary trunk. Our goal was to investigate the role of the AVF in the development of flow-efficient collateral circulation.
Methods: Experimental BWGS was created in the canine model. Myocardial ischemia was induced via an Ameroid constrictor that was placed around the circumflex coronary artery (CCA). Two weeks later, an AVF was created by placing a heparin-coated catheter between the distal part of CCA and the proximal part of the adjacent coronary vein. One week following, the AVF and the development of collateral vessels were evaluated. Regional myocardial blood flow (RMBF) was quantified using radioactive microspheres at the baseline prior to ischemia, after ischemia, and one week after AVF creation. During the harvest procedure, contrast media was injected into the coronary vessels for assessment of the newly formed collaterals. Tissues from the collateral vessels were obtained and gene expression profiling was accomplished using Affymetrix GeneChip® Canine Genome Array, Array Assist® and Pathway Assist®. The experimental group (seven patent AVFs) was compared to the five control (occluded AVF) animals.
Results: It was found that in the presence of a patent AVF there was an increase in the quantity and caliber of the collateral vessels. In comparison with the baseline level, RMBF was reduced after ischemia and in closed AVF conditions, but was elevated in cases of patent AVF.
Gene expression analysis revealed 168 genes expressed with statistically significant difference (P=0.05) in the presence of patent AVF. Annotation of the probe sets found an array of upregulated candidate genes involved in cellular proliferation, differentiation, mobility and regulation of signal transduction. Among the upregulated genes were APBA1, PRKDC, TAP1, NEK2, GC, TFGß1, GBA, F8, IMPDH2, AFM, NBL1, LECT2, ANGPT1, KHDRBS1, ITGAM, and RAD52.
Conclusions: A functional AVF, as in cases of BWGS, prevents myocardial ischemia by augmentation of collateral vessel formation, presumably via the mechanism of shear stress amplification. Gene expression profiling enables further refinement of the factors that trigger neovascularization.

May 19, 2007 3rd Congress Day
16:30-18:00
14th Cardiac Scientific Session - Cardiac Minipresentation I

C14-1
TEN-YEAR SINGLE CENTER EXPERIENCE WITH THE ON-X PROSTHETIC HEART VALVE
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Objective: The On-X mechanical heart has a unique design and material different to all other existing valves and was first implanted worldwide in 1996 in our institution. This is the first ten year single center experience with this valve in aortic and mitral position.
Methods: Between September 1996 and December 2005, 428 patients (59% males) underwent 264 aortic (AVR) and 164 mitral (MVR) valve replacements with the On-X heart valve. Preoperatively, 67.5% of patients were in NYHA class III or IV. In addition, 5% of AVR and 23% of MVR patients had had previous cardiac surgery. Concomitant surgery was performed in 49.8% of the patients. Mean age at implant was 62.7 years. The mean follow-up was 4.0 years (maximum 9.3 years), and cumulative follow-up was 1.625 patient-years with an overall follow-up rate of 98.7%.
Results: Early (=30-days) overall mortality was 3.7% (AVR) and 14.0% (MVR), with valve-related mortality of 0.4% and 1.2% for AVR and MVR patients, respectively. At autopsy (n=13) all implants were intact. There were 75 late deaths (3.9%/pt-year AVR and 5.9%/pt-year MVR). Based on guidelines criteria 31 of these deaths (41%) were possibly valve-related. Early and late total valve-related morbidity was low. There has been no case of structural valve failure. At the end of follow-up, 95% of survivors were in NYHA class I or II.
Conclusions: After almost one decade of clinical experience with the On-X mechanical valve, this prosthesis continues to be safe and effective.

C14-2
AORTIC VALVE REPLACEMENT WITH 'FREEDOM SOLO' PROSTHESIS: SHORT AND MID-TERM CLINICAL AND HEMODYNAMIC RESULTS
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Objective: Using The Freedom Solo aortic stentless bioprosthesis with one single-suture line simplifies surgical time. Its supra-annular seating results in a 100% orifice-to-annulus ratio guaranteeing excellent hemodynamic performance.
Methods: Between January 2005 and January 2007, the Freedom Solo prosthesis was implanted in 148 patients (98 females, mean age 74±8 years). Patients were followed up at 1 week, 6 months and 1-year after surgery by clinical and echocardiographic examination.
Results: Isolated aortic valve replacement was performed in 104 patients, 44 patients underwent concomitant procedure included coronary artery bypass grafting (20), mitral procedures (11), subvalvular myectomy (7) and atrial ablation (6). The logistic EuroSCORE was 12.4%±8.6% and in hospital mortality was 3.38% (P<0.01). The valve size ranged from 19 mm to 27 mm (mean: 24.7±2.1 mm). Mean pump time was 61±10 min, the aortic cross-clamp time was 38±7 min.
Mean follow-up time was 9 months (range: 1–24 months). There was no valve-related mortality. All patients were asyntomatic. Mean and peak transprosthesis gradient were 9.2±4.2 mmHg and 18.6±7.2 mmHg at discharge and 8.7±3.2 mmHg and 17.5±6.5 mmHg at 6 month follow-up (P: NS) and 8.2±3.4 mmHg and 17.3±5.2 mmHg (P:NS) at 12 month follow-up. No patients had paravalvular leakage and a minimal regurgitation (central jet) was detected in seven patients. Neither structural valve failure nor endocarditis were observed.
Conclusions: Supra-annular implantation of the Freedom Solo Stentless valve is safe and reliable with good in hospital results and performed with relatively short pump an cross-clamp time. Short and mid-term prosthesis hemodynamic profile seems to be encouraging.

C14-3
NEW ULTRASOUND TECHNOLOGIES IN THE EVALUATION OF MITRAL REGURGITATION IN PATIENTS WITH DILATIVE CARDIOMYOPATHY
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Objective: Primary and secondary dilative cardiomyopathies are characterized by the dilatation and disorder of the left ventricular (LV) spherical form. This geometrical remodeling of heart structures is associated with LV segmental remodeling, dislocation of papillar muscles towards LV apex and dilatation of the mitral annulus, what leads to mitral regurgitation (MR) of different grade.
Aim: To reveal the importance of mitral annulus dynamics and its dilatation in the genesis of mitral regurgitation by using contemporary echocardiographic (echo) methods of investigation.
Methods: Seventy patients were enrolled in our study. Among them were patients with dilative (DCMP), arrhythmogenic (ACMP) and ischemic cardiomyopathy (ICMP). We analyzed mitral valve damage by using transthoracic, transesophageal and 3D-echo, magnetic resonance computing tomography (MRT) and X-ray. For the evaluation of MR along with conventional echo markers we used proximal is velocity surface area (PISA) method, proximal jet volume regurgitation, effective area of regurgitation, stroke volume and regurgitation fraction measurements. All these calculations allowed us to assess the influence of mitral annulus size, its remodeling and trajectory movement changes of papillary muscles on the degree of MR.
Results: We revealed anterior-posterior dilatation of mitral annulus in patients with ACMP (r=0.4, P<0.001), saddle flat form of mitral annulus in patients with ICMP (r=0.3, P<0.001). In patients with DCMP we found out correlation between the significance of MR and mitral annulus diameter (r=0.32, P=0.007) and between MR and trajectory movement changes of papillary muscles (r=0.28, P<0.001). Proximal area of MR and Vena Contract a assessed by echo absolutely correlated with the MRT results (r=0.92, P=0.001; r=0.93, P<0.001, consequently). Our future goal is to evaluate dissynchronnic systolic and diastolic movements of mitral annulus in relation to LV.
Conclusions: 3D echo gives us the opportunity to better understand the mitral annulus morphology, pathophysiology of MR in patients with DCMP

and consequently helps in the decision making process of undertaking new treatment strategy of functional MR.

C14-4

THE DELTASTREAM© ROTARY BLOOD PUMP SYSTEM AS SHORT-TERM VENTRICULAR ASSIST DEVICE – FIRST CLINICAL EXPERIENCES

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Objective: The Deltastream© blood pump system has been developed a few years ago and at the beginning mainly been used as inbuilt part of the heart-lung-machine in cardiac surgery. However, several other attempts have been made for further use, such as ECMO or in priming reduced extracorporeal bypass circuits. We reflect the first clinical experiences with the Deltastream© pump as short-term assist device.
Methods: Between 7/04 and 6/05 altogether five patients received a Deltastream© rotary pump as L- or BiVAD. Mean age was 49 years and the underlying diseases were acute postoperative left- or biventricular failure on the base on ischemic heart disease in three patients, acute valve endocarditis (one patient) and acute aortic dissection in one more patient.
Results: Duration of assistance was from 24 to 72 h. In three patients CI increased in mean from 1.8 to 2.5 l/min/m^2. In the other two patients CI could not be increased. Platelets remained normal during the entire running time and hemolysis was moderate (LDH 280±65 U/l) at the endpoint of observation. One patient was successfully weaned but died in the further postop. Course due to severe infection.
Conclusions: The Deltastream© blood pump system can easily be used as left- or even biventricular assist device in the postoperative course. In case of definitive decision early therapy is strongly recommended for successful ventricular recovery.

C14-5

TISSUE DOPPLER IMAGING IN ASSESSMENT OF THE LEFT VENTRICLE REMODELING AFTER AOTRIC VALVE REPLACEMENT

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Objective: To assess the left ventricle remodeling after aortic valve replacement using different tissue Doppler parameters.
Methods: Forty patients (33 men) mean age 39.93±7.07 years were evaluate using tissue Doppler techniques before the operation and 6 months later. Patients were divided in three groups: group 1-patient with aortic stenosis (*n*=8), group 2-patients with aortic insufficiency (*n*=12), group 3-patients with aortic stenosis and insufficiency (*n*=20). Following tissue Doppler parameters from the apical four chamber view at the lateral part of the mitral annulus were evaluate: peak systolic velocity, early peak diastolic velocity, late peak diastolic velocity, isovolumetric contraction time, isovolumetric relaxation time, the ratio of transmitral early left ventricular filling velocity to peak diastolic tissue Doppler velocity at the lateral part of the mitral annulus.
Results: We found increasing of peak systolic velocity of moving the mitral annulus lateral part in group 2 from 7.67±1.64 to 9.0±1.73 (P<0.05) and from 6.83±1.17 to 10.0±2.83 (P<0.05) in group 3. Early peak diastolic velocity increased in all patients: from 7.63±1.03 to 11.75±1.56 (P<0.05) in group 1, from 7.67±1.64 to 9.0±1.6 (P<0.05) in group 2 and from 6.83±0.75 to 9.67±1.03 (P<0.05) in group 3. The ratio of transmitral early left ventricular filling velocity to peak diastolic tissue Doppler velocity at the lateral part of the mitral annulus decreased in group 1 from 16.49±2.35 to 7.91±1.08 (P<0.05) in group 2 from 10.07±2.06 to 6.59±2.24 (P<0.05) and from 14.39±3.57 to 9.69±2.44 (P<0.05) in group 3, 6 months after aotric valve replacement.
Conclusions: Increasing of peak systolic and diastolic velocity of moving the mitral annulus lateral part in groups 2 and 3 indicate the improvement of initially decreased left ventricle systolic and dyastolic functions. In group 1, the marked improvement of dyastolic function of the left ventricle was found. The ratio of transmitral early left ventricular filling velocity to peak diastolic tissue Doppler velocity decreased in all groups; that means the decreasing of LV end dyastolic pressure and wedge pressure, improvement the long-term prognosis and decreasing the number of cardio-vascular complications. Thus tissue doppler techniques such as moving the mitral annulus lateral part could be useful in assessment of LV remodeling 6 months after aotric valve replacement.

C14-6

SIMULTANEOUS ANTE-RETROGRADE CARDIOPLEGIA IN REDO VALVE SURGERY

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Objective: Myocardial protection in case of redo heart valve surgery is one of the urgent problems at the present time.
The main aim of this study was to evaluate the efficiency of simultaneous ante-retrograde cardioplegia during redo heart valve surgery.
Methods: During 1999–2005, 110 patients underwent redo heart valve operations. All patients were divided into two groups. The 1st group included patients who undergone redo heart valve operation with the ante-retrograde cardioplegia (*n*=42). In this group male gender was 37%; female gender was 63%. The 2nd group were the patients with the use of antegrade or retrograde cardioplegia during the operation (*n*=68). In this group male gender was 42%; female gender was 58%. All operations were performed with cardiopulmonary bypass (CPB) and blood-based pharmacological cardioplegia. In 1st group warm cardioplegia was used in 24% of cases; in the 2nd group – 41%. Due to severe left ventricular disfunction two patients of 1st group and eight patients of 2nd group required intraaortic balloon contrapulsator. The expel criterion was concomitant coronary artery lesion. Status of the patients was considered by standard laboratory and functional tests. Estimated operative mortality rate was counted by EuroSCORE.
Results: The average age of the 1st patient group was 49.7±10.3 years old and 47.3±11.8 years old (P=0.05) in the 2nd group. High systolic pulmonary pressure (over 50 mmHg) was observed in 48% and 39% accordingly (P<0.01). Severe left ventricular dysfunction (ejection fraction by Simpson <40%) existed up to 43% and 34% cases before operation in both groups accordingly (P<0.05). Average CPB time was 106.3±43.2 and 121.4±38.6 min accordingly (P=0.01). Uneventful pump withdraw or one episode of defibrillation was in 74% and 38% of cases accordingly (P<0.05). The duration of inotropic support was 18.5±3.5 h and 26.7±5.8 h accordingly (P<0.05). The duration of artificial lung ventilation was 11.2±3.4 h and 14.6±4.3 h accordingly (P<0.01). Resuscitation unit stay was 2.3±1.5 days and 4.1±1.2 days accordingly (P<0.01). Hospital stay was 20.5±5.2 days and 26.8±8.2 days accordingly (P<0.01). Operative mortality rate was 24.3% and 19.7% by EuroSCORE accordingly (P<0.05). Actual mortality – 7.7% and 13.4% (P<0.05) accordingly.
Conclusions: Patients for redo valve operations are more complicated. Use of simultaneous ante-retrograde cardioplegia helps to make better myocardial protection in patients operated repeatedly.

C14-7

SIGNIFICANT COST BENEFIT BY USE OF COSEAL AS SURGICAL SEALANT IN AORTIC SURGERY REDUCING OPERATIVE BLEEDING AND TRANSFUSION REQUIREMENTS

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Objective: The use of Coseal (CS) as a surgical sealant in cardiac and vascular surgery for prevention of anastomotic bleeding has been subject in prior investigations. We analysed our intra and postoperative data to determine the clinical benefit using the polymeric sealant to inhibit suture line bleeding during aortic surgery.
Methods: From 01/2004 to 06/2006, 123 patients underwent aortic surgical procedures such as full root replacements, reconstruction and/or replacement of ascending aorta and aortic arch procedures including aortic dissections and interventions in moderate/deep hypothermia. Sixty-four patients were treated with Coseal, 59 patients had no additive treatment to the suture line (Non CS). There was no significant difference in the demographic data of the patients treated with similar logistic EuroSCORE and preoperative risk profile.
Results: The Coseal group had reduced transfusion requirements (RBC 1140±1396 ml vs. 2190±3281, P=0.031, FFP 1026±1316 ml vs. 1901±2490, P=0.031) and less postoperative drainage loss (1187±1228 ml vs. 2029±2734, P=0.036). The rate of rethoracotomy was significantly lower in the CS group (1/64 vs. 9/59, P=0.006) The ICU and hospital stay demonstrated no significant difference (P=0.47). The resulting economic benefit by reduced

transfusion requirements and lower operative costs through less rethoracotomy rates is over €50 000 in this data analysis.
Conclusions: The use of the novel polymeric surgical sealant demonstrate an improved intraoperative management of anastomotic bleeding, leading to reduced postoperative drainage loss and less transfusion requirements. Further studies performed at our institution shall investigate the clinical and economic benefits of Coseal in a prospective manner.

C14-8

CYCLING ANTIBIOTIC THERAPY REDUCES OCCURRENCE OF SURGICAL SITE INFECTIONS AFTER CARDIAC SURGERY

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Objective: We have been introducing cycling antibiotic therapy after cardiac surgery for the purpose of preventing surgical site infections in our department. Cycling antibiotic therapy was performed as the use of antibiotics during and after surgery is limited to a single antibiotic with a change every 3 months. In this study, we compared the frequency of surgical site infections and incidence of bacterial resistance, before and after the introduction of cycling antibiotic therapy.
Methods: From April 1997 to March 2005, a total of 618 patients (male 448 and female 170, age 65.2±10.2 years old) underwent elective cardiac surgery. Those cases were retrospectively examined for the frequency of occurrence of surgical site infection including wounds of legs and bacterial resistance, before and after the introduction of cycling antibiotic therapy. Cycling antibiotic therapy (group C) was performed for 284 patients (CABG 192, valve 66, and others 26, age 66.0±10.2 years old), and mixing antibiotic therapy (group M) was performed for 334 patients (CABG 259, valve 57, and others 18, age 64.6±10.8 years old).
Results: Three patients (1.1%) developed surgical site infections after cardiac surgery in group C, and 13 patients (3.9%) developed surgical site infections in group M (P=0.027). Mediastinitis occurred in one patient of group C, and in four patients of group M. The incidence of bacterial resistance was two (methicillin-resistant Staphylococcus aureus 2) patients (0.7%) in group C, and 10 (methicillin-resistant Staphylococcus aureus 8, methicillin-resistant Staphylococcus epidermidis 1, multidrug-resistant Pseudomonas aeruginosa 1) patients (3.0%) in group M (P=0.04). Factors including type of antibiotic therapy, type of operation, cardiopulmonary bypass, diabetes mellitus, chronic renal failure, hyperlipidemia and hypertension were compared retrospectively between patients with and without surgical site infections. Factors differing between groups were analyzed further by stepwise multivariate logistic analysis. Stepwise multiple logistic regression analysis indicated close relationships between cycling antibiotic therapy (odds ratio, 0.246; 95% CI, 0.07–0.90, P=0.034)
Conclusions: In this study, cycling antibiotic therapy reduced the incidence of bacterial resistance and surgical site infections after cardiac surgery. Cycling antibiotic was associated with significant changes for the prevention of surgical site infections.

C14-9

NEUTROPHIL GELATINASE ASSOCIATED LIPOCALIN AS A NOVEL MARKER OF RENAL INJURY IN PATIENTS UNDERGOING CORONARY REVASCULARIZATION WITH AND WITHOUT CARDIOPULMONARY BYPASS

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Objective: Renal dysfunction is a recognised complication following coronary artery bypass grafting (CABG). Cardiopulmonary bypass (CPB) has long been considered to be the main etiological factor. Fortunately the incidence acute renal failure (ARF) requiring renal replacement therapy is <1%. However when it does occur mortality rates of up to 60% have been reported. Further more serum creatinine despite its attendant limitations continues to be the mainstay of diagnosis. Recently a novel biomarker of acute renal injury termed neutrophil gelatinase associated lipocalin (NGAL) has shown promising results as a more sensitive marker of renal dysfunction following CPB. We sought to evaluate its role against patients undergoing CABG without CPB (OPCAB).
Methods: Forty patients were randomized to either CABG with CPB (ONCAB) (n=20) or OPCAB (n=20). Blood samples were collected from the radial artery into ethylenediaminetetraacetic acid (EDTA)-containing glass tubes shortly after anaesthetic induction, at the end of operation and 4, 8, 12 h postoperatively. The samples were immediately centrifuged in a refrigerated centrifuge to separate the plasma, which was subsequently frozen and stored at –70°C until assayed.
Results: There was a significant increase in NGAL levels immediately postoperatively in the ONCAB (P=0.0092). There after no statistical differences were noted between the two groups up to 12 h postoperatively. Analysis of area under the curve (AUC) between the two groups showed that there was a greater release of NGAL in the OPCAB group.
Conclusions: To our knowledge this is the first study to document changes in NGAL in this patient group. The ONCAB group suffer a bigger renal insult immediately postoperatively than the OPCAB group. However these changes are not sustained even up to 4 h post operatively. Our routine use of pulsatile CPB may be an important factor in the attenuation of the renal dysfuction associated with CPB. Further more the analysis of AUC suggest that OPCAB causes more sustained and prolonged renal insult than ONCAB.

C14-10

CARDIAC SURGERY IN PATIENTS WITH DIALYSIS-DEPENDENT RENAL INSUFFICIENCY

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Objective: Chronic dialysis is a risk factor for mortality and morbidity after cardiac surgery. The purpose of this study was to review the short and long-term follow-up of patients with end-stage renal disease undergoing cardiac surgery.
Methods: We retrospectively reviewed 72 patients (57 men and 15 women, mean age 61.3±7.6 years) with end-stage renal disease underwent cardiac operations at our Institution from 1996 to 2006. Surgery included isolated coronary artery bypass grafting in 38 patients (51.4%), aortic valve replacement in eight patients, mitral valve replacement in five, aortic valve surgery associated with CABG in ten, mitral valve surgery associated with CABG in four, double valve replacement in five and ascending aorta replacement in two patients. Mean duration of preoperative dialysis was 50±19 months.
Results: Overall in-hospital mortality was 13.9% (ten patients); mortality was 5.3% in patients operated on elective CABG, 17% in isolated mitral or aortic valve surgery and 60% in double valve replacement. CCS/NYHA functional class IV, urgent/emergency operation, depressed LVEF, mitral valve surgery and double valve replacement were related to in-hospital mortality. Long-term follow-up results and related statistical analysis are in progress.
Conclusions: In dialysis-dependent patients cardiac surgery procedures can be performed with an acceptable risk only in elective isolated coronary artery or aortic valve disease. Adequate preoperative management with identification of high-risk patients and a more aggressive approach before the onset of symptoms of cardiac failure are advisable.

C14-11

FACTORS INCREASING RISK OF PERIOPERATIVE RED BLOOD CELLS TRANSFUSION IN CARDIAC SURGERY – RESULTS OF SINGLE-CENTRE, MULTIVARIATE ANALYSIS

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Objective: Despite the lowering risk for transfusion transmitted viral infections and inconsistent data about impact of transfusion on postoperative infection due to transfusion related immunomodulation, use of homological blood products in cardiac surgery is still a major disadvantage. Transfusions of blood in currently published papers are individual, independent risk factors for death and decreasing the quality of life in long-term observation after open heart surgery. The aim of this study is identification of perioperative variables which increase the rate of homological red blood cells transfusion (RBC) in cardiac surgery patients.
Methods: Data from 1524 consecutive, adult patients operated on for heart disease and discharged from our centre from 01.01.2006 to 31.12.2006 were analyzed. The patients were categorized into seven types of surgical procedure: CABG, OPCAB/MIDCAB, CABG+other, single valve/simple congenital defect SVLV, multivalve MVLV, aortic aneurysm AA and transplantation TX. After that 37 patients were excluded from the study because of the impossibility of inclusion to any of the type of the previous proposed categories. Preselection of demographic, laboratory and perioperative variables, collected in the institutional data base was performed using the χ^2 test. Next, the step-wise logistic regression model for identification factors increasing the risk of perioperative homological red blood cells transfusion was created. Odds ratio (OR) for individual variables was evaluated. A P value <0.05

was considered significant. For all the patients the same institutional protocol of blood transfusion was used, the trigger for RBC transfusion was: during CPB: HCt=23% and HCt=25% in patients of age=70, during ICU stay: HCt<27% and HCt<30% in patients with serious morbidity: perioperative myocardial infarction/ischemia, low cardiac output, during stay in cardiac surgery ward: HCt<25% was the trigger for RBC transfusion. In all cases the trigger could be changed by consultant, depending on the clinical status of the patient.
Results: Overall transfusion rate in analyzed material was 51%. There were eight perioperative variables identified as the risk factors for transfusion of RBC: perioperative myocardial infarction/ischemia OR 8.22 (CI 2.15–31.36), preoperative Hot<40% OR 3.95 (CI 2.79–5.58), use of cob OR 3.87 (CI 2.55–5.87), female gender OR 3.55 (CI 2.43–5.19), postoperative low cardiac output OR 2.53 (CI 1.26–5.04), chest tube drainage >800 ml OR 2.34 (CI 1.69–3.22), mechanical ventilation>12 h OR 2.02 (CI 1.47–2.07), ice stay >24 h OR 1.64 (CI 1.20–2.23).
Conclusions: 1. Reduction of postoperative morbidity seems to be one of the ways of reducing perioperative transfusion rate in cardiac surgery.
2. Perioperative protocol including techniques of 'bloodless surgery' could be used to reduce the rate of RBC transfusion in high risk patients: female, with preoperative HCt<40%, operated on using CPB.

C14-12
CARDIAC SURGERY IN PATIENTS WITH EXTRA CARDIAC ARTERIOPATHY IN MODERN ERA – PATIENT CHARACTERISTICS, EARLY AND LATE OUTCOMES
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Objective: Recent trends show that patients with multiple risk factors needing cardiac surgery are increasingly becoming the norm. Reassessment of contribution of recognised risk factors in modern era helps accurate risk assessment. Extracardiac arteriopathy has been associated with increased morbidity and mortality and hence is included in risk scoring systems. We set out to study the effects of peripheral vascular disease on immediate and late outcomes after cardiac surgery.
Methods: Fifteen thousand four hundred and eighty one patients underwent cardiac surgical procedures between January 1993 to June 2006. Using the cardiac surgical database 1892 patients were identified to have pre-operative history suggestive of peripheral vascular disease. Data reflecting patient characteristics, severity of heart disease, comorbidity, and in-hospital mortality were collected. Patients undergoing coronary revascularisation, valvular procedures and combined procedures were included in the study. Univariate and Multivariate logistic regression analysis was performed. Survival data analysed using Kaplan-Meyer survival curves.
Results: Seventy-six percent of patients were males. Mean age of the group was 64.3±9.0 years with mean BMI of 27.6±4.17. 82.5% patients underwent isolated coronary revascularisation with a mean CPB time and cross clamp time of 81.5±39.5 and 44.1±22.7 min. Overall mortality for the group was 3.91%. 16.4% patients developed atrial fibrillation, 3.3% leg wound and 5.2% sternal wound problems in the postoperative period. The mean postoperative hospital stay was 11.1±10.5 days. Univariate analysis showed that NYHA grade III shortness of breath, previous MI, diabetes, renal failure and ejection fraction <30% are associated with increased mortality. However multivariate analysis showed Ejection fraction <30%, presence of renal failure, history of CVA and prolonged CPB time contribute to increased mortality.
Conclusions: Despite advances in cardiac surgical procedures patients with extracardiac arteriopathy are at increased risk of morbidity and mortality following cardiac surgery. Presence of other comorbid features further increases this risk.

C14-13
PLASMA D-DIMERS IN ACUTE AORTIC DISSECTION: DIAGNOSTIC AND PROGNOSTIC ROLE
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Objective: Laboratory testing provides important information in the management of acute onset of chest pain. Few reports have investigated the role of d-dimer levels in patients with acute aortic dissection (AAD). They have been recently suggested as a complementary tool in the diagnostic work-up of patients with suspected AAD, however the prognostic implications of preoperative and postoperative d-dimers levels are unclear.
Methods: From January 2000 to December 2006, 86 patients were admitted in our institution with diagnosis of acute aortic dissection type A Stanford and underwent surgical operation. Thirty-four patients (20 males; mean age 59±13 year) had preoperative and postoperative (untill six day after operation) daily evaluation of plasma d-dimers. Clinical features and laboratory tests were reviewed. In-hospital mortality and patients long-term outcome at mean follow-up of 46 months (range 13–78 months) were reported.
Results: Mean preoperative d-dimer value was 2473 μg/l (range: 47–16800 μg/l; abnormal value cut-off is 200 μg/l). There were no operative deaths but four patients died during hospitalization (12%). D-dimer levels decreased postoperatively showing a statistically significant difference compared to preoperative values in postoperative day 1, 2 and 4 (P=0.015; P=0.04; P=0.04). Two patients died for cardiovascular related events during follow-up, total mortality was 18%. Survivors had a significant lower preoperative d-dimers values (P<0.05). A correlation between preoperative d-dimers and postoperative plasma creatinine values was found (P<0.02); patients with acute postoperative renal insufficiency (plasma creatinine >2.5 mg/dl) had higher preoperative d-dimer levels (P<0.01).
Conclusions: Our data suggest that plasma fibrin d-dimer is a valuable diagnostic tool in patients with suspected AAD. Positive results should advocate more accurate imaging evaluation to rule out AAD. We hypothesize that d-dimers reflect the extension of dissection and therefore justify their ability to predict short and mid-term outcome.

C14-14
CARDIAC OUTPUT MONITORING AFTER CORONARY ARTERY BYPASS SURGERY: COMPARISON OF A NON-INVASIVE SYSTEM DATA WITH THE THERMODILUTION METHOD
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Objective: Cardiac output (CO) monitoring might be essential in patients with heart disease, especially in those patients with low ejection fraction who undergo cardiac surgery procedures. For this purpose, different systems have been proposed where the thermodilution method with a Swan-Ganz (S-G) catheter is considered a gold standard; Whoever, such method is invasive, the system requires several invasive monitor lines and measurements should be repeated. Also, prolonged in-situ central vein catheter might increase the risk for infections. Recently a new non-invasive cardiac system (NICaS 2004 Slim), an impedance technology-based non-invasive portable device, has been introduced for CO measurements. Differently from invasive measurements methods, to obtain patient's CO with NICaS, four electrodes are applied to the skin on two limbs: two electrodes are placed on a wrist and the other two to the controlateral ankle above the distal radial and posterior tibialis arteries. The aim of the study was to evaluate reliability of the NICaS in measuring CO in patients who underwent cardiac surgery procedures.
Methods: To evaluate the reliability of NICaS data, 30 consecutive patients who underwent isolated CABG surgery and monitored intraoperatively with S-G were enrolled for the study. Mean age was 70 years and 60% were male. Six hours after arrival to the ICU and when body temperature was normal, two independent doctors obtained standard measurements of the CO by means of thermodilution and by the NICaS contemporarily. The NICaS calculates the CO every 20 s, therefore, during one minute three independent measurements were recorded, the average of which is the determined CO result. The CO values obtained by the thermodilution method were calculated as well based on average values of three measurements with <15% disparity between the two extreme measurements.
Results: In all patients measurements could be obtained. Mean cardiac output was 4.75 l/min and 4.95 l/min with the S-G and NICaS respectively (P=0.95) and stroke volume was 56.8 ml vs. 57.75 ml (P=0.83).
Conclusions: The CO results measured by the NICaS and with the thermodilution method found to be similar with maximum discrepancy of less than ±20%. Given that ±20% discrepancy between a new technology and the gold standard thermodilution meets FDA requirements for bioequivalence, our results suggest that the NICaS apparatus is reliable and can be considered to obtain CO in patients undergoing CABG surgery procedure.

C14-15
HYBRID TREATMENT OF AORTIC ARCH ANEURYSM: ONE STAGE OFF-PUMP AO-TSA BYPASS AND ENDOVASCULAR STENT-GRAFT
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Objective: The surgical treatment of aneurysms involving the aortic arch is total arch replacement, on extracorporeal circulation, total circulatory arrest with deep hypothermia and cerebral perfusion. Mortality and morbidities remain high for such operations due to cerebral embolization, neurologic dysfunction, high haemorragic risk, respiratory complications, particularly on elderly patients with heavy co-morbidities.
We have used a stent-grafting implanting method that uses Ao-TSA bypass on partial clamping before covering the arch and descending aorta with one or more endoprostesis.
The aim of our study is to evaluate the efficacy and safety of the technique.
Methods: Between December 2002 and October 2004, 12 patients were enrolled in this study. Male/female: 9/3. Median age: 74 (68–81) Preoperative evaluation was made by spiral CT scans. A cerebral magnetic resonance imaging was done to estimate the competence of the circle of Willis. Cerebral perfusion monitoring during operation was made by near-infrared spectroscopy.
The main portion of a bi or triforcated PTFE 12/8 mm was anastomosed to the lateral aspect of the ascending aorta. The distal ends of the graft were anastomosed to the innominate artery, to the left carotid artery and to the left subclavian artery in all cases but two. In those cases the left subclavian artery was legated, due to a difficult anatomy. The native three cervical branches were sutured at the origin before the aortic arch manipulation of the delivery system, to reduce any cerebral ischemic complication.
The Talent endovascular stent-graft system (EGS) was used in all cases, introduced from the right common femoral artery, surgically isolated.
After positioning under fluoroscopy view the EGS was gradually deployed.
Two or three EGS were necessary to seal the aortic arch from the 0 zone to the thoracic aorta, zone 4 (according to Ishimaru classification).
Results: There was no operative mortality.
The stent graft placement was carried out during the same operation. 100% technical success. No ischemia of left upper arm lesions or paraplegia occurred. No AMI, no respiratory failure, one case of worsening of renal insufficiency. No infections. The patients were estubated 3 to 6 h after the operation. All patients are still alive and followed by angio to multislice every six moths on the first postoperative year and than every year. No endoleak have been noticed at follow-up.
Conclusions: The aortic arch aneurysm repair with hybrid technique is an innovative way to avoid the risks of the conventional surgical technique, particularly helpful for high risk patients.

C14-16

ALTERNATIVE CANNULATION SITE FOR ACUTE AORTIC DISSECTIONS

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Objective: Acute proximal aortic dissection is a devastating disease. Often finding is cardiac tamponade, severe aortic insufficiency, dissection of right coronary artery and hemodynamic instability.
Methods: During last ten years we operated on 107 patients for acute aortic dissections. In majority of cases we used femoral cannulation. Three patients had severe neurological deficit and failed to wake up after operation. Most probably because of brain malperfusion.
Results: Recently we started to use heart apex as inflow site. In 16 cases we didn't have any neurological or other problems with this strategy. Our approach was to use this site for quick, easy but at the same time reliable way for establishing CPB. Having physiological blood flow, we believe, will minimize possibility of malperfusion syndrome.
Conclusions: We believe that heart apical cannulation is safe, reliable and efficient method and advantageous compared to others especially in avoiding malperfusion phenomenon.

C14-17

OPEN DISTAL ANASTOMOSIS AND RETROGRADE PERFUSION FOR THE ASCENDING AORTA AND ARCH ANEURYSMS CORRECTION

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Objective: To present the experience of surgical treatment of ascending aortic and arch dissecting aneurysms.
Methods: From 1994 to 2006, 81 patients with ascending aortic and arch dissecting aneurysms were operated on in our institution. There were 66 (81.5%) males and 15 (19.5%) females, age 22–68 years, mean 48.8+4.6 years, 12 (14.8%) of patients were in class III NYHA classification, 69 (85.2%) – in class IV NYHA.
The reasons of aneurysms: hypertension, atherosclerosis – 45 (55.6%), Marfan syndrome – 17 (21.0%), cystomedionecrosis – 13 (16.0%), bicuspid aortic valve – 5 (6.2%), falling down from the height – one case.
All patients were operated on with cardiopulmonary bypass (CPB) in deep hypothermia (DH), with cardiac arrest and retrograde cerebral perfusion (RCP) via superior vena cava (SVC).
The following operations were used: (a) supracoronary replacement with the aortic valve cusps resuspension – 52 patients; (b) Bentall's operation in our modification – 25 patients; aortic arch replacement – three (3.7%); Wheat operation and arch correction – one (1.2%).
Myocardial protection–cold crystalloid ante-retrograde cardioplegia. Cannulation of femoral artery (FA) was performed in all cases.
There were 25 patients operated on with DH (16–18 °C), CPB blood flow 500–750 ml/min/m^2, SVC pressure 15–20 mmHg and mean RCP time 34.6+8.8 min (range 28–58 min) during 1994–2002 period (group A). Fifty-six patients were operated on with RCP and DH (12.5–14 °C), CPB blood flow 250–500 ml/min/m^2, SVC pressure 10–12 mmHg and perfusion via FA was conducting during the all RCP period. The RCP time was 56.8+10.4 min (range 38–158) – group B, during 2003–2006.
Results: General hospital mortality was 20 (24.6%); 32.1% (17 from 53) for urgent cases and 10.7% (3 from 28) for elective cases.
Mortality in group A was seven (28%), two of patients died because of brain damage. The mortality in group B was 13 (23.2%) without any neurological events.
Conclusions: Improved combined RCP with low pressure in SVC and low blood flow of extracorporeal circulation, DH (12.5–14 °C) with permanent perfusion through FA (group B) are better methods to preserve brain during the long periods of arch and hemiarch correction in cases with ascending aortic and arch dissecting aneurysms.

C14-18

MITRAL VALVE REGURGITAION CORRECTION WITH SYNTHETIC TAPE

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Objective: The purpose of this study is to present our experience in surgical treatment of the patients with mitral regurgitation correction of different etiology and additional pathology.
Methods: From 2005 to 2007, 69 patients underwent mitral valve (MV) regurgitation (MR) correction. eleven (15.9%) patients MR had rheumatic origin (seven patients with additional aortic valve replacement and three with tricuspid valve plasty). In 35 (50.7%) patients MR was due to ischemic origin (three patients needed redo surgery). Among this group for 18 patients MV plasty with CABG was performed and for 17 patients MV plasty with CABG with left ventricle aneurism plasty was performed. four (5.8%) patients had mixomatous MR and 10 (6.9%) – degenerative process. Congenital MR with leaflets defects was in five (7.2%). Combination of rheumatic and ischemic etiology was in four (5.8%) patients (one patients had ascending aortic aneurism). Mean age of the patients was 54.2±11.6. 61 (88.4%) patients were male. Mean ejection fraction was 44.5%±11.4%. Mean additive EuroSCORE was six, logistic – 8.3%. Mean pulmonary artery pressure was 42.5 mmHg. MR of IV degree was in eight (11.6%) patients. MR of III degree was in 57 (82.6%) patients. In four (5.8%) of the patients had II degree of MR which was corrected with other pathology.
Results: In all cases MR was corrected using a synthetic tape of Goretex-like material of Russian manufacture. In four patients in degenerative group annular plasty was combined with quadriangular resection. CABG was performed in all patients of ischemic group. Mean number of grafts per patient was 2.9±1.7 in this group. In 45 of the patients (65.2%) there were no mitral regurgitation during intraoperative echocardiography and in postoperative period. In 18 (26.1%) patients I degree of mitral regurgitation remains. In three (4.3%) patients II degree of mitral regurgitation remains. In three (4.3%) of the patients remains significant MR of III–IV degree and valve replacement was performed. One patient needed valve replacement in follow-up period due to significant MR appearance. Five (7.2%) patients died in postoperative period but only from ischemic group.
Conclusions: Mitral valve regurgitation correction with synthetic tape in patients of different origin with additional pathology could be successfully performed with good results and acceptable mortality.

May 19, 2007 3rd Congress Day
16:30-18:00
9th Vascular Scientific Session - Veins

V9-1

POSSIBILITY OF LASER COAGULATION FOR TREATMENT OF VENOUS MALFORMATION

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Objective: The purpose of the present study was to determine opportunities of endovasal laser coagulation for the treatment patients with a lower extremity venous malformation.
Methods: Domestic highly energetic diode laser (1030 nm) was used for coagulation. Method was used as a stage of combined surgical intervention in five patients with embryonic veins in area of thigh and shin lateral surfaces and in five cases in infiltrating venous malformations. Preoperatively DS examination has been used for preoperative marking and specification of angioarchitectonics. Skin was protected by the method of maintaining of hydraulic pillow. For the control of results DS was performed in 1 week, 1 and 6 months after operation. To evaluate the hemodynamic effects of intervention we compared preoperative and postoperative photopletismography findings (Vo, RT).
Results: Application of a this method shows complete or partial occlusion of dysplastic veins and partial obliteration of venous angiomatosis. Parameters of coagulation - power 23–25 W, distribution of energy 70–80 W/cm^2. There were no serious complication after coagulation. In cases of embrionyc veins partial recanalization was observed in two patients. In one case recanalization occured through insufficient laser power. As a result of intervention the painful syndrome has decreased, is noted relapses of a bleeding. Mean photopletismography parameters have increased with 8.5 up to 18.3 s (RT) and with 2.6 to 3.5% (Vo).
Conclusions: The application of laser coagulation is able to diminish significantly intraoperative traumatization and achieve obliteration of dysplastic veins and diffuse infiltrating venous malformations. Hemodynamic and clinical improvements were observed in this series. It allows to improve quality of a life of this heavy category of patients. Are required the further accumulation of experience for specification of a role of the given method of treatment.

V9-2

THE MANAGEMENT OF ACUTE LOWER LIMB ISCHEMIA FOLLOWING INADVERTENT ARTERIAL INJURY DURING SAPHENOUS VEIN STRIPPING: OUR EXPERIENCE

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Objective: Injury to the arteries of the lower limb is a rare but catastrophic complication of the saphenous veins stripping and seems to be more common than might be supposed, with an important impact either on morbidity and mortality or for the legal implications. Diagnosis is often delayed because the pain is mistaken by the surgical trauma and the outcome is dependent to the severity of the arterial injury with high incidence of lower limb loss. We report our experience in the management of severe lower limb ischemia due to inadvertent lesion of superficial femoral artery.
Methods: Two patients were admitted to our Unit with lower limb ischemia after varicose vein surgery. In the first case an inadvertent superficial artery ligature 4–6 h after a redo operation for recurrent varicose vein surgery occurred with heavy ischemia. In the second case, an intraoperative ligature of the superficial femoral artery and vein was detected during dissection of the saphenous-femoral junction. In the first case, an angiography was carried out and a superficial- superficial femoral artery interposition graft with polytetrafluoroethylene was performed. In the other case, an interposition graft with autologous vein between common and superficial femoral artery and reapproximation of the common and superficial vein after removal of thrombi by squeezing, were carried out. No fasciotomy were performed, no necrotic tissue debridment was required.
Results: No mortality occurred and limb salvage and patency rate at 5 years and 12 months respectively were achieved in both cases. No neurologic or muscles complications were revealed.
Conclusions: Femoral artery injury after venous stripping is showing an high amputation rate either due to delayed diagnosis or for the extension of arterial involvement. In our opinion the diagnosis and therapeutics strategy are directed by the type of arterial lesion and the degree of ischemia. Duplex scan examination can help to prompt diagnosis with no delay in diagnosis and worse of ischemia. Angiography must be reserved in selective cases. A prompt diagnosis and an aggressive surgical approach is mandatory to achieve a limb salvage without severe sequelae.

V9-3

DEEP VEIN THROMBOSIS OF THE LOWER EXTREMITIES: A BENIGN DISEASE?

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Objective: A retrospective study of 102 patients with deep vein thrombosis of the lower extremities to define risk factors, to assess diagnostic and therapeutic methods, to report clinical outcomes and to propose conclusions for reducing mortality and morbidity of this disease.
Methods: From July 1996 to July 2006, 112 patients were diagnosed for deep vein thrombosis of the lower extremities. There was 42 males and 70 females the mean age was 59.32 years (range 21–92 years).
The most frequent risk factors for thrombophlebitis were surgery, obesity, advanced age, estroprogestative treatment, cancer, heart failure, history of thrombophlebitis or pulmonary emboli, varicose veins, immobilization, pregnancy and post-partum
Sixteen patients had thrombophilia (hypercoagulation state). Twelve had one and four had two inherited genetic predisposing factors (Heterozygous Prothrombin G 20210A mutation: 1, MTHFR C 677T mutation: 1, Antiphospholipid syndrome: 1, Factor V Leiden mutation: 13, Homozygous: 1, Heterozygous: 12 of whom four had associated Protein C deficiency, Protein S deficiency, MTHFR C677T Heterozygous mutation and Prothrombin G 20210A Heterozygous mutation.
Diagnostic procedures included doppler ultrasound, duplex scan, D Dimer dosage and rarely CT scan and phlebography. Patients were mainly treated with low molecular weight heparin, followed by oral anticoagulation (3 to 12 months or more) and graduated compression stockings. Four patients required inferior vena cava filter insertion.
Results: Only one mortality was recorded and was related to a major bleeding secondary to the underlying hematologic disorder (severe thrombocytosis). No other significant morbidity was observed.
Patients were followed between 3 to 120 months (mean: 20 months). Six patients died secondary to their malignant disease. Four patients had recurrences and twenty-five had post-thrombotic syndrome (three severe).
Conclusions: Deep vein thrombosis of the lower extremities is a relatively benign condition when promptly diagnosed and properly treated. Thrombophilia should be screened in young patients essentially without risk factors, in patients with family history or recurrent or extended forms. Using diagnostic modalities, deep vein thrombosis must be confirmed or excluded. Late morbidity (post-thrombotic syndrome and recurrences) can be reduced with graduated compression stockings and recommended periods of anticoagulation.

V9-4

USE OF CRYOPRESERVED HOMOGRAFT VESSELS IN MANAGEMENT OF COMPLICATED A-V ACCESSES

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Objective: The autologous strategy producing A-V access gained a worldwide acceptance. In fact a minority of the patients are not available for autologous access, or in case of certain conditions a maturation period is not accepted. The use of homograft vessels is published for the replacement of an infected prosthetic access. In order to keep the above mentioned strategy, we introduced the use of homografts as AV access in case of septic complication of the central venous catether and/or if a short-term use of the access was requested.
Methods: We performed 1518 arterio-venous fistula creation from 1997 to 2007. Prosthetic fistulas were created under 2% in this population. Six patients were operated with implantation of cryopreserved homograft vessels. Informations were obtained from the patients and the dialisis centers retrospectively. The cases were operated in a single institute by one surgeon.
Results: Indication: Two patients had a septic condition due to a gangrenous leg. Five patients had previously multiple central venous catheters and difficulties to place a new one.
The average age of patients was 51.6 years. Gender distribution: three men and three women.

Four patients had more than two long-term functioning access, one patients was operated seven times previously. Two patients had unsuccessful fistula creation two and three times prior the homograft implantation. Two patients were diabetic. Two grafts were implanted on the thigh, four on the forearm. We used cryopreserved 8–10 mm diameter femoral vein segments. All of them started immediately. The first puncture were performed prior the 10 postoperative day. Two patients died with functioning graft on intercurrent disesases 18 and 4 months later. One graft occluded five months later due to an inguinal wound infection. Three grafts are still in use in an average of 11 months follow-up.
Conclusions: We have always emphasized the priority of autologous fistulas. It has a lower rate of infection, patients tolerate them better, the crew of dialisis centers prefer them, the incidence of post treatment bleedings are less. Homograft vessels fulfill in desperate situations as biological conduit these options. A short-term use is possible due to the immediately available diameter, and offers a tolerable patency.

V9-5

VENOUS TRAUMA IN THE LEBANON WAR - 2006

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Objective: To present our recent experience in major venous trauma during the Lebanon conflict, means of diagnosis and treatment in a level I trauma center.
Reports on venous trauma are relatively sparse. Severe venous trauma is manifested by hemorrhage, not ischemia. Bleeding may be external or internal and lead to a hypovolemic shock. Repair of major extremity veins has been a subject of controversy and the current teaching is to avoid venos repair in an unstable or multitrauma patient.
Methods: We have collected all the cases of major venous trauma, either isolated or combined with arterial injury, admitted to the emergency room during the 33-day conflict.
Results: Overall 511 wounded soldiers and civilians were admitted, out of which 12 (2.3%) sustained a penetrating venous injury (isolated: 5, combined with arterial injury: 7). All injuries were secondary to high velocity penetrating missiles from small arms used in direct combat, shrapnels or multiple pellets from long range missiles. All injuries were accompanied by additional insult to soft tissue, bones and viscera. The mean severity score was 15. Severe external bleeding was the presenting symptom in three cases of isolated venous injury (jugular, popliteal and femoral). The diagnosis of a major venous injury was made by a CTA scan in five cases, angiography in one and during surgical exploration in six cases.
All injured veins were repaired: three by venous interposition grafts, four by end to end anastomosis and three by lateral suture. Endovascular technique was employed in two case of traumatic arteriovenous fistula of the internal iliac vessels. None of those injuries was treated by ligation of a major named vein.
Immediate postoperative course was uneventful in all patients and the 30-days follow-up (by clinical assessment and duplex scan) has demonstrated a patent repair with no evidence of thrombosis.
Conclusions: Without contradicting the wisdom of ligating major veins in the setup of a multitrauma or unstable patient our experience indicated that a routine repair of venous trauma can be safely and effectively performed in young patients. Postoperative course is not compromised and late sequelae of venous interruption may be prevented.

V9-6

INFERIOR VENA CAVA THROMBOSIS OF VARIOUS GENESIS

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Objective: Thrombosis of the inferior vena cava (IVC) is an under recognized entity with a variety of clinical presentations. The purpose of the research: to study the etiology, clinic manifestations, diagnostic aspects and to analyze treatment outcomes of IVC thrombosis.
Methods: Fifty-two consecutive patients (37 men, 15 women; mean age, 45.6 years; range, 17–73 years) with the IVC thrombosis, who were treated during the period of 1998–2006 were included in the work. Clinical assessment, duplex ultrasound, phlebography, SCT-angiography, angiopulmonography and echocardiography were performed for determining the etiology, the level of thrombosis, characteristics of the obstacle and confirming complications. The treatment included heparin therapy (adjusted continuous IV for 4–7 days with APTT monitoring), then warfarin (under INR control for 3–12 months); thrombectomy (six patients), implantation of cava-filter (three patients).
Results: Basing on the findings of the investigation we found out that the frequency of IVC thrombosis among all symptomatic patients with deep vein thrombosis is 7.3%. The cause of IVC thrombosis was extended iliofemoral thrombosis - 20 patients (38.5%); 7 (13.5%) of IVC thrombosis were verified as posttraumatic (after spinal trauma, or blunt trauma of abdomen); renal cell carcinoma and extension of tumor into the retrohepatic vena cava or into the right atrium in seven patients (13.5%); implantation of the caval filters or cavaplication - 7 (13.5%); congenital anomalies of the inferior vena cava - six cases (11.5%); extrinsic compression IVC – 3 (5.8%) and 2 (3.8%) thrombosis was idiopathic. Thrombosis of infrarenal segment of the IVC was observed in 30 patients, infrarenal and renal –10, retrohepatic – 9, total IVC – in three patients.
Twenty-five (48%) of the patients had the classic presentations of IVC thrombosis (leg swelling with dilated, visible superficial abdominal veins); during 1–4 years after hospitalization 12.3% of the patients had of leg ulcers. Symptoms of pulmonary embolism were revealed at 18 (34.6%) patients. Seven (13.5%) patients died.
Conclusions: IVC thrombosis remains a challenging process to diagnose and cure. <1/2 of patients had a correct diagnosis before making special investigations. IVC thrombosis is diagnosed rather late when severe complications occur: pulmonary embolism, chronic venous insufficiency.

V9-7

NEW ASPECTS OF CHRONIC VENOUS COMPARTMENT SYNDROME AND SURGICAL THERAPY OF CHRONIC ULCERS

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Objective: The functional stage-related/stage-specific diagnosis, surgical treatment and postoperative compression therapy of the ulcer cruris venosum in the stages III and IV of a chronic venous insufficiency is still a therapeutic challenge. The surgical treatment of varicous veins with dissection of perforated veins used as the essential form of therapy.
Methods: Between 2000 and 2006, 240 patients suffering from ulcer cruris with a severe dermatoliposclerosis and dermatofasioliposclerosis were treated in our hospital with radical necrectomy, paratibial fasciotomy or fasciectomy with vacuum- assisted closure therapy and follow-up mesh-graft transplantion.
Results: With this form of therapy especially stage IV ulcers with chronic venous insuffiency that had been unsuccessfully treated with long-term conservative methods could be healed completely.
Conclusions: Our statistics have shown that for the treatment of chronic venous ulcer cruris a functional and stage-related therapy is indispensable. Ultimate healing of dermatofascioliposclerosis can only be achieved with the help of radical fasciectomy, the construction of healthy ground tissue, follow-up mesh-graft transplantation, and consistent compression therapy.

V9-8

ENDOLUMINAL RADIOFREQUENCY OBLITERATION OF THE SUPERFICIAL VENOUS SYSTEM: CURRENT EVALUATION OF THE METHOD

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Objective: Since introduction of the radiofrequency obliteration the procedure has improved itself by changing of the settings and very good results have been published regarding the perioperative complications and elimination of superficial reflux.
Methods: We made meta analysis of the data published about the results of radio frequency obliteration. The two major data sources for the meta analysis are the still ongoing clinical registry and a prospective randomized trial (EVOLvES study) between radiofrequency obliteration and high ligation and stripping of the greater saphenous vein. In this meta analysis our own data with the radiofrequency obliteration were included.
Results: The perioperative complication rate in the clinical registry were very low with pulmonary embolism 0.1%, DVT and/or clot extention into the common femoral vein 0.9%, skin burn 1.2% - which could be minimized by tumes-

cent infiltration – superficial phlebitis 2.9%, infection 0.2%. Initial quite high rates of paresthesias with 12.2% dropped down to 2.6% at the five year follow-up. The other studies showed even lower perioperative complication rates.
In several studies the perioperative quality of life and patient satisfaction with the radiofrequency procedure in comparison to high ligation and stripping were analysed. Radiofrequency obliteration showed statistically significant better outcomes in comparison to stripping for pain, less postoperative mobility, faster recovery, better quality of life.
The overall occlusion rate after radiofrequency obliteration was 87% up to five years postoperatively. During the follow-up period, more that 80% of the treated veins could not be seen by duplex ultrasound any more. The rate of neovascularization was very low two years after operation with 3.1% in comparison to stripping and ligation with more than 18% at the saphena-femoral junction.
Conclusions: The radiofrequency obliteration of the superficial venous reflux is nowadays a very established procedure to treat varicose vein diseases. The periopertive complication rates are very favourable and additionally there are clear advantages for radiofrequency obliteration regarding faster recovery and better quality of life perioperatively than in stripping patients. Midterm results up to five years are as good as after high ligation and stripping.

V9-9

NEW RESULTS OF CAVACLIPPING IN INFRARENAL SEGMENT AS A METHOD OF PREVENTING OF LUNG ARTERY THROMBOEMBOLY CASES IN VIEW OF THE REMOTE RESULTS

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Objective: Modern researches continue to demonstrate a high level of morbidity due to thromboebolism of the lung artery (TELA). Restriction of indication to application of thrombolythical drugs and surgical methods of preventive maintenance of migration of the thromboembols, thus, has not improved the general adverse state of affairs in this area. There is an occasion to consider, that as against ways of endoveinic implants of filters, external clipping, of the bottom caval and iliac veins at embologene phlebothrombose has proved the validity and efficiency.
Methods: The group of patients (254 from 735 whole), after significant time (on the average, 8.2 years) after installation clips on a course of realisation conservative (medicamentous) or surgical (thromboectomy, perfusion, plastics of veins) programs is surveyed. With the help of modern technicques (USG, CT, NMG, phlebography, fibroangioscopy, angiopulmonography etc.) the quality they life and sequence of the venous block is specified.
Results: Passambleness of the clipping veins in the remote period was kept at 78% of patients. It is recognized of hemodynamic significant only at 23.3% (a gradient of pressure over 2 mmHg). Frequency of occlusions did not depend on a level of the clipping (caval or iliac veins). Cases of late formation are rather rare (no more than 3% after five years of supervision)
Conclusions: Clipping caval or iliac veins does not result in significant infringments of venous outflow, does not worsen results medicamentous (anticoagulant) therapy of a acute venous thrombosis, it is not connected to complication and rise in price of treatment and obviously reduces risk of lethal relapses TELA.

V9-10

CRITERIA OF IMPLANTATION OF VENA CAVAL FILTERS WHEN PERFORMING THROMBECTOMY FROM DEEP VEINS OF THE LOWER EXTREMITIES

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Objective: Ileofemoral segment thrombectomy and local thrombolysis are efficient measures for preventing the development of chronic venous insufficiency (CVI) of the lower extremities. In some cases, however, a high probability of intra- and postoperative pulmonary artery thromboembolism (PATE) occurs. To prevent this dangerous complication the removable caval filters can be successfully used.
Methods: Over three-year period (2004–2006) 43 patients with acute venous thromboses of various segments in the lower limbs were examined and operated in the Clinic of Cardiovascular Surgery (Military Medical Academy). Apart from conventional clinical examination, some highly accurate methods of the venous system investigation (ultrasonic duplex angioscanning, functional phlebography, angiopulmonography, multispiral computed tomoangiography) were applied. The investigations made it possible to reveal not only localization and extension of the major veins injury but qualitative features of the thrombus at its investigation stage as well.
Results: Dangerous floting thrombi in the major veins of the lower extremities were revealed in 35 patients. In eight cases the thrombotic massae had heterogenous structure pointing to unstable attachment to the venous walls.
To prevent a possible PATE the caval filter implantation was performed in 20 cases with using only removable embolus-trapping devices. Thrombectomy in the major veins of the extremities and the pelvis was conducted after the caval filter setting, on the same or next day. After eliminating the danger of thromboembolic complications the removal of filters was carried out within a different period, a maximum of 38 days.
Thrombosis of caval filter and thrombosis of infrarenal part of inferior vena cava was observed in two patients. No recurrent pulmonary artery thromboembolism occurred. In the rest cases of regional thrombolysis and thrombectomy the recovery of the blood flow in proximal parts of deep veins of the lower extremities was noted.
Conclusions: Preoperative use of removable caval filters when conducting thrombectomy and thrombolysis has proved completely reliable in preventing pulmonary artery thromboembolism. Implantation of removable filters is indicated in the following cases:

- when loose (unstable) occlusing thrombotic massae are detected in the ileofemoral segement;
- when extended floting thrombi are present in any venous segment of the extremity;
- when pulmonary artery thromboembolism is evident.

After successful use of measures for eliminating the acute occlusion of major veins of the lower extremities and the small pelvis the caval filters can be removed without any hazard to patient's health.

May 19, 2007 3rd Congress Day
16:30-18:00
10th Vascular Scientific Session - Vascular Access

V10-1

LONG-TERM RESULTS OF ABDOMINAL AORTIC ANEURYSM REPAIR IN SEVEN PATIENTS WITH A WELL FUNCTIONING RENAL ALLOGRAFT AND INDICATIONS OF ENDOVASCULAR VS. OPEN APPROACH

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Objective: The purpose of the study is to present long-term results in seven patients with a well functioning kidney transplant, submitted to abdominal aortic aneurysm (AAA) repair and the indications to choice a standard open (five cases) or endovascular (2) approach, according to our experience.
Methods: Seven consecutive patients (six men, one woman), out of 2686 transplanted at our institution between 1969 and 2006, were submitted to AAA reconstruction at our institution between 1991 and 2006. Their mean age at transplantation was 34.7 years (range: 18–50 years). The mean interval between kidney transplantation and aortic reconstruction was 248±132 months (range 19–372 months) and the mean recipient age at aortic reconstruction was 55.4 years (range 43–64 years). Heavy multiple comorbidities was assessed in 85.7% of the patients at preoperative evaluation. Five patients were submitted to AAA open repair, employing renal protection devices in four of them, using an original aorto-femoral temporary shunt (three patients) or femoro-femoral bypass pump-oxygenator (one patient).
Two patients were judged at a too high risk for the open repair (ASA 3–4) and were submitted to endovascular abdominal repair (EVAR), placing an AneuRx stent graft.
Results: No patient died or lost the graft because of AAA repair. The mean length of hospital stay after operation was 8.3±3.7 days (range 5–14 days); the renal function was unchanged at discharge. Among the five AAA open repairs, one patient died from sudden myocardial infarction 37 months after the operation and four patients are until now alive for 186, 115, 82, and 31 months respectively, showing a normal renal function. One of the two patients submitted to EVAR lived well with a normal renal function, until a sudden death occurred 60 months later due to a devastating mesenteric

ischemia, not related to the stent graft. The second patient had undergone to EVAR for imminent risk of AAA rupture under chronic graft rejection; he is still living 55 months after EVAR, but lost his graft from rejection/graft renal aneurysm 25 months later.
Conclusions: Higher incidence of AAA must be expected in the future due to increased longevity of transplanted patients. Wise adoption of new technology and timely operation could allowed a life year gain after AAA repair, which in our series of seven kidney transplant recipients with multiple risk factors was in total until now 46 years.

V10-2
CENTRAL VENOUS STENOSIS IN HEMODIALYSIS VASCULAR ACCESS – IS THE REPEATED PTA WITH STENT IMPLANTATION A REASONABLE THERAPEUTICAL OPTION?
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Objective: A clinically relevant stenosis of the vena subclavia is a complication that often appears in upper arm vascular access, particularly in brachio axillary AV bridge grafts with a high flow. Originally well-working hemodialysis accesses turn to chronic problem cases. Does a repeated interventional therapy with PTA+stent implantation make sense?
Methods: Within a period of four years 103 stenoses of the vena subclavia were diagnosed in 52 hemodialysis patients with a primarily well formed upper arm AV fistula or AV bridge graft when investigating the reasons for the increasing deterioration of the access function. Flow measurement and angiographie were carried out before intervention.
Results: On an average two intervention of the affected extremity were necessary in these 52 patients. In 21% of the cases one or several central veneous acesses existed in the affected veneous segment. Stent implantation (min. 1, max. 6) after PTA was necessary in 16 patients. After repeated intervention occlusion of the referred central veneous part was seen in eight cases. No peri-interventional complications occurred. The mean period of observation amounted to 21 months.
Conclusions: The central veneous stenosis in connection with hemodialysis access with or without a previous ipsi lateral central veneous access is a frequent complication among patients with chronic hemodialysis. In our opinion the PTA with optional stent implantation is not a permanent solution to this problem. However, the provisional application of this method seems to be effective as a bridging solution until the maturation of an alternative AV fistula.

V10-3
AN ORIGINAL ARTERIO-ARTERIAL ANGIOACCESS GRAFT FOR HEMODIALYSIS
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Objective: A new arterio-arterial (A-A) access for hemodialysis is proposed as vascular conduit, anastomosing a modern organic vascular graft to the brachial artery, that functions as inflow and outflow vessel. This technique has special indications for patients with complete exhaustion of superficial vessels after multiple angioaccess failures, central venous thrombosis, lower limb postphlebitic syndrome, cardiac insufficiency and/or peripheral arterial disease.
Methods: The first A-A access was constructed under local anesthesia for a 70-year-old patient who had all aforementioned comorbidities, placing in his upper limb a modern organic vascular substitute with optimal handling, absence of valves and tributaries, sufficient wall thickness, and resistance to infection, the decellularized SynerGraft 100 bovine ureter, anastomosing it in an end-to-side fashion to the brachial artery in a straight configuration with two running sutures. No ligature was applied on the brachial artery in our patient, differently from the other two cases reported in the literature.
Results: Postoperative course was uneventful and the graft was allowed for a three week maturation prior needling for hemodialysis. At the end of the sixth month, the graft is patent and the patient has three hemodialysis session per week without any problem. The cardiac function was not made worse after the operation and an efficient dialysis can be made at a dialysate flow rate of 150–300 ml/min, with no re-circulation phenomenon. No oedema or venous hypertension and no peripheral ischemia or steal syndrome was observed after the procedure, as no vein was used and no artery was tied, the main arterial flow of the upper limb remaining patent. A strict collaboration with the nephrologist is mandatory to avoid any intra-arterial infusion of drugs.
Conclusions: The exhaustion of superficial vessels leads often to the use of Central Venous Catheter (CVC) for continuing the depurative treatment or to the construction of extreme vascular access or extra-anatomic arterio-venous grafts.
Permanent dialysis with the use of CVC is associated with patient discomfort, low patency rates, central vein thrombosis, higher morbidity and mortality, due to recurrent thromboses, dialysis inadequacy and infection. Extreme vascular accesses employ greater vessels and may potentially provoke peripheral ischemia and congestive heart failure; moreover, long extra-anatomic arterio-venous grafts are prone to thrombosis.
The A-A access for hemodialysis represents a viable alternative procedure for permanent vascular access in a selected group of patients.

V10-4
INTRAOPERATIVE DIGITAL SUBTRACTION ANGIOGRAPHY FOR QUALITY ASSURANCE DIAGNOSTICS IN OUTPATIENT ARTERIOVENOUS FISTULA SURGERY
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Objective: Quality assurance is taking on increasing importance today in many fields. Real-time sonography, Doppler flow measurement and digital subtraction angiography (DSA) are regarded as suitable procedures for intraoperative evaluation of the results of vascular surgery, in some cases allowing immediate correction of any problems detected.
Methods: In a prospective study, we are currently investigating the practicability and benefits of intraoperative DSA in outpatient AVF surgery. The operations are performed under brachial plexus anaesthesia. When the arteriovenous anastomosis is completed and is clinically judged as running, DSA via percutaneous or open-site puncture is conducted.
Results: We operated on 45 patients from December 2005 to August 2006, 44 of which could be included in our study (66, range 42-85 years) (1 exclusion due to contrast agent allergy). In 31 cases AVF was newly created, and in the remaining 13 patients an existing AVF was corrected. In one case of primary creation, we were unable to insert a cannula into the A. brachialis (- study escape). In the other cases, DSA visualized the afferent artery, anastomosis and draining vein. No complications occurred associated with DSA. 4 (1-40) ml contrast agent were required per patient. In 10 of the 30 newly created fistulae and 9 of the 13 reoperations, DSA revealed one or more problems which could be corrected immediately: The vein was freed from restraining soft tissue (n=4), a stealing venous branch was ligated (n=9), transluminal thrombectomy (n=2), patchplasty (n=4), reanastomosis (n=1), transluminal angioplasty (n=3) and one prosthesis interposition were performed. In 37 (86%) of the patients, a sufficient AVF could be created proven by ongoing dialysis in 29 cases, and in the others by clinical and sonographic evaluations. Two early closures and four occlusions after more than 48 h were observed.
Conclusions: Intraoperative DSA is a viable alternative for quality assurance in outpatient AVF surgery, revealing conditions that can be corrected immediately, thus improving surgical outcome. Long since standard in other areas of vascular surgery, DSA should become a routine procedure in AVF creation.

V10-5
RE-DO SURGERY FOR STENOSED AND THROMBOSED FOREARM A/V FISTULAS FOR HEMODIALYSIS: LAST 6 YEARS DATA
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Objective: Surgery is an established treatment for stenosed and thrombosed forearm arteriovenous fistulas (AVFs), but the literature on its outcome is limited. We report a 6-year experience of the surgical repair of stenosis in patent and thrombosed forearm AVFs and compare the outcome of two techniques, proximal neo-anastomosis (NEO) vs. replacement of the stenosed segment with a short PTFE interposition graft (JG).

Methods: From January 2000 until February 2006, fifty-eight stenosed forearm AVFs underwent surgery, 29 preemptively (PreSU) and 29 following thrombosis (PostSU). End points of the study were initial success and restenosis rate. After treatment, AVFs were monitored for restenosis by measuring access blood flow rate quarterly and had at least one follow-up angiogram.
Results: Initial procedural success was 100% for PreSU and 79% for PostSU (P=0.023). Twenty-six AVFs underwent NEO (13 PreSU and 13 PostSU) and twenty-six JG (16 PreSU and 10 PostSU). The restenosis rate was 0.171 events/AVF-y for the PreSU and 0.158 for the PostSU (P=ns). The restenosis rates for NEO and JG were similar in the preSU (0.200 vs. 0.148 events/AVF-y, P=ns), but higher for JG than for NEO in the postSU (0.293 vs. 0.098 events/AVF-y, P=0.028).
Conclusions: Our study shows that surgery remains a valid option for the preemptive repair of stenosis and to salvage clotted forearm AVFs, offering an excellent initial success rate and low restenosis rate. Our findings confirm that it is better to treat stenosis preemptively than after thrombosis, but the restenosis rate appears to be uninfluenced by the timing of intervention. Our results also show that JG compares favorably with conventional NEO, though it may be less successful in thrombosed AVFs.

V10-6

TRANSVENOUS ENDORRHAPHY VS. FISTULA LIGATION FOR CLOSURE OF ARTERIOVENOUS FISTULAE (AVFS): AN EVIDENCE BASED COMPARISON

F. Accrocca
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Objective: Due to the increasing number of hemodialysis patients, the number of arteriovenous fistulae which need to be sacrificed is increasing. Sever arm edema, false aneurysms and heart failure are prevalent complications which require correction. Several surgical and endovascular techniques have been proposed but may be incomplete and associated with remarkable complications and high recurrence rate, and finally resulting in sacrifice of the access. Furthermore, which subtype of the arteriovenous fistulae benefits from which closure technique? The answer has not been ellucidated. In this paper we introduce our evidence based preferred technique for AVF closure of these challenging cases.
Methods: A prospective randomized trial was desidned. One hundred and forty patients with side-side fistulae were divided randomly into two groups. Seventy cases were operated by ligature technique and the other ones underwent transvenous endorrhaphy. Both techniques were performed under local anesthesia and operation time was recorded. Follow-up was done by a colleague who was unaware of the technique used recording thrill recurrence during a six months period.
Results: One hundred and forty patients from the age of 9 to 80 years old were included. Twenty-six cases (18.57%) failed totally. Twenty-four cases (37.14%) were due to ligature technique and two cases (2.85%) due to endorrhaphy technique. χ^2 showed 22.8 with a degree of freedom that equaled 1 and P<0.0005.
Conclusions: Transvenous endorrhaphy technique is a more effective technique for closure of side to side arteriovenous fistulae than ligature technique. It is associated with a very low recurrence rate and of the authors knowledge, this technique has not been introduced for such patients to date.

V10-7

DOES PREEMPTIVE STELLATE GANGLION BLOCKAGE INCREASE THE PATENCY OF RADIOCEPHALIC ARTERIOVENOUS FISTULA

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Objective: Radio-cephalic arteriovenous fistulas (AVFs) have high early failure ratio. Increased sympathetic activity and spasm of radial artery during the surgery may responsible for early occlusion rate.
Methods: Fifty patients were randomized to two groups (each containing 25 patients). Stellate Ganglion Blockade (SGB) was performed in Group-1. Another group was considered as control group (Group-2) to make statistical comparisons. All AVFs were performed under local anesthesia in both groups.
Results: Average fistula flow was 201.4±40.4 ml/min in group-1 and 155.6±27.4 ml/min in group-2 (P<0.001). While average peak velocity of radial artery was 167.1±31.3 cm/s in group-1, it was 107.8±15.8 cm/s in group-2 (P<0.001). Thrill was found in all group-1 patients, but there was thrill only 13 of the group-2 patients (P<0.001). Mean maturation time was 41.4±6.8 days after surgery in group-1 and 77.1±10.5 days in group-2 (P<0.001). Adequate vascular access was obtained 19 patients in group-1 and 12 patients in group-2 (P=0.041)
Conclusions: AVF occlusion rate is much more common in early postoperative period. Diminished sympathetic tonus by preemptive SGB not only increases early patency rate but also increases fistula maturation rate.

V10-8

IMPACT OF PREOPERATIVE VENOGRAPHY ON PLANNING AND OUTCOME OF VASCULAR ACCESS FOR HEMODIALYSIS PATIENTS

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Objective: Preoperative venous mapping has increased dramatically in most of the dialysis units since Dialysis Outcome Quality Initiative (DOQI) guidelines recommended native arteriovenous venous fistula (AVF) rather than graft for hemodialysis access procedures. However, there are conflicting consequences as a result of this policy. Some authors showed routine mapping has resulted in a marked increase in maturation rate while others observed the reverse. The aim of this study is to evaluate the impact of preoperative venography on planning and outcome of AVF for our hemodialysis patients.
Methods: A prospective study was performed on all patients with end stage renal disease (ESRD) who had hemodialysis access procedure and preoperative venography between October 2003 and November 2005. Upper limb venography was done for all patients except those required primary access and had visible veins. All patients had hemodialysis immediately after the venography. Selection of the access procedure was based on the result of the venography. The complications of venography, the surgical procedure and outcome were recorded.
Results: One hundred and twenty-nine cases with ESRD who had preoperative venography were included in this study. They were mostly middle age (mean age ±S.D. 41 years ±15.5) with high rate of diabetes mellitus (53%). No single complication was reported. A graft was placed in 6 (5%) cases only. Unsuccessful surgical exploration was 0%. Early failure was in 10 cases (8%).
Conclusions: Preoperative venography has resulted in increase the number of AVF. It can improve the results of hemodialysis access procedures by selecting the most suitable veins.

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C15-1

MID-TERM FOLLOW-UP AFTER SAPHENOUS VEIN HARVEST WITH A LESS INVASIVE TECHNIQUE IN TYPE II DIABETIC PATIENTS

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Objective: Diabetes mellitus is an established risk factor for leg wound healing complications after great saphenous vein harvest. Diabetes affects endothelial function, and potentially worsens the outcome of grafts. Leg healing complications occur in 1–25% of CABG patients and are often underestimated. We evaluate the impact of a minimally invasive technique for saphenous vein harvest through multiple skin incision in diabetic and nondiabetic patients.
Methods: We followed-up 300 patients enrolled in a prospective trial for evaluation of minimally invasive approach (multiple skin incisions up to 4 cm in length each one and vein harvest below skin bridges) vs. conventional longitudinal harvest. Of these, 129 (43%) were diabetic. Among diabetics, 55 had received minimally invasive harvest (Group A). From the larger pool of non-diabetics, we selected through propensity scoring analysis 55 individuals who received minimally invasive harvest (Group B), and 55 diabetics (Group C) who were operated on conventionally were matched to Group A patients. Leg wound healing was quantified through ASEPSIS score by two independent surgeons in a blinded way. Occurrence of complications was compared among groups. A multiple regression analysis was conducted through ANCOVA method with the ASEPSIS scoring as the response variable. A 12-month follow-up was performed.
Results: We report a lower incidence of any leg wound healing complication among diabetics operated on by minimally invasive than among those with conventional approach ($P \leq 0.0001$). Rates of wound complications were comparable among diabetics and nondiabetics operated on by minimally invasive technique. ASEPSIS scoring was worse among diabetics operated on by the conventional technique compared to those who underwent minimally invasive harvest ($P=0.0011$). Such difference was slightly weakened after adjustment for age, sex, smoking status, history of dyslipidemia, diabetes duration and plasma HbA1c. Adjustment for peripheral vasculopathy and obesity modestly attenuated the difference (F-ANCOVA 5.1; $P=0.023$). At the mid-term follow-up, the rate of angina recurrence due to venous graft failure was comparable among all groups ($P=0.59$, multiple comparison).
Conclusions: The use of the less invasive method renders the diabetic patients comparable to non-diabetics in terms of leg wound morbidity. Rates of graft failure were similar among groups; this underlines the safety of the less invasive method and deserves further investigation.

C15-2

CORONARY ARTERY ENDARTERECTOMY: IMPACT ON MORBIDITY AND MORTALITY

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Objective: The purpose of this study was to analyze the short and long-term outcomes, co-morbid factors, implications on morbidity and mortality, control coronary angiographic results and the factors affecting the graft patency rate for coronary endarterectomy.
Methods: Five hundred and seventy six patients received coronary endarterectomy during CABG were included in our study. Most of the patients (77%) were male. The mean age was 59.2±10.1 years (28–82 years). Total 614 coronary artery endarterectomies were performed: 267 endarterectomies was performed on the LAD, 25 on the D1, 112 on the Cx and 210 on the RCA. Forty-eight patients received coronary endarterectomy on the beating heart technique.
Results: The perioperative myocardial infarction rate was 14.1%. The early mortality rate was 10.2% and the late mortality rate was 2.3%. Actuarial 10 years survival rate was 87.5%. Older age, coronary artery endarterectomy to RCA system, prolonged cross-clamp time and cardiopulmonary bypass time, perioperative myocardial infarction, development of postoperative temporary arterial fibrillation, positive inotropic support, intraaortic balloon pump support, reoperation for bleeding, development of late term renal failure were found to be highly significantly related to the early mortality ($P<0.01$). The length of the arteriotomy (=2 cm) and development of mediastinitis were found to be related to the late mortality.
One hundred patients received a control angiography at the mean 20.6±20.2 months. The patency rate of the total anastomoses was 66.3%. The total patency rate for the LAD was 78.3%. The total patency rate for the saphenous vein grafts was 50.9%. The best patency rate was observed on the LIMA to LAD anastomosis (81.4%). Patients with occluded LAD anastomosis had congestive heart failure while there was no congestive failure in the patients with patent anastomosis ($P<0.01$).
Conclusions: Coronary endarterectomy can be used as a tool for complete myocardial revascularization in selected patients with diffuse coronary artery disease. In current cardiac surgical practice, coronary endarterectomy has acceptable postoperative morbidity and long-term results with a high graft patency rate.

C15-3

LESS INVASIVE ENDOSCOPIC VESSEL HARVESTING (ESVH) TECHNIQUE WITH NEW DEVICE MAY BRING A GREAT BENEFIT TO PATIENTS AND MEDICAL SERVICES

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Objective: It is reported that the radial artery (RA) is the second most common arterial conduit used for Coronary artery bypass grafting (CABG). ESVH technique gives a great benefit to the patients who need CABG. In the North America, more than 50% CABG cases are indicated ESVH when they harvest the radial artery. On the other hand, in our country, ESVH is not so common. We suspected the reason why that ESVH devices are single-used tool and we cannot call they are economical devices. Then we developed the new procedure for ESVH with KARL STORZ-ENDOSKOPE system and harmonic scalpel.
Methods: 2 cm (distal side) and 1 cm (proximal side) skin incisions are made on two places and harvesting RA as possible in direct vision. Then Harmonic scalpel and KARL STORZ-ENDOSKOPE system which are able to do Re-sterilization, are used and RA betweeen two skin incision are havested.
Results: Twenty CABG cases are used RA which are havested by ESVH with above precedure. All CABG cases were performed by OFF-PUMP CABG. Male: Female=15:5 Mean harvest time was 29.1±10.6 min. Mean harvested length was 19.1±2.8 cm. All cases were performed postoperative angiography, then all graft was patent and there were no anastomotic stenosis. There were no significant nerve paresthesias with all patients' arm that RA was harvested. There was no conversion from ESVH to conventional method.
Conclusions: We think that Initial result of this Harvest procedures are acceptable result. We suspect that this Harvest procedure may have ESVH spread to our country because of economical and less invasive.

C15-4

CORRECTION OF COMBINED MITRAL-AORTIC VALVE DISEASES COMPLICATED WITH CONSTRICTIVE PERICARDITIS AND PREVIOUS CLOSED MITRAL COMMISSUROTOMY

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Objective: To research surgical correction of combined mitral-aortic valve diseases complicated constrictive pericardytis (CP), previous closed mitral commissurotomy (CMC) and to mark ways for decreasing of hospital mortality (HM).
Methods: One thousand two hundred and ninety seven patients (pts) with combined mitral-aortic valve diseases were consequtive operated in Institute from 1980–2005 years. Predominant genesis of CMAVD was rheumatism. Among them analyzed group was 211 (16.3%) patients with constrictive pericardytis - 101 patients, previous CMC - 110 patients. The average age was 47.4±6.3 (19–69) years. At all group 39 (18.5%) patients were in III NYHA class and 172 (81.5%) patients - in IV. The following operations were performed: 1) MAVR 174 (82.5%) patients, 2) MVR plus aortic valve's plasty 29 (13.7%) patients, 3) AVR plus mitral valve's plasty seven (3.3%) patients. Plasty proceedures on both valves was at one (0.5%) patients. Concomitant tricuspid valve disease was corrected by De Vega (plus tricuspid commissurotomy in organic disease) in 49 (23.2 %) patients.
Commissural tissue in pericardum was discovered at the next variances: 1) complete (including the posterior wall of left ventricle) - 90 (42.6%)

patients (group A), 2) right side of the heart and anterior-apical part of the left ventricle - 44 (20.9%) patients (group B), 3) complete only right side of the heart - 77 (36.5%) patients (group C). All operations were performed with CPB, moderate hypothermia (28–32 °C), combined ante-retrograde St. Thomas crystalloid cardioplegia.
Results: HM at the latest 6 years was 5.2% (n=57/3). HM was higher almoust twice in group C than in other group A and B (P<0.05). HM was also lower almost twice in group of III NYHA class, than in group of IY class (P<0.01). The remote results were followed up in 132 patients from 1 till 15 years (average - 9.8±2.3 years). Good results were marked in 56 (26.5%) patients, satisfactive in 44 (20.9%) patients, unsatisfactive in 15 (7.1%) patients. Seventeen (8.1%) patients were died. The main reason of late death and unsatisfactive result was increasing heart failure.
Conclusions: Correction of combined mitral-aortic valves complicated CP and previous CMC should be better performed, when both ventricles will be discovered of commissural tissue for better myocardium protection at procedure and also in status of III NYHA class in view of increasing HM in IY NYHA class and heart failure at the late period.

C15-5
AORTIC VALVE REPLACEMENT IN OCTOGENARIANS
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Objective: The advancing age of the population in industrialized countries associated with recent improvements in surgical technology, intraoperative myocardial protection and postoperative care are leading to an increasing number of elderly patients undergoing cardiac surgery. Nevertheless, there are elderly patients to whom aortic valve replacement is still denied because of the presence of preoperative characteristics as older age and left ventricular dysfunction. The aim of this study is to review the outcome in 122 octogenarians after aortic valve replacement
Methods: We reviewed 122 patients 80 years old or older who underwent aortic valve replacement due to severe aortic stenosis, with or without concomitant coronary artery revascularization, between July 1997 and July 2006. Mean age was 81.5±1.9 years. Mean aortic valve area was 0.61± 0.2 cm^2.
Results: The in-hospital mortality was 3.3% (four patients). Five patients (4%) experienced low cardiac output syndrome post cardiotomy. Acute renal failure occurred in 18 patients (14.7%). Seventeen patients (14%) needed prolonged ventilatory support due to difficult respiratory weaning. Overall in-hospital mortality was 3.3% (four patients). Causes of death were multi organ failure secondary to low cardiac output syndrome in two patients, sudden death in one and cerebrovascular accident in one patient. There were 12 late deaths in the follow-up (10%): 11 patients died from cardiovascular causes and one from neoplasia. The mean NYHA functional class improved from 2.8±0.7 to 1.48 ±0.6. No survivors experienced prosthetic valve endocarditis or reoperations. Preoperative left ventricular ejection fraction and small prosthesis size do not reach statistical significance as risk factors of in-hospital mortality.
Conclusions: The outcome after aortic valve replacement in elderly patients is excellent with satisfying late survival rate. Functional improvement obtained in the survivors in the follow-up can justify surgery even in case of patients with preoperative poor left ventricle ejection fraction.

C15-6
ISOLATED AORTIC VALVE REPLACEMENT VS. AORTIC VALVE REPLACEMENT WITH CABG IN ELDERLY PATIENTS
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Objective: With the advancing age of population in the western world, more septuagenarians and octogenarians become candidates for cardiac surgery. Age is associated with increased surgical complexity required e.g. aortic valve replacement with coronary artery bypass grafting. To evaluate clinical characteristics and outcomes of patients aged 70 years or older undergoing isolated aortic valve replacement vs. aortic valve replacement with CABG and to determine the predictors of adverse outcome.
Methods: Between January 2001 and December 2005, 408 patients aged over 70 underwent aortic valve replacement (AVR) with and without coronary revascularisation (CABG). One hundred and fifty seven patients (group A) had isolated AVR, 251 patients (group B) AVR+CABG. Mean follow up group A was 29.1 months (S.D. 18.7) and in group B 30.7 months (S.D. 19.9) (ns).
Results: There were 82 (49%) females in group A and 77 (33%) in group B (P<0.001). Parsonnet score was higher in group B [24.24 (S.D. 5.8) vs. 20.3 (S.D. 5.9) (P<0.001)]. In group B cross clamp time was longer [118.3 min (S.D. 30.3) vs. 74.3 min (S.D. 18.9) (P<0.001)]. Patients with AVR+CABG more frequently had stroke [13 (5.5%) vs. 0 (P<0.01)] had GI complications [26 (10.8%) vs. 9 (5.7%) (P<0.05) and had blood transfusion [0.2 U pp (S.D. 0.4) vs. 2.5 (S.D. 3.9) U pp (P<0.001)]. Thirty-day mortality was higher in group B 23 (9.1%) vs. 6 (3.8%) (P<0.05). Multivariable logistic regression identified redo [P=0.043 (95% CI 0.102–0.827)], AF [P=033 (95% CI 1.187–6.187)], urgent operation [P=0.025 (95% CI 0.012–0.738)], CPBT>100 min [P=0.027 (95% CI 1.008–1.124)] in group A and female gender [P=0.033 (95% CI 0.015–0.840), poor EF [P=0.002 (95% CI 4.475–6.112), intraoperative IABP [P=0.004 (95% CI 6.702–8.796)] and number of grafts [P=0.042 (95% CI 1.029–4.596)] in group B as independent predictors of mortality in both groups.
Conclusions: Overall mortality in our series is comparable with data from other centres. Redo, preoperative AF, long CPBT and urgent referrals were independent risk factors of mortality in AVR group. Female gender, poor EF, number of grafts, long CPBT and intraoperative use of IABP were independent risk factors of mortality in AVR+CABG group.

C15-7
CONTINUOUS CORONARY PERFUSION FOR VALVE CASES WITH SEVERE LEFT VENTRICULAR DYSFUNCTION
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Objective: Sixty-seven patients with severe LV Dysfunction and with valvular heart disease (31 MVRs/6 OMVs/16 AVRs/14 DVRs) were operated using continuous coronary perfusion with oxygenated blood from the Oxygenator. There were 41 males/26 females aged 36–56 years.
LVEF ranged between 35 to 40%. The follow-up period was 6 months to 1 year. There were no major complications attributable to this method (mortality or air embolism).
Follow-up was done using 2D echo/clinical (3, 6, 9 postoperative months).
Methods: GA with midline sternotomy was used. Aortic cannulation/Bicaval cannulation was used in majority, except for AVR/DVR were two staged venous cannula was used (Sarns, Calmed - USA). Membrane oxygenator (Dideco, Polystan) were used in all the cases. After cross clamping oxygenated blood was given into aortic root in cases undergoing MVR/OMV/retrograde coronary perfusion in patients undergoing AVR/DVR. Oxygenated blood was given at flows between 250 to 300 m 1 per min.
Starr Edwards valve (MVR), Carbomedics for AVR was used. After the procedure was completed the chamber closed and deairing achieved via aortic root vent. All cases were ventilated for 3–6 h postoperatively. The ICU stay was between 36 to 48 h. Four patients were reopened for bleeding. All patients required minimal ionotropic support.
Results: There was no mortality attributable to this method. There were four rexplorations for bleeding, One patient died at the end of 6 months due to non-compliance of medications.
This method bypasses cooling, rewarming, reperfusion time and injury, no rhythm disturbances in the immediate or delayed postoperative period. All patients were extubated within 4-6 h post surgery except three DVR's who were extubated 10 h later. The ICU stay of these patients was 36-48 h with minimal ionotropic support. All patients were discharged on the 7th postoperative day. Postoperative follow-up 6 months to one year did not have any significant adverse findings. Patients were accessed by 2-D Echocardiography and fluoroscopy. Postoperative echo showed LV function comparable to preoperative echo.
The CPB time can be reduced significantly and thus the related problems by using this technique.
Conclusions: This method of surgery in patients with severe LV dysfunction is viable, physiological, reduces ischemic arrest, reperfusion time and injury giving good results.

C15-8
FIVE-YEAR EXPERIENCE WITH THE SORIN PERICARBON FREEDOM STENTLESS BIOPROSTHESIS
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Objective: Early results and mid-term outcome were prospectively analysed in patients underwent aortic valve replacement with the Sorin Pericarbon Freedom stentless pericardial bioprosthesis.

Methods: Between May 2001 and July 2006, 135 Pericarbon Freedom stentless valves were implanted in 134 patients (average age 68.5 years, S.D. 7.0, 87 females, 48 males). The aortic valve pathology was pure stenosis in 60, pure insufficienty in nine and mixed valve disease in 63 cases. There were two cases of prosthetic valve failure and one prosthetic valve endocarditis. The operative procedure was simple aortic valve replacement in 88 cases (including three redo procedures). The remaining 47 patients underwent combined procedures. The surgical technique included 92 cases of continuous sutures, 31 cases of interrupted mattress and 12 cases of interrupted single stitches. The extracorporal perfusion and aortic cross-clamp times were 131 (S.D. 25) and 110 min (S.D. 21) for the simple aortic valve replacements and 170 (S.D. 41) and 136 min (S.D. 26) for the combined procedures, respectively. The internal diameter of the annulus was measured and a matching size valve was implanted in all cases. Twenty-eight - 21 mm, forty-nine - 23 mm, thirty-two - 25 mm, twenty-four - 27 mm and two - 29 mm valves were implanted.
Results: The early and late mortality was 5.9% (8/135) and 4.7% (6/127) respectively. None of the deaths was valve related. The only valve related complication was a case of early prosthetic valve endocarditis requiring re-replacement with another Pericarbon Freedom valve. The follow-up was 96.8% complete (123/127) at 44.0 months (S.D.14.5). During the follow-up time the peak and mean transvalvular gradients decreased from 23 (S.D. 8.9) to 17 mmHg (S.D. 5.8) and from 13 (S.D. 5.2) to 9 mmHg (S.D. 3.4), respectively. The left ventricular wall thickness reduced significantly (from 15.3 mm (S.D. 2.1) to 12.5 mm (S.D. 1.6), $P \approx 2.9$ E-26). Regurgitation was not more than trivial for any of the implanted valves.
Conclusions: The Sorin Pericarbon Freedom stentless pericardial prosthesis showed excellent hemodynamic performance with no structural deterioration up to 70 months. The superior hemodynamic parameters resulted a significant left ventricular mass reduction during the follow-up time.

C15-9
TWO YEARS EXPERIENCE WITH SORIN FREEDOM SOLO: CLINICAL RESULTS AND FOLLOW-UP
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Objective: The Sorin Freedom Solo pericardial aortic valve, has the potential to provide superior hemodynamic function and durability with shorter time of implantation compared to the others stentless valve. The aim of the study was to analyze the mid-term results with this new stentless valve.
Methods: From December 2004 to December 2006, 118 patients (62 females and 56 males, mean age 76.7±6.9) underwent aortic valve replacement with Pericarbon Freedom Solo. Valve performance was investigated in all patients in all patients with echocardiographic controls at 3, 6, 12 and 24 months.
Results: Hospital mortality was 4.2%. N° patients died after hospital discharged (0.88%). All deaths were not related to valve dysfunction. Sixty-two patients underwent isolated aortic valve replacement while 56 underwent combined procedures that included coronary artery bypass grafting, mitral valve surgery, septal myectomy and AF ablation. The mean valve size implanted was 22.40±1.8 mm. The cross-clamp time in isolated valve implantation was 40±6.7 min. No structural anomalies, paravalvular leakage and endocarditis were observed. Follow up at 3, 6, 12 and 24 months (mean follow-up 16.5 months) was complete in all patients. During follow-up the mean and peak transvalvular gradient decreased from 9±2 and 15±1.7 mmHg prior to discharge to respectively 5±1.6 and 11±1.3 mmHg at 12 months.
Conclusions: The Freedom Solo pericardial bioprosthesis, compared to other stentless valves, is easier to implant and so require a shorter learning curve. The supra annular position allows to face the small aortic root problem even in the elderly patients. Technique of implantation consent to reduce CPB and cross-clamp time compared to other stentless valve. In conclusion this valve provide excellent hemodynamic performance that seems to further improve at early follow-up. Longer follow-up is warranted to confirm these preliminary results.

C15-10
LEFT VENTRICLE ANEURYSM PLASTY USING OVERLAPPING METHOD WITH MENICANTI PAPILLARY MUSCLE PLASTY AND CABG
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Objective: The purpose of this study is to present our experience in surgical treatment of the patients with left ventricle aneurysm using overlapping method with menicanti papillary muscle plasty and CABG.
Methods: From October 2005 to December 2006, 22 patients underwent CABG with surgical repair of postinfarction dyskinetic or akinetic left ventricle aneurysm by overlapping method with Menicanti papillary muscle plasty in 13 patients. Mean age of the patients was 55.3±15.7 (39–71 years old). Twenty patients (91%) were male. Mean ejection fraction was 31.5%±13.5% and varied from 18% to 45%. Mean left ventricle diastolic size was 63±10 mm, systolic – 45.5±12.5 mm. Mean left ventricle diastolic volume was 219±101 ml, systolic – 159.5±94.5 ml. Mean additive EuroSCORE was 5, logistic – 5.4%. Mean pulmonary artery pressure was 48.5±37.5 mmHg. Four patients had mitral regurgitation III degree.
Results: Mean number of gafts per patient was 2.9 ±1.9. Endarterectomies were performed in two cases (9.01%). Mean time of CPB was 123.7±78.2 min. Mean time of aorta cross-clamp was 83.1±64.1 min. Mean ejection fraction increased from 31.5%±13.5% to 44%±5.4% ($P<0.05$). Mean left ventricle diastolic size decreased from 63±10 mm to 57±4.4 mm ($P<0.05$), systolic – from 45.5±12.5 mm to 41±3.8 mm ($P<0.05$). Mean left ventricle diastolic volume decreased from 219±101 ml to 145±28 ml, systolic – from 159.5±94.5 ml to 86±12 ml ($P<0.05$). Pulmonary pressure decreased from 48.5±37.5 mmHg to 26.3 mmHg ($P<0.05$) in postoperative period. Inotropic support took place in 13 (59.1%) of the patients. Two patients needed intraaortic baloon counterpulsation (IABC). In three of four patients there were no mitral regurgitation during intraoperative echocardiography and in postoperative period. In one patient I degree of mitral regurgitation remains. Mean hospital stay was 24±7 days. There were no hospital mortality. Two patients (9.01%) had a stroke, all with at least partial recovery. Two patients (9.01%) had an episode of atrium fibrillation requiring.
Conclusions: Coronary artery bypass grafting in patients with left ventricle aneurism plasty using overlapping method could be successfully performed with good results also with additional mitral regurgitation. Menicanti method of papillary muscle plasty gives also good results in this group of patients.

C15-11
OFF-PUMP BEATING HEART EPICARDIAL BIPOLAR ABLATION AND OFF-PUMP CORONARY ARTERY BYPASS GRAFTING IN TREATMENT OF ATRIAL FIBRILLATION AND ISCHEMIC HEART DISEASE
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Objective: Atrial fibrillation often accompanies ischemic heart disease. This prospective study shows long-term effectiveness of surgical off-pump pulmonary vein isolation (PVI) as concomitant procedure to off-pump coronary artery bypass grafting (OPCAB) in patients with paroxysmal atrial fibrillation (AF).
Methods: Between December 2003 and June 2006, 25 patients underwent OPCAB and bipolar radiofrequency PVI. Patients were in mean age of 66.2 (±9.7) years, mean preoperatine left atrial diameter was 43 (±7) mm, average EuroSCORE was 2.4 (±1.2), mean ejection fraction was 55.4 (±12.1) %. In all patients PVI was performed before main surgical procedure. There were no conversions to cadiopulmonary bypass. Acute conduction block was recorded in all patients. At discharge and 3, 6, 12 months after surgery in all cases 24-Holter ECG was performed.
Results: At discharge 96% of patients were in stable sinus rhythm (SSR). After 3 months 78.4% of patients were in SSR, 17.3% had episode of PAF and 4.3% had atrial flutter (Afl). After 6 months 90.4% of patients were in SSR, 4.8% had episodes of PAF and one patient (4.8%) had had pacemaker implanted. After one year 90% of patients were in SSR and 10% had pacemakers implanted. There were no incidents of PAF or Afl. In 96% of pulmonary veins couples conduction block was achieved after first application.
Conclusions: OPCAB surgery may be successfully supplemented with epicardial PVI performed with bipolar radiofrequency technology. Long-term data show excellent efficacy however in some patients pacemaker therapy may be needed.

C15-12

HYPERGLYCEMIA IN DIABETIC AND NON-DIABETIC PATIENTS USING BUCKBERG SOLUTION CARDIOPLEGIA

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Objective: Hyperglycemia commonly occurs during cardiopulmonary bypass (CPB), with possible detrimental effects to organs. Different mechanisms are advocated for this hyperglycemia including exogenous administration of glucose, altered hormone imbalance and the rate of consumption of glucose during CPB. Our study was designed to quantify and evaluate glucose levels in diabetic and non-diabetic patients using Buckberg cardioplegic solution.
Methods: Thirty-one patients (25 males; 67.5±7.9 years; range: 47–80) underwent isolated CABG operation using Buckberg cardioplegia. Diabetic patients, including either oral or insulin-dependent patients, accounted for ten subjects. Glucose levels were assessed from arterial blood samples and obtained before, during (every 15 min) and after CPB. The anaesthetic and surgical management followed identical methods. Operations were performed by the same surgeon.
Results: No differences were observed between diabetic and non-diabetic patients regarding demographic, operative and postoperative data. There was no statistically significant difference in cardioplegia infusion between groups in terms of amount of solution administered (2605±764 vs. 2652±988, P=0.895). Significant change in glycemia during CPB time was observed in both groups (P=0.001). However, no changes in glucose level over time were registered between groups (P=0.760). A not significant difference in glucose levels was also evident between diabetic and non-diabetic patients (P=0.208).
Conclusions: Hyperglycemia during CPB in isolated CABG diabetic and non-diabetic patients is not influenced by administration of Buckberg cardioplegic solution.

C15-13

USE OF SODIUM NITROPRUSSIDE DURING CARDIOPULMONARY BYPASS AFFECTS THYROID STATUS OF PATIENTS UNDERGOING CABG OPERATIONS

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Objective: Non-thyroidal Illness Syndrome (NTIS) is a form of hypothyroidism seen in starvation, sepsis, surgery, myocardial infarction, bone marrow transplantation, bypass surgery and in fact, probably in any severe illness. It's well recognized that on-pump cardiac surgery is associated with NTIS. Sodium Nitroprusside (SNP) is a natural donor of nitric oxide (NO). NO has been shown to have some regulatory effects on thyroid cells. SNP inhibits influx, organification and transport of iodide into the thyrocites. SNP also generates a dose dependent release of nitric oxide and cGMP from thyrocites. Whether use of SNP has effects on thyroid functions during and after cardiac operations has not yet been investigated in humans. In the present study, we therefore investigated whether the routine use of SNP during the rewarming period of cardiac operations has additional effects on the circulating levels of thyroid hormones or do not.
Methods: Thirty consecutive patients undergoing elective, primary coronary artery bypass grafting (CABG) operation were prospectively randomized to receive continuous infusions of either SNP (SNP group) or saline (control group) beginning from the initiation of rewarming period until weaning from CPB. Thyroid stimulating hormone (TSH), fT3, tT3, fT4, tT4 and albumin levels were detected soon after the patients' admission to the hospital, just before going to the operating room, at the 5th minute of CPB, after CPB and on the postoperative 1st, 3rd and 5th days' mornings.
Statistics: Analyses of variance in repeated measures was used for statistical analysis.
Results: Free T3 differences of each group throughout the study period were statistically different from each other (P=0.022). The main dissociation of two groups were significantly observed in two time periods. Between ending of CPB and beginning of CPB, the mean difference for SNP group was 0.145 ±0.121 whereas for the control group this value was –0.185±0.072. Between 3rd and 1st postoperative days, the mean difference for SNP group was 0.254±0.131 and for the control group this was -0.004±0.079. TSH, tT3, tT4, fT4 and albumin levels all showed differences from baseline but there were no statistical differences between two groups.
Conclusions: Effect of sodium nitroprusside on circulating thyroid hormone levels in humans is not well known. In this study, we have shown that routine use of SNP during rewarming period of CPB affects the thyroid status and prevents further decline of free T3 hormone levels following CPB and on the early postoperative period.

C15-14

DIAGNOSTIC ACCURACY OF N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE IN THE EVALUATION OF POSTOPERATIVE LEFT VENTRICULAR DYSFUNCTION

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Objective: The purpose of this study was to compare the diagnostic accuracy of amino terminal fragment B-type natriuretic peptide (NT-proBNP) and echocardiographic parameters in the assessment of left ventricular diastolic dysfunction after the coronary artery bypass grafting.
Methods: Thirty patients who were undergoing CABG were prospectively studied. Patients who had a recent myocardial infarction, unstable angina pectoris, and low ejection fraction with systolic dysfunction were excluded. Three blood samples were obtained: before anesthetic induction, at postoperative 1st hour, and on the postoperative 7th day. NT-proBNP was measured by electrochemiluminescence immunoassays. Comprehensive echo-Doppler examinations were performed on admission and on postoperative 7th day. The relationship between NT-proBNP and echocardiographic parameters were assessed by correlation, multiple linear regression and receiver-operating characteristic curve analyses.
Results: There were significant and correlated worsenings in both diastolic stage determined by echocardiographic indexes and NT-proBNP levels. Early transmitral to early diastolic annular velocity ratio (E/Ea) was the most significant determinant of both NT-proBNP and postoperative diastolic stage (r=0.78, P<0.001). Mitral E/Ea is significantly more sensitive than the NT-proBNP levels in predicting diastolic stage. The area under the ROC curve (AUC) for NT-proBNP was significantly lower than that of mitral E/Ea (mean difference 0.12, P=0.024). The NT-proBNP had 87.5% sensitivity and 55% specifity, whereas E/Ea had 87.5% sensitivity and 86.4% specifity.
Conclusions: Plasma NT-proBNP levels are significantly related to mitral E/Ea ratio which is predictor of diastolic stage. Therefore, elevated NT-proBNP levels may indicate the time for a doppler echocardiographic evaluation and identify a subgroup of patients at high risk, who need closer monitoring in early postoperative period.

C15-15

DOES COMBINATION OF ANTEGRADE AND RETROGRADE CARDIOPLEGIA REDUCE CORONARY ARTERY BYPASS GRAFTING-RELATED CONDUCTION DEFECTS?

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Objective: Conduction disorders appearing after coronary artery bypass surgery (CABG) may have many different causes. In this study, we evaluated the postoperative conduction disorders after CABG with respect to the ante-grade blood cardioplegia and ante-grade plus continuous retrograde cardioplegia delivery methods.
Methods: This retrospective study included 1824 patients undergoing CABG between January 2001 and December 2005. There were 694 female patients (38%) and 1130 male patients (62%). Myocardial protection was done by isothermic hyperkalemic blood cardioplegia. Patents in Group 1 (n=704) were operated on using only intermittent antegrade cardioplegia and those in group two (n=1120) were operated on using the antegrade plus retrograde continuous cardioplegia. The postoperative occurrences of a new right bundle branch block, left anterior hemiblock, left posterior hemiblock, left bundle branch block, or third-degree atrioventricular block were evaluated and compared.
Results: Total mortality rate was 1.6% (29 patients) without significant difference between the groups. The preoperative and perioperative characteristics were statistically similar in the groups. The occurrence of conduction disorders was significantly higher in group 1 (P=0.006, 55 vs. 52 patients). The analysis of the patients with conduction disorders showed a significantly increased mortality rate (P<0.001) in addition to a significantly increased period of intensive care unit follow-up and duration of postoperative hospitalization (P<0.001).
Conclusions: The present study demonstrated that the perioperative occurrence of conduction disorders after CABG was decreased by antegrade controlled and retrograde continuous combination cardioplegia.

C15-16

CARDIAC SURGERY IN 629 OCTOGENARIANS: A SINGLE CENTER EXPERIENCE

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Objective: The advancing age of the population in the western world and the improvement in the surgical techniques and the postoperative care resulted in increasing number of very elderly patients undergoing cardiac operations. Therefore, the aim of this study is to evaluate the surgical outcome in 629 consecutive octogenarians after cardiac surgery operations.
Methods: Between January 2001 to March 2006, 629 consecutive octogenarian patients underwent cardiac surgery operations. Preoperative data were retrospectively collected, in hospital mortality and actuarial survival rate at 6-month and 3 years were reported. Univariate and multivariate analysis were performed to detect the in hospital and late mortality predictors factors.
Results: The mean age was 84.5 years (80–92 years). Two hundred ninety four patients had coronary grafting (CABG), 190 isolated valvular surgery, 101 valvular surgery+CABG, 44 patient underwent other complex procedure as aortic surgery, triple valve disease etc. The overall in hospital mortality was 4.6% (29/629). The in-hospital mortality was 1.7%, 2.9%, 7.5%, 10% for CABG, Isolated valvular surgery, Valvular surgery+CABG and other procedure respectively. Actuarial survival at 6 months and 3 years was 92.4% and 74.4%, respectively.
Conclusions: Cardiac surgery in octogenarians is a safe with an acceptable risk. The outcome after, CABG, mitral repair and aortic valve replacement in octogenarians is excellent. The operative risk is acceptable and the late survival rate is good also in case of valvular surgery+CABG. Therefore, cardiac surgery should not be witheld on the bases of age alone, but a carefully preoperative evaluation is mandatory for a correct surgical indication.

C15-17

CARDIAC SURGERY IN PATIENTS AGED EIGHTY AND OLDER: A SINGLE CENTER EXPERIENCE

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Objective: Cardiovascular disease is the leading cause of morbidity and mortality in elderly patients. Recent studies have shown that cardiac surgical procedures performed in elderly patients, in otherwise good physical and mental health, can improve mortality, morbidity and quality of life. We have reviewed our early and long-term results in these patients.
Methods: Since January 1999 to December 2005, 312 patients aged over 80 underwent cardiac surgery procedures. We retrospectively analysed preoperative risk factors, hospital mortality and morbidity and long-term survival by means of multivariate analysis.
Results: Follow-up was 94% complete. The most frequent surgical procedures were isolated CABG (48.7%) and combined valve+CABG (31.7%). In hospital mortality was 8.3%. Major morbidity was stroke (2.4%), acute renal failure (9.7% - 4.87% with CVVH -), mediastinitis (7.2%), bleeding (4.8%), low cardiac output (7.3%). Survival at one, three and five years was 87.1%, 80.9% and 74.2% respectively. Ninety-five percent of long-term survivors were in NYHA class I or II and 95.2% were free from reoperation. At the multivariate analysis, urgent procedures, mitral valve surgery and advanced NYHA class were predictors of late mortality. Presentation of postoperative complications resulted to be an independent predictor of early mortality.
Conclusions: Cardiac surgery in octogenarians can be performed with a reasonable early morbidity and mortality, in accordance with previous reports. In our experience long-term survival and quality of life of the in hospital survivors are similar to those of the aged-matched population.

C15-18

WHAT IS THE RISK OF CARDIAC SURGERY IN PATIENTS >80 YEARS OF AGE?

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Objective: In recent years open heart surgery in patients older than 80 years of age has become no longer an uncommon procedure. In Germany the number of cardiac operations in elderly patients has been tripled over the past decade. The question is whether it is justified to perform cardiac surgery in elderly patients or whether the incidence of postoperative complications is too high.
Methods: The preoperative risk factors in patients older than 80 years of age were evaluated and the postoperative complications were analyzed in these patients. Five hundred and eighty patients >80 years were operated between 2001 and 2006 and compared to 5630 patients. At the age below 80 years of age undergoing open heart surgery at the same time interval. The mean age of the patients over 80 years was 82.3±3.4 years. They stay in the hospital, in the ICU and the in hospital mortality as well as the postoperative complications were compared and predictors of the postoperative morbidity were analyzed.
Results: Patients older than 80 years of age suffered significantly more often from unstable angina, renal insufficiency, arterial hypertensions, history of neurological deficits as well as form NYHA class IV. The necessity of combined procedures (27.5% vs. 18%, $P<0.05$) as well as the indication for urgent surgery was higher (7.2% vs. 4.1%, $P<0.05$). The stay in the ICU as well as the stay in the hospital was longer and the hospital mortality (7.5% vs. 3.9%, $P<0.05$) was higher. Postoperative complications, e.g. rhythm disturbances, neurological deficits etc. occurred more often in the patients. >80 years of age (15% vs. 7.8%, $P<0.05$). The risk factors for the patients >80 years of age as predictors of the mortality were: urgent surgery, redo surgery, mitral valve surgery and prolonged cross clamping time of the aorta. Postoperative mortality was higher in patients >80 years, in NYHA class IV patients, in females and when postoperative renal failure occurred.
Conclusions: Despite increased mortality and morbidity in patients older than 80 years of age compared to younger patients cardiac surgery must be considered as therapeutic option. Since there are no alternatives for treatment of these patients and since the quality of life can be improved considerably in the majority of patients >80 years of age, there is no reason to exclude the octogenarians from open heart surgery.

C15-19

COMPARISON OF THE OXIDATIVE STRESS PRODUCED BY ON-PUMP AND OFF-PUMP CORONARY BYPASS SURGERY

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Objective: The avoidance of cardiopulmonary bypass seems to improve the results of coronary grafting in selected indications. The mechanisms explaining this benefit are still largely unknown, therefore, we tried to assess whether off-pump coronary surgery generates less oxidative stress than on-pump surgery.
Methods: Plasmas were sampled from patients before (T0), just after (T1) and 24 h after (T2) cardiac surgery (six on-pump and six off-pump CABG). Rings of thoracic aortas isolated from male Wistar rats were incubated for 24 h with these different plasmas (100 µl+4 ml medium) or saline (control). Thereafter, superoxide anion production was assessed by the lucigenin (5 µM) - enhanced chemiluminescence technique and mean signal recorded for 40 min was expressed as percent of control ring.
Results: In rat aorta exposed to plasma from on-pump CABG patients, chemiluminescence signal was enhanced by 361±63% at T1 ($P<0.05$ vs. T0, $n=6$) and by 447±61% at T2 ($P<0.05$ vs. T0, $n=6$). In contrast, exposure to plasma from off-pump CABG patients did not enhance the signal: 1±5% at T1 and 15±15% at T2 (NS vs. T0, $n=6$). Interestingly, the increase of superoxide production induced by 'on-pump' plasma was blunted by co-incubation with pravastatin 10 µmol/l. Incubation with lipid fractions did not enhance the signal at any time and in any group. Nevertheless, ultracentrifugation of the on-pump plasma markedly blunted the enhanced signal at T1 and T2, whereas incubation with the microparticules (isolated by ultracentrifugation) almost restored the signal at T1 ($P<0.05$ vs. T0, $n=5$) and at T2 (NS, $n=5$). Further analyses show an increase in endothelial microparticles at T1. CRP and SAA plasma levels were enhanced only at T2 in both groups.
Conclusions: Off-pump CABG seems to produce less oxidative stress than on-pump CABG, although inflammatory responses seem similar. Moreover, this on-pump-induced oxidative stress which seems related to endothelial microparticles, can be blunted by pravastatin co-incubation.

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11:00–12:30
16th Cardiac Scientific Session - Cardiac Minipresentation III

C16-1
RELIABILITY OF CLINICAL FINDINGS AND DIAGNOSTIC METHODS IN POTENTIAL PENETRATING CARDIAC INJURIES
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Objective: Penetrating cardiac injuries are fatal thoracic traumas. Many patients arrive at the hospital dead or in severe shock. Rapid hemodynamic deterioration may develop in patients exposed to cardiac trauma. Early diagnosis and rapid surgical intervention can determine the prognosis. The aim of this study was to analyze retrospectively false cases recognized postoperatively.
Methods: Thirteen false positive or negative cases detected as a result of the surgical intervention findings in our department were analyzed retrospectively. Demographic characteristics, causes of injury, time of arrival at the hospital, and emergency room examination findings, as well as the performance of the diagnostic methods used to demonstrate cardiac injury were evaluated.
Results: Fifty-eight patients were operated on for suspected penetrating cardiac injury between September 2002 and August 2006, and 13 (22.41%) of these had false positive or negative findings. In these 13 patients retrospectively analyzed, the male to female ratio was 12:1, and the mean age was 26.30±12.83 years (range 6–56 years). Echocardiography was used in seven (53.8%) cases, computed thorax tomography in two (15.45%) and chest X-ray in 11 (84.6%) as additional diagnostic methods. In patients examined by echocardiography, five false positive results, one false negative result and one true positive result were obtained. In two of the patients who were additionally examined by thoracic CT in order to support the diagnosis after echocardiography, one was found to be false positive and the other was false negative. The false negative CT case was found to be true positive by echocardiography. The hospital mortality rate was 15.4% (two patients).
Conclusions: Early diagnosis and emergency thoracotomy are essential for the survival of patients after cardiac injury. There are no specific diagnostic methods to guide the diagnosis of potential penetrating cardiac injuries. Therefore, we think that all patients need to be assessed on an individual basis and patient-specific diagnostic strategies should be formulated accordingly.

C16-2
STERNAL WIRE REMOVAL TO TREAT PERSISTENT CHEST WALL PAIN AFTER MEDIAN STERNOTOMY. EVALUATION OF PATIENT PROFILE, PROCEDURE AND OUTCOME. RESULTS OF 11 YEARS EXPERIENCE
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Objective: One of the most underestimated complications following heart surgery, through median sternotomy, is a persistent anterior thoracic pain due to sternal wire. The pain is described either as sharp and stabbing or as a deep-seated ache. We report our 11 years experience with complete sternal wire removal, aiming to find a patient profile and evaluate the procedure and its influence on relieving this disabling thoracic pain.
Methods: Between April 1995 and December 2006, 132 patients received sternal wire removal. For better cosmetic result, all patients were treated with complete sharp excision of the operation scar. Patients with myocardial ischemia, wound infection, sternal instability or other serious postoperative complications have been excluded. We retrospectively studied the patients` data regarding the primary operation, the postoperative course, and the sternal wire removal. The patients were interviewed about the outcome of the wire removal.
Results: Complete follow-up was possible by 126 patients (95, 5%) since six patients were unreachable (4, 5%). Patients were average 65, five years old and mainly pensioner (64, 4%) and male (77, 8%). Mean operation time was 27±9 min. Wire removal was performed 17 months (4–84 months) after the primary procedure. The most of the patients 90.9% received CABG and only ten patients (7.6%) did not have an IMA graft. Eight patients (6.1%) hat more than one heart operation. In one case (female, 72-year-old, BMI 30) a sternal wound infection made local wound treatment and antibiotic therapy necessary. By all other patients wound healing was uneventful. The vast majority of the patients followed up (86%) reported relief of symptoms, while 11% reported no change or worsening of the pain after wire removal.
Conclusions: Surgical removal of sternal wire sutures is a very simple safe and rapid procedure. The typical patient suffering from this pain is male, pensioner, who had about 1.5 year before a CABG operation with the use of the left IMA graft. Removal of all wires relieved pain by the majority of patients, although the causes of this pain still remain unknown. Sternal wire removal should be offered to patients with foreign material related persistent anterior chest wall pain after sternotomy, when other serious postoperative complications have been excluded.

C16-3
PREVENTIVE STERNAL REINFORCEMENT REDUCES THE INCIDENCE OF WOUND DEHISCENCE IN HIGH-RISK PATIENTS
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Objective: Sternal wound complications after median sternotomy vary from persisting thoracic pain to sternal instability and wound dehiscence and present high-risk for mediastinitis, where the latter is characterized with high morbidity and mortality rates. The risk for such complications appears to increase seriously in patients with multiple known risk factors, as diabetes mellitus, obesity, chronic obstructive pulmonary disease or when faulty sternotomy occurs. In such cases standard closure might not be adequate and reinforcement is required. Purpose of this study was to evaluate a new sternal reinforcement device in preventing sternal wound dehiscence in high-risk patients who presented multiple risk factors. Data were analyzed and compared to matched patients without sternal reinforcement.
Methods: A new sternum reinforcement system, made in titanium, was applied in patients at high-risk for sternal wound dehiscence. The sternal reinforcement device consists of separate titanium clips sliding to each other to form two braces placed at either side of the sternum. The number of clips and the length of braces can be adjusted to fit the sternum size. Each clip has a grooved arm that is placed into the intercostal space, in a way that there is no direct contact of the stainless steel wires with the sternum. The stainless steel wire is then passed around the grooved arm, to secure sternum closure. Data were analyzed and patients population was matched with regard to age, sex, use of single or bilateral ITA, and risk factors to patients who underwent simple sternal closure in the same period time.
Results: Forty patients who underwent CABG surgery and presented multiple risk factors for sternal wound dehiscence (Obesity (18%), chronic obstructive pulmonary disease (32%), diabetes mellitus (55%), low ejection fraction (40%), chronic renal failure (10%) and peripheral artery disease (15%)) under went preventive sternal reinforcement with the new device. Mean age was 70 years (24 men). Bilateral ITA was used in 16 patients (40%). In the reinforced patient group two superficial wound dehiscence were observed. In the control matched group (60 patients) total sternal wound dehiscence were 11 (P=0.007); seven patients presented superficial (P=0.05) and four patients deep wound dehiscence (P=0.034).
Conclusions: This sternal reinforcement system avoids stainless steel wires cutting through the bone, allows the use of stainless steel wires in patients with osteoporosis sternum or with complete or partial bone fractures and it might be of benefit in preventing sternal wound dehiscence in selected high-risk patients.

C16-4
AORTIC ROOT OPERATION WITH VALVE SPARING TECHNIQUE
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Objective: The known complications of prosthetic valve replacement in patients with an ascending aortic aneurysm and sary aortic regurgitation who frequently have a morphologically normal aortic valve have prompted interest in valve-sparing aneurysm repair procedures. Aortic root reconstruction by reimplantation of the native valve (David operation) represents an alternative therapeutic option for ascending aortic aneurysms. The aim of this study was to examine the perioperative and intermediate-term results of this innovative procedure.

Methods: Between January 2006 and December 2006, of the 28 patients with aorta ascending aneurysms with aortic regurgitation treated surgically in our institution, eight patients underwent ascending aortic replacement with resuspension of the native valve within a vascular prosthesis and reimplantation of the coronary ostia. Five patients had nondissecting aneurysms, and three patients had a Stanford type A aortic dissection. The age of the patients ranged from 36–72 years. Only patients with morphologically normal aortic leaflets and leaflets of similar size were selected. Echocardiography was performed preoperatively and intraoperatively, before discharge, and during follow-up.
Results: There was one death perioperatively, two patients required early reoperation (<24 h) for bleeding. The graft size was 28 (mm) in two (patients), and 32 mm in six (47%). (Hemashield Platinium) None of the patients showed AI greater than low (1+).
Conclusions: In selected patients undergoing ascending aortic aneurysm repair who have normal aortic leaflets but sary aortic regurgitation, the native valve can be spared through this novel operation. The aortic annulus size is reduced significantly, thereby effectively eliminating hemodynamically significant aortic regurgitation. The intermediate-term results are promising, but the long-term durability of this type of repair needs to be determined.

C16-5

TREATMENT DYSFUNCTIONS OF THE BIAFLET VALVES

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Objective: The goal of this study is the estimation of the prostheses mechanical valves long-term results.
Methods: For the decade period of the use in our clinic there was implanted 1687 mechanical valves (1527 «MedEng» valves and 162 'Carbonics' valves): 967 - in mitral position, 705 in aortic position and 15 – in tricuspid position in patients with acquired and congenital heart diseases. It was noticed the dysfunction development of 58 valves in 56 patients (18 «MedEng» valves and 40 'Carbonics' valves). They were in the mitral position - 32 patients), in the tricuspid position - 11 patients, in aortic positions - nine patients and in the aortic-mitral position - two patient. The main cases of the dysfunction development were: the prosthesis pannus degeneration (69.1%), thrombosis (23.8%), para-annullar prosthesis fistula (7.1%). The average period from the primary repair to pathological event was 25.3 weeks. The age of the patients was from 10 to 57 years (32.4±5.4). Among reoperated patients - 18 (32.1%) had III Functional Class (FC) NYHA, 38 (67.9%) - IV FC.
Results: The peculiarity of the valve dysfunction degeneration was the immediate valve deterioration and the growing of circulatory decompensation with changed work of the mechanical valve. X-ray data demonstrate the size increases of the heart and venous stagnation. On the Echo-ECG data it was indicated the reducing of the amplitude movements the locked element and its polymorphousness, so as additional echo-signal events in the prosthetic projection, increasing of the valve gradient and EAO (effective orifice area) reducing. Surgical treatment was carried out on the extra indications in the first day of the patient hospitalization. It was performed the valve reimplantation (mortality – 14.3% in eight patients). The main cases of the mortality were: circular and linear aortic rupture during aortic cannula removing (one patient), acute cardiac insufficiency (five patients), hepato-renal failure (two patient). During follow-up all the patients had I-II FC NYHA.
Conclusions: It is necessary to perform a surgical repair in the appearance of the valve dysfunction in the first hours of the hospitalization because of the circulatory decompensation.

C16-6

COMPARISON OF DIFFERENT ANTICALCIFICATION TREATMENTS

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Objective: At present no ideal artificial heart valve is available. Bioprostheses are advantageous in terms of hemodynamics, thrombogenicity, risk of bleeding, and need for anticoagulation, whereas limited durability is the greatest problem. Valve failure is mainly due to structural degeneration from tissue and cell calcification, caused by multiple factors. New anticalcificant treatments have been developed because tissue calcification is a major contributing factor for bioprosthetic valve failure. So, current research is investigating the development of additional anticalcificant treatments.
Methods: Aortic valve leaflet, aortic root tissue and mitral valve leaflet samples prepared from fresh porcine hearts, were pretreated with glutaraldehide 0.1% (glu) and additionally with different agents: ethylenediaminetetraacetic acid (EDTA) 0.1%, sodium ethylenediaminetetraacetic acid (Na EDTA) 0.1%, D-Alanine 0.1%, D-Norvaline 0.1%. Samples were implantated subcutaneously in 104 rats, 30 days old. Explantation performed after 60 days. Residual calcium level was assessed, also histological examination was performed. All data were analysed with statistical program SPSS11, and were expressed as means±S.D. of the means, also statistical analysis involved differences among the means using the Tukey post hoc test.
Results: Research could be divided into two groups: first – analysing how all different agents effect on each biomatherial, second group – comparing how each agent separatelly influenses all matherials. Aortic valve leaflet explants showed the highest calcium level in samples treated with glu and glu/D-Alanine (55.1±36.6 and 38.9±10.5 mg/g), the difference is statistically significant, the lowest – in glu/EDTA and glu/Na EDTA (17.8±6.2 and 16.0±4.6 mg/g respectively) the difference isn't statistically significant. In samples from aortic wall the lowest calcium concentration was revealed in glu/Na EDTA - 15.4±3.9 mg/g, whereas treatment with glu/D-Norvaline cumulated calcium up to 28.7±8.3 mg/g, the difference is statistically significant. Surprisingly low residual calcium amount was found in mitral valve samples treated with glu/Na EDTA – 0.7±0.1 mg/g, while glu and glu/D-Norvaline 19.0±5.9 mg/g and 18.9±6.6 mg/g respectively, the difference is statistically significant. Comparing each agent effect on biomatherials we found that aortic valve leaflet almost in all cases accumulated calcium the most, except treatment with glu/EDTA. Contrary to it mitral valve samples in all cases accumulated the least calcium.
Conclusions: We find the most effective anticalcification treatment is glu/Na EDTA and treatment with all agents is effective the most in mitral valve leaflet decalcification.

C16-7

CORRECTION OF THE CONGENITAL AND ACQUIRED HEART DISEASES BY MEANS OF ALTERNATIVE ACCESSES AND MINIMALLY AGGRESSIVE SURGERY

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Objective: To analyze the efficiency of alternative accesses and minimally aggressive surgical interferences in correction of the congenital and acquired heart diseases.
Methods: We examined the postoperative course of our 353 patients, who underwent minimally aggressive surgery in 2000–2006 years. The durations of operation and heart ischemia, times of cardiotonic support and mechanical lung ventilation, also as the amount of effusion from drainages, stay in ICU and hospital, nearest complications and distant results were evaluated.
The correction of ASD and anomalies of pulmonary veins confluence was performed through right-hand minimal thoracotomy (RMTT) at 118 patients in the age of 3–46 years, and through T-shaped minimal sternotomy (TMST) at 14 adult patients. Mechanical aortic valve replacement was done at 72 adult patients through J-and T-shaped MST (medial age of 44.9 years). For implantation of mitral prosthetics (n=126) or mitral valulopasty (n=23) was used either inferior TMST (n=39) or RMTT in the IV intercostals space. When RMTTs were done, the connection to the heart-lung machine could be either standard (40), or femoral (n=70). Video assistance was used in latter 70 operations. The choice of access was based on the chest radiology or spiral computed tomography data. All operations were done in conditions of extracorporeal perfusion, moderate hypothermia and crystalloid cardioplegia.
The comparison group consists of patients with the same pathology, operated through standard medial sternotomy (SMS).
Results: All minimally aggressive operations were done as planned with the exception of two cases, when, during operation on aortic valve, there was a necessity of conversion to SMS. These faults happened because of the empirical choice of surgical access. Two patients died from acute cardiovascular insufficiency: one had aortic valve lesion, another – mitral valve disease. Limitations of operational field (basically at RMTT) dictated application of more careful surgical technique, usage of specially developed tools (wound dilator, original aortic clamp), insufflation of carbon dioxide during 'open heart' period, also as diagnostic support (trans-esophageal echo-cardiography, endoscopy).

Comparison of results of minimally aggressive interventions with standard approaches reveals reduction of an operational trauma, decrease of postoperative bleeding, alleviation of an algetic syndrome and reduction of quantity of complications.
Conclusions: Usage of alternative accesses and minimally aggressive surgery for correction of heart diseases gives a line of advantages in comparison with standard approaches.

C16-8
ANOMALOUS ORIGIN OF THE LEFT CORONARY ARTERY FROM THE PULMONARY ARTERY: 36 YEARS EXPERIENCE
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Objective: To present our experience of surgical treatment of the patients (pts) with anomalous origin of the left coronary artery (LCA) from the pulmonary artery (ALCAPA).
Methods: Since 1970 till 2006 96 patients underwent surgery for ALCAPA. The age of patients varied from 3 months to 33 years. Patients condition was very severe: they suffered from dyspnea, cardiomegaly and hepatomegaly. ALCAPA was diagnosed by 2-D Echo and coronarography. Radionuclide investigations (201 Tl) of the left ventricle was performed as well. Different types of surgery due to long period of time were used. Direct implantation of LCA into the aorta was performed in 53 patients (55.2%). In ten patients (10.4%) creation of aortopulmonary tunnel (Takeuchi procedure) was done and in one patient (1.04%) Meyer operation was carried out. LCA bandaging was performed in 15 children (15.6%), transpulmonary sewing of the LCA origin - in five patients (5.7%). CABG was carried out in ten cases (10.4%). In the year 1970 the pericardium was talced in two patients (2.08%). In 15 patients (15.6%) with severe mitral insufficiency valve replacement was performed and five patients (5.5%) – valve repair. Left ventricle reconstruction was performed in eight patients (8.3%) with left ventricular aneurysm. In nine cases (8.02%) undifferentiated cardiomyoblastes were implanted.
Results: Mortality rate since 1971 till 1980 was 25% (2 of 8); in 1981–1990 – 33.3% (5 of 15); in 1991–2000 – 26.3% (5 of 19); in 2001–2006 – 30.6% (15 of 49). Cardiac assist devices were used in the perioperative period in 18 patients (19.7%).
Conclusions: 1) In spite of the significant success achieved in surgical treatment of ALCAPA, hospital mortality continues to remain high due to the initial severe myocardium lesion; 2) nowadays cardiac surgeons have a wide range of optionsin the treatment of ALCAPA; 3) application of cardiac assist devices (IABP, ECMO) is an important addition to the treatment of the given cohort of patients both before and after surgery.

C16-9
SURGERY OF EBSTEIN'S ANOMALY IN ADULT: IMPORTANCE OF RHYTHM DISTURBANCES
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Objective: To access the incidence of rhythm disturbances after conservative surgical treatment of Ebstein's anomaly.
Methods: One hundred and seventy four adult patients (pts) were operated on from 1980 to 2006. Ages were above 16 years (16–70 years) mean 34±13 years. Thirty-seven percent were in functional class two and 40% in class 3. Rhythm was permanently sinus (SR) in 50% (86 patients) with supra ventricular tachycardia (SVT) or Wolf Parkinson White syndrome in 40% (70 patients) and in permanent atrial fibrillation (AF) in 10% (18 patients). Tricuspid valve insufficiency was 3+ in 94 patients and 4+ in 57 patients. Eight patients had a radiofrequence ablation which failed. Conservative surgery was achieved in 171 patients (98%) and included anterior leaflet mobilization and longitudinal plication of the atrialized right ventricle (RV). A bidirectionnal cavopulmonary shunt was associated in 33% (57 patients). A right maze procedure was used in 15 patients. A valve replacement was performed in three patients (2%).
Results: Hospital mortality was 7% (13 patients), not related to age but to RV failure in 7/13. Mean follow-up was 7.3 years (1 to 25). Survival was 86% at 20 years follow-up. Four patients upon eight late deaths died suddenly and were attributed to arrhythmia. Clinical improvement was observed in 80%. Freedom from reoperation was 96% at 20 years. The last echocardiogram disclosed a permanent SR in 80% (131 patients). Ten percent (16 patients) had episodes of TSV. The episodes were better tolerated than before the operation. Five patients had sary ablation and are now in SR. Three percent (five patients) are still in AF and seven patients had a pace maker (four for low rate AF). The incidence of AF was not significantly decrease by the surgery. One patient had nodal rhythm and in two patients the rhythm was unknown. The significant decreasing of SVT episodes was attributed to the surgical technique: the anterior leaflet is temporarly disconnected from the RV and atrialized RV is plicated, then the accessory pathways were interrupted and the ectopic foci were blinded.
Conclusions: Conservation surgery is possible in most of the Ebstein's anomaly in adults. The operation even with right maze procedure was not efficient on atrial fibrillation. The mobilization of the anterior leaflet and plication of the atrialized RV decreased (but not abololished) the incidence of supra ventricular tachycardia.

C16-10
PERFORMANCE OF XENOPERICARDIAL STENTLESS TRI-LEAFLET CONDUITS IN SIX YEARS AFTER RIGHT VENTRICULAR OUTFLOW TRACT RECONSTRUCTION
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Objective: This report assesses the mid-term outcome of stentless tri-leaflet conduits made of heterologous pericardium we have implanted, as an alternative to homograft for right ventricular outflow tract reconstruction.
Methods: From 2001 to 2006, 76 xenopericardial handmade tri-leaflet conduits consisting: bovine pericardium valve in five, porcine pericardium in 31 and bovine glisson in 40, were implanted in the main pulmonary artery position. Seventy-two patients had previous conduit repairs. The mean age at operation was 10.2±4.5 years (range: 7 months – 31 years). The underlying diagnoses were atrioventricular discordance in 26 patients, transposition of the great arteries in 19, double outlet right ventricle in 14, pulmonary atresia with ventricular septal defect in 12, tetralogy of Fallot in four, and truncus arteriosus in one. The conduit size was 18.1±2.1 mm (range: 14–23 mm).
Results: Follow-up examination was available in 21 patients range 2.5 to 6 years (mean 4.8) after the procedure. Twenty patients were New York Heart Association class I-II, one – IV. No evidence of degeneration of the xenopericardial conduit wall and valve tissue was found. Moderate-to-severe degree of pulmonary insufficiency represented 6% at 4 years. No difference in the valve function, depending on tissue, was found. There was one case of distal stenosis with systolic pressure gradient over 60 mmHg. Reimplantation has been needed in one xenopericardial conduit and two endovascular procedure.
Conclusions: Stentless tri-leaflet conduits show preferable mid-term results and provide a reliable alternative for RVOT reconstruction in children.

C16-11
TRANSCATHETER TREATMENT OF THE CONGENITAL
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Objective: To December, 2006, 22 patients underwent transcatheter closure of the coronary fistulae using Gianturco coils, Amplatzer Duct and Plug Occluder.
Methods: Patients' age varied from 11 months to 44 years (mean age 7.2±2.7 years) and weight – from 9 to 74 kg (mean 28±3.1 kg). Localization and fistulae diameter were determined after selective right and left coronary angiography. Six patients had the fistulae between RCA and RV, 1 – between the posterior ventricular branch of the RCA and RV, 3 – between the RCA and RA, 1 – between the branch of the RCA and the PA trunk, 2 – between LAD and PA, 5 – between the LAD and the RV, 2 – between the Cx and the RV and 2 – between the Cx and the RA. Occlusive coils diameter was approximately as twice more as the fistulae diameter. The number of the implanted coils was determined by the fistulae size: from 1 to 20 coils were implanted to every patient. In one patient with fistulae recanalization after three surgical operations we used six coils, Amplatzer Duct and Plug Occluder.
Results: Immediate results: complete coronary fistulae occlusion was achieved in 21 cases. In one case (patient with big RCA aneurysm, 18 coils were implanted) was a small residual shunt. There were noted following complications: coil migration to the pulmonary artery in two patients, femoral artery thrombosis in two patients. In one case occurred a wire-related perforation of the fistulae which led to immediate haemopericardium with complete fistulae thrombosis and in one patient we noted fistulae thrombosis during catheterization of the coronary artery.
Long-term results were analyzed in 22 patients during the period from 6 months to 18 years after surgery. All the patients led a regular life and had no complaints. A selective coronary angiography was carried out in four patients. In one patient with a small residual shunt we implanted two

additional coils and achieved total occlusion (after one year). Myocardial perfusion scintigraphy with tallium-201 was being performed in seven patients. The complete occlusion of the fistulae was confirmed in all cases.
Conclusions: Percutaneous treatment of the coronary fistulae is a safe and effective method. Coils are optimal embolization material for a small diameter fistulae, Amplatzer Duct or Plug Occluder - for bigger diameter (>4–5 mm) fistulae.

C16-12
STENTING OF THE PATENT DUCTUS ARTERIOSUS IN INFANTS WITH PULMONARY ATRESIA
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Objective: The aim of the study was to analyze of the institutional experience with stent implantation in the patent ductus arteriosus (PDA) in infants with pulmonary atresia and ductus-dependent pulmonary circulation.
Methods: Twenty-one neonates and infants (13 males/8 females) underwent PDA to maintain pulmonary blood supply in pulmonary atresia. The mean age of the patients was 49.9±51.9 days and the weight – 3.6±0.9 kg. The pathology was pulmonary atresia: with intact ventricular septum (*n*=7) and with ventricular septal defect (*n*=14). The mean arterial oxygen saturation was 43.7+18%. Balloon-expandable coronary stents were implanted in the PDA with a final diameter of 3.5–5 mm and initial length from 8 to 18 mm.
Results: PDA stenting was successful in 17 cases. The procedure failure was due to technical difficulties in four patients through extreme kinks and twists of the PDA. The mean arterial oxygen saturation increased to 81.4±10.4%. There were no procedure-related complications and mortality. In all the patients the procedure allowed prostaglandin and inotropic withdrawal and hospital discharge.
Conclusions: PDA stenting turned out to be safe and effective procedure, allowing improvement of pulmonary circulation in infants with pulmonary atresia.

C16-13
SURGICAL TREATMENT OF PATIENTS WITH CONGENITAL DISORDERS OF BLOOD CIRCULATION IN THE AORTIC ARCH BRANCHES
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Objective: To analyze the reasons of blood circulation disorders in subclavian arteries and to evaluate the results of the surgical treatment of congenital disorders of the aortic arch and its branches.
Methods: The results of surgical treatment of 1546 patients with coarctation syndrome with/or without associated pathology of the aortic branches were analyzed.
The systolic pressure gradient between upper limbs variated from 25 to 120 mmHg (average gradient – 48+5 mmHg) in patients with an average age of 16+0.9 (3—56) years. We revealed 106 patients (6.9%) with blood circulation disorders in one or both subclavian arteries. Frequency of A. Luzoria in the research group contained 31 cases (2%). The main reasons of blood circulation disorders in subclavian arteries:
– left subclavian artery:

1) Atypical coarctation of the aorta (between left common carotid artery and left subclavian artery) – 20.8%
2) Coarctation of the aorta with aortic arch and left subclavian artery hypoplasia– 20.8.%
3) Kinking of aortic arch with coarctation syndrome and blood circulation disorder in left subclavian artery – 24.5%
4) Congenital atresia of the aortic arch – 3%
   - right subclavian artery (A. Lusoria)
5) Coarctation of the aorta and A. Lusoria –29.3%

We put 12 patients (11.3%) with blood circulation disorders in both subclavian arteries into special group:

1) Coarctation of the aorta with position of both subclavian arteries lower then coarctation – four cases
2) Aortic arch kinking, coarctation syndrome, A. Lusoria – six cases
3) Coarctation of the aorta, aortic arch and left subclavian artery hypoplasia, A. Lusoria– two cases

Results: Satisfactory clinical and anatomic results were obtained in 1504 patients (97.3%). Restoration of the direct blood flow in subclavian artery was performed in all cases with detected anomaly of subclavian arteries. Analysis of paraplegia reasons in four patients from 1546, operated on with congenital pathology of isthmus of the aorta (kinking, coarctation, aneurysm), revealed that all of them had ischemic nature and in all four cases abberant disposition of aortic branches occured. In spite of the fact that the average aortic clamping time was 14±6 min and hemorrhagic complications of aortic arch cross-clamping and both subclavian arteries without preventive neuroprotective methods, led to the mentioned dramatic complications.
Conclusions: Reconstructive operations in patients with congenital anomaly of the aortic arch and blood flow disorders in subclavian arteries should be performed with preventive neuroprotective methods, such as cardio-pulmonary bypass, regional hypothermia and pharmacological protection.

C16-14
INTRAOPERATIVE HEMODYNAMIC RECOVERY AFTER DIFFICULT WEANING FROM CPB IN YOUNG PATIENTS
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Objective: Open heart surgery for complex congenital cardiac diseases in pediatric population exposes the myocardium to relevant injury. As a consequence the weaning from CPB may sometimes result in an early low output syndrome (LOS).
At our institution these cases are treated by continuing CPB as Intraoperative Extra-Corporeal Support (IECS) as long as necessary to restore an adequate circulatory physiology and a general homeostasis.
This communication reports our eight years experience with IECS.
Methods: Indication to IECS was established looking at clinical (low arterial pressures -AP, high filling pressures -CVP, rapidly decreasing venous saturation-SVO_2) and echocardiographic data, and on the need to increase inotropic support beyond normal range.
We performed a normothermic full-flow support by draining either right or left atrium and keeping low filling pressures. Drugs infusion was interrupted. In line ultrafiltration was maintained during IECS.
Results: Forty-five patients (weight <15 kg) affected by heart failure and LOS following CPB discontinuation received IECS. Among these 41 (89%) were successfully weaned with good circulatory patterns; four babies died during the support (three residual diseases, one intracranial hemorrhage). Among weaned 21 patients died (within seven days=18; <30 days=3); four patients received a subsequent ECMO/VAD procedure; 24 patients were alive and discharged home. Postoperative death was related to cardiac failure in 16 cases.
The analysis of results between alive (A) and dead (D) patients showed that early after IECS cardiac output was normalized in both groups, with normal SVO_2 value and increase of AP, hematochrit and contractility values.
Mortality rate was higher in prolonged CPB (>3 h=37.5%; <3 h=13.3%) and in prolonged myocardial ischemic time (aortic crossclamping >90 min=54.5%; <90 min=10.0%). Mortality rate was significantly higher among univentricular heart patients, in spite of an apparent initial cardiac function recovery following IECS (univentricular=87.0%; biventricular=25.0%).
Conclusions: In most patients IECS was effective in recovering a good hemodynamic function after complex surgery. Restoration of normal anatomy was essential to hemodynamic recovery. A shift from IECS to ECMO/VAD procedure is indicated in case of univentricular correction and when we need high filling pressures after IECS.
Prolongation of IECS did not influence overall results.

C16-15
SURGICAL CORRECTION OF HOCM PATIENTS WITH SIMULTANEOUS OBSTRUCTION OF LVOT AND RVOT
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Objective: The classic Morrow technique does not allow to perform the resection of the muscular bar in right ventricle outflow tract and midventricular part of septum.
Methods: The presented excision of asymmetrical hypertrophied area of the interventricular septum (IVS) causing obstruction of LVOT and RVOT simultaneously is made from conal part of right ventricle transversely and anteriorly of the Lancisi muscle but not throught the whole thickness of IVS, that is, without penetration into the left ventrical cavity. This excision of IVS implies avoiding the damage of the His bundle right branch and not using dissection of the endomyocardium of the left side IVS. The simultaneous obstruction was noted in 27 patients from 185 operated patients with HOCM. The follow-up period was 48±5 months.

Results: The mean echocardiographic gradient in LVOT decreased from 97.6±23.6 to 12.9±7.8 mmHg (P<0.001), the mean value of gradient in RVOT reduced 41.2±17.6 vs. 7.2±4.6 mmHg (P<0.001). Echocardiographically determined septal thickness in the basal part of IVS was reduced 31.8±9.3 vs. 18.6±7.5 mm (P<0.001). Follow-up magnetic resonance imaging showed an increase of the diastolic volume of RV and RV stroke volume. With our technique, preoperative and postoperative mortality was 0%.
Conclusions: This method is effective technique for surgical treatment of HOCM and advisable to use in cases of simultaneous obstruction of LVOT and RVOT.

C16-16
RECELLULARIZATION MECHANISM OF DECELLULARIZED PATCH MATERIAL IN THE AORTIC POSITION OF THE JUVENILE SHEEP MODEL
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Objective: This study was performed to evaluate the recellularization mechanisms of decellularized patches in a high pressure environment.
Methods: In seven juvenile sheep, decellularized equine pericardium was implanted within the blood circulation (group I, n=7). The patches of group II (n=7) were sutured around the aorta without contacting the blood circulation. The patches were evaluated after 4 months of implantation by gross examination, light microscopy (H&E, serius red, Gomori, Weigert and von Kossa straining), and immunohistochemical staining (CD 31.34 and 68).
Results: All animals showed fast recovery after surgery. In group I, all patches showed a smooth and pliable surface without degeneration. Light microscopy showed a well preserved extracellular scaffold with a monolayer of endothelial cells, well developed vasa vasorum and recellularization by host interstitial cells. The patches of group II showed a well preserved extracellular scaffold, however severe calcification, absence of development of a vasa vasorum and no host interstitial cell receullularization.
Conclusions: In the juvenile sheep, the blood circulation is needed to allow decellularization equine tissue to regenerate and remodel.

C16-17
SURGICAL MANAGEMENT OF THE AORTIC ARCH ANOMALIES
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Objective: To study patterns of the diagnosis and surgical treatment of the aortic arch anomalies forming vascular rings.
Methods: We have an experience of the examination of more than 200 patients with aortic arch anomalies. In 34% of cases aortic arch anomaly was present by the vascular ring and caused trachea-esophageal compression (which is the characteristic syndrome of this pathology) that required surgical treatment. Double aortic arch was diagnosed in 50% of cases; right aortic arch with vascular ring forming– in 45% cases and left aortic arch with vascular ring in 5% of patients. Aortic arch anomalies without vascular ring were found in 66% of patients. Patients age varied from 1 month to 60 years. We analyzed 30 patients with different types of aortic arch anomalies who underwent surgical procedure. Profound vascular ring was found in 26.7% of cases (eight patients). In six of them characteristic symptoms of tracheaesophageal compression was present. Double aortic arch was diagnosed in three patients (37.5%); right aortic arch with vascular ring - in five patients (62.5%). Aortic arch anomaly without of forming profound vascular ring was found in 73.3% (22 patients). Aberrant subclavian artery was present in most of the cases – 15 patients (68.2%). Right aortic arch without of vascular ring (with a mirror-image fashion of great vessels) was present in two patients (9.1%); left subclavian and common carotid arteries originated as one truncus – in three patients (13.1%); left common carotid artery originated as truncus bicaroticus – in one patient (4.5%); in one patient (4.5%) left common carotid artery originated as a first truncus from aortic arch.
Results: All the patients with marked symptoms of trachea-esophageal compression underwent surgical intervention. The main thing in managing double aortic arch is to detect and divide constrictive arch. In the case of double aortic arch in the most of cases division of the smaller arch is performed (in 70–80% of cases – left arch). In the case of right aortic arch we also divided ligamentum arteriosum, and if needed – aberrant subclavian artery dissection performed. In the case of left aortic arch we divided ligamentum arteriosum and right aberrant subclavian artery. Aberrant subclavian artery was reimplanted into ascendant aorta or common carotid artery. Surgery type varied due to associated congenital heart anomalies.
Conclusions: All the patients with marked symptoms should undergo surgical intervention at the time of diagnosis - trachea-esophageal decompression by dividing constrictive vascular structure.

C16-18
QUANTITATIVE DEMONSTRATION OF MYOCARDIAL LEUCOCYTE ACCUMULATION AFTER USE OF DIFFERENT CARDIOPLEGIC SOLUTIONS BY A RADIONUCLIDE METHOD IN HEART VALVE OPERATIONS
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Objective: Different types of cardioplegia techniques have been introduced to protect the myocardium since the early years of heart surgery. Of these, blood and cristalloid cardioplegia are most widely used application methods of cardioplegic solutions. The efficacy of these two methods have been compared in a number of studies. However, there is no report for a quantitative method which measures count of leucocytes directly which accumulate in the myocardium after the administration of cristalloid or blood cardioplegia.
Methods: In this study, randomly selected 21 patients divided into two groups, which were prepared for an elective heart valve surgery. Cristalloid cardioplegia, including potassium and sodium bicarbonate, was used in 11 patients (CC Group) and cold blood cardioplegia in ten patients (BC Group). For detecting myocardial leucocyte levels, a radionuclide method was used. Leucocytes of each patient were labeled by Tecnesium-99 m exametazime (HMPAO) and injected back to the patient before the operation. For comparison of the effects of two cardioplegic solutions on myocardial leucocyte accumulation, myocardial biopsies from the right ventricle were taken preoperatively before the initiation of extracorporeal circulation and following cardiopulmonary bypass. All of the biopsy materials were detected by a gamma counter at the nuclear medicine laboratory for assessing their radioactivity levels. In addition, for evaluation of the relationships between the cardiac hemodynamic status and myocardial leucocyte levels, ventricular contractile functions were compared via measurements of hemodynamic parameters, cardiac enzymes, cardiac indices, and left ventricular stroke work indices.
Results: When myocardial leucocyte counts were compared, in BC group, the accumulation rate was statistically significant (P<0.05), whereas any significant leucocyte accumulation was not observed in the CC group. There were no significant differences between the levels of creatine kinase myocardial band (CK-MB), which show the myocardial damage, between two groups. In both groups, cardiac indices (CI) were found to be similar in the postoperative period. But, at the second hours after the operation, left ventricular stroke work index (LVSWI) was lower in BC group (P<0.001). At the second hours following the operation the heart rate was also higher in BC group (P=0.001). No statistical differences between two groups were found for other clinical parameters considering the extubation time, intensive care unit staying and bleeding from mediastinum.
Conclusions: Our study findings show that blood cardioplegia administration causes myocardial leucocyte accumulation which may have some clinical effects at the early postoperative period of heart valve surgery patients.

May 20, 2007 4th Congress Day
11:00–12:30
11th Vascular Scientific Session - Aorta and Carotid

V11-1
ASSESSMENT OF CEREBRAL EMBOLISM AFTER CAROTID ENDARTERECTOMY AND STENTING BY SERUM S-100 PROTEIN LEVELS AND MAGNETIC RESONANCE IMAGING
V.S. Lacroix, D. Gruson, P. Astarci, F. Hammer, J. Ketelslegers, A. Peeters, R. Verhelst
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Objective: To study the postoperative serum levels of the neuronal protein S-100B in patients undergoing carotid endarterectomy or protected carotid

stenting and to correlate the results with the potential new ischemic lesions detected on early postoperative cerebral diffusion-weighted magnetic resonance.
Methods: Prospective and non-randomised single-center study including 80 patients with symptomatic and asymptomatic significant carotid stenosis. Sixty patients were treated by surgery with systematic use of a shunt and 20 treated by protected carotid stenting.
Cerebral DW-MRI was performed before and after each procedure. The presence, location and volume of new cerebral lesions were determined. Serum levels of S100B protein were analysed pre and postoperatively at 24 h and 48 h.
Results: Three postoperative neurological deficits were registered in the surgical group (one major stroke, one minor stroke and one transient ischemic attack) and one major stroke in the stenting group.
Seven patients in the surgical group (11.6%) and nine patients in the stenting group (45%) presented new cerebral lesions. At 48th hours postoperatively, S100B levels were significantly higher in the subgroup presenting cerebral lesions (median, 0.07 μg/l; range, 0.03–0.64 μg/l) compared to the subgroup without cerebral lesions (0.04 μg/l; 0.03–0.28 μg/l; $P<0.007$). In patients with cerebral lesions, there is a correlation between the S100B serum levels and the lesion volume ($r=0.78$; $P=0.008$; $n=10$).
Conclusions: The increase of S100B protein level after carotid endarterectomy and stenting is correlated to new cerebral lesions detected on magnetic resonance imaging. The importance of the increase seems to be related to the lesion volume.

V11-2
OUR EXPERIENCE IN CHEVALIER SECTION-EVERSION CAROTID TEA
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Objective: Carotid bifurcation TEA (trombendartectomy), throught a longitudinal arteriotomy from the common carotid to the internal, with or without patch interposition, became the standard surgical technique for carotid stenosis treatment.
Eversion endarterectomy, with the versions described by Etheredge and VanMaele, was introduced as an alternative technique that could reduce restenosis incidence, during the follow-up.
Aim of this study is to report our preliminary experience with a modification of the original eversion technique, described by JM Chevalier in 1994, done with an internal carotid section at the end of the plaque while the endarterectomy is done throught an arteriotomy from the common carotid to the external carotid artery.
Methods: From January 2003 to December 2006 we practiced 202 surgical carotid revascularization, 78 (38.6%) were done in 77 patients with the 'eversion-section' technique. Patients mean age were 68.8 years, 64 of them (82%) were asymptomatic for an ischemic cerebral event, 11 had a TIA and three suffered from a stroke. Five patients had kinking or coiling of the distal internal carotid artery. Ninety seven percent of the patients were operated under local anaesthesia with cervicalis plexus block. During surgery, cerebral blood flow was monitored, using a transcranial Doppler, in 85% of the patients.
Results: One patient died of acute myocardial infarction (1.29%); only one neurologic complication was observed, a minor stroke (1.29%), for a combined mortality/morbidity rate of 2.56%. During follow-up (mean 13.8 months, range 1–34 months), new neurologic events or new cardiovascular accident were not observed. Supraortic Duplex Ultrasound examination, done in all patients during follow-up, showed one case of significantly restenosis (1.29%), without difference with other techniques and one asymptomatic occlusion of the internal carotid artery. A control cerebral MRA, done in 15 patients (19.2%), showed one asymptomatic case of microembolism (6.6%).
Conclusions: Eversion-section internal carotid endarterectomy is a real alternative technique to the others and shows excellent immediately and long-term results.
Main advantages of this technique seem to be:

1) Easy contol of the internal carotid distal intima.
2) Kinking or coiling simultaneous correction.
3) Accurate external carotid endarterectomy.
4) Patch not needed.
5) Physiological reconstruction of the carotid bifurcation morphology.

V11-3
INTRAOPERATIVE DUPLEX SONOGRAPHY AND DIRECTED IMMEDIATE REVISION REDUCES STROKE RISK IN CAROTID ENDARTERECTOMY
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Objective: To evaluate the impact of intra-operative duplex sonography in detecting technical errors requiring immediate revision during carotid endarterectomy (CEA).
Methods: We analysed a prospectively gathered dataset of a consecutive series of 240 patients (age range 36.5–91.7, median 72.9 years) undergoing CEA between May 1996 and November 2006. All patients were treated under general anaesthetic, under the auspices of a single consultant vascular surgeon. Shunting was employed selectively. Duplex scanning was universally employed preoperatively and at 6 weeks postoperatively. The indications for surgery, operative technique, intra-operative duplex findings and action taken, and clinical outcome were recorded.
Results: There were four (1.7%) cerebrovascular events (one transient), two myocardial infarctions (one fatal). The combined permanent stroke and death rate are 1.7%.
Operative duplex revealed technical defects in 15 patients (6.3%). Fourteen of these were treated with re-anticoagulation, re-arteriotomy and revision patches. One patient was deemed to be maximally treated and not revised. Eleven scans showed defined abnormalities, four were uninterpretable. Abnormal scan findings included high velocities, common carotid shelves, internal carotid artery (ICA) flaps and shelves and a complete absence of flow. In three patients with high velocities no definite abnormality was identified at revision (20% false positives). All of the other abnormalities were confirmed and corrected. Two patients in the uninterpretable group underwent angiography, one per-operatively and one immediately postoperatively. The per-operative angiogram was non-diagnostic, the post-op angiogram showed residual ICA stenosis. Thereafter, non-diagnostic scans were treated as abnormal and resulted in revision. One patient (with no flow on scan) suffered an immediate stroke. Endarterectomy site thrombosis was confirmed at re-exploration. The vessel was cleared and patched with normal duplex findings at post-revision and 6 week scans. Three patients with apparently ideal operative scans (i.e. not revised) suffered strokes (one transient) and one patient suffered a TIA. All but one patient had stenosis-free endarterectomy sites at 6 weeks. The exception was a clinically silent post-op ICA occlusion (0.4%). This occurred following a very high dissection, following which a stenosis identified preoperatively was deemed inoperable.
Conclusions: Intra-operative completion duplex scanning is a sensitive tool for identifying technical errors. Revision of such errors prevented a possible 11 additional strokes. Therefore this policy has contained a potential 6% incidence of peri-CEA stroke (co-incidentally, the current GALA stroke risk) to 1.7% and resulted in a very high proportion of technically ideal endarterectomies.

V11-4
A NEW INDICATION TO AORTIC ENDOGRAFT
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Objective: Covered stent grafts are currently used for arterial aneurysm exclusion, aortic dissection or peripheral occlusive disease. A new indication to endograft was applied to perform resection of the thoracic aorta for infiltration of an adjacent lung cancer into the vessel wall, avoiding a major vascular intervention for aortic graft interposition associated with tumour resection.
Methods: A 61-year-old man had a relapsing thoracic metastatic carcinoma of the left lung infiltrating the aortic wall. In 1995 the patient underwent a surgical resection of a porocarcinoma, a malignant tumor arising from the intraepidermal portion of the sweat gland, localized in the posterior region of the neck and left side lymphadenectomy. In 1999, he underwent a lower lobectomy for a metastatic porocarcinoma in left lung. In 2006, he presented with dyspnea. CT scan showed a new growth in the left emithorax occluding the main bronchus and infiltrating the aortic wall. He had no evidence of cancer in other location. A biopsy was performed at bronchoscopy and a relapsing porocarcinoma confirmed by pathology examination.
Results: A thoracic endovascular graft (Zenith TX2 Thoracic TAA, Cook, Brisbane, Australia) 28 mm diameter and 120 mm length was placed distal to the left subclavian artery, covering the area involved by cancer infiltration

with a safe proximal and distal 3 cm margin of normal aorta. The following day the patient underwent a redo thoracotomy for tumour resection, removing the remaining left upper lobe together with the infiltrated area of thoracic aorta. The removed area included the adventitia and the external portion of the media, about 1.5 cm wide of ¼ of aorta circumference. The patient had no postoperative complications and was discharged after 10 days from the hospital. The pathology examination confirmed carcinoma infiltration into the adventitia of the aortic wall removed. He underwent a radiotherapy treatment one month after surgery and he is well and free of disease 7 months after surgery.
Conclusions: We showed that an aortic endograft can be applied to a patient with a metastatic carcinoma of the lung to allow combined resection of the carcinoma and the infiltrated aortic wall without the need of thoracic aorta cross-clamping and graft replacement, reducing morbidity and mortality associated with surgery.

V11-5
MEASUREMENT OF SERUM CYSTATIN C TO ASSESS THE SAFETY OF UNCOVERED BARE METAL SUPRA-RENAL FIXATION IN ENDOVASCULAR ANEURYSM REPAIR (SR-EVR)
P. Davey, R. Peaston, R.A. Jackson, J. Rose, M.G. Wyatt
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Objective: Reports regarding the renal sequelae of SR-EVR have largely relied on creatinine methods for biochemical assessment. Serum cystatin C (CC) is a better marker of early renal injury that is not subject to non-renal influence. The aim of this study was to assess the renal effect of SR-EVR using this superior renal index.
Methods: A prospective trial of all SR-EVR over a 1-year period from May 2002, compared to control groups of open abdominal aortic aneurysm repairs (OR) and those undergoing colorectal resection (CR). Serum CC was determined by particle-enhanced turbidimetric immunoassay (PETIA) preoperatively and at 3, 6 and 12 months post-surgery. Comparative analysis of renal function was by the technique of summary measures (regression coefficient derivation and 2-sample *t*-testing).
Results: During the study period, 65 patients (M:F; 52:13, median age 74 years) were recruited. Fifty-two patients required abdominal aortic aneurysm (AAA) repair (24 SR-EVR and 28 OR) whereas the remaining 13 patients underwent major colorectal resection. Preoperative renal function and risk factors were similar between groups: mean CC 1.04 mg/l (SR-EVR); 0.96 mg/l (OR) and 0.97 mg/l (CR). Although one patient in the entire series required permanent dialysis as a complication of SR-EVR, the minimal annual mean change in CC of +0.07 mg/l following endovascular AAA repair was not significantly different compared to both the OR and CR control groups.
Conclusions: Using Cystatin C as a more sensitive renal index, there was no detectable evidence of kidney dysfunction at 12 months post-EVR. Uncovered supra-renal fixation in EVR would appear unrelated to any clinically silent biochemical renal insult.

V11-6
ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM REPAIR AND RENAL FUNCTION: 10 YEARS EXPERIENCE FROM A SINGLE CENTRE
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Northern Vascular Centre, Newcastle Upon Tyne, England

Objective: Endovascular repair (EVR) is now well established in the management of abdominal aortic aneurysm (AAA). Initial devices employing infra-renal (IR) graft fixation were associated with a significant incidence of device failure. Later generation devices employing bare metal supra-renal fixation (SR) appear more durable, but concern remains regarding their potential effect on renal function with few reports of long-term outcome. This study assesses this renal effect, up to 10 years following EVR with both IR and SR devices.
Methods: A prospectively maintained database was interrogated for consecutive EVR procedures performed between 1996 and 2001. Patients were grouped according to proximal fixation level, either IR or SR. Post-EVR renal function was recorded annually by serum creatinine (sCr umol/l) and Cockroft-Gault derived creatinine clearance (CrC ml/min). Changes in renal function over time were compared using the 1-sample Wilcoxon Test within each group, and the Mann–Whitney *U* test between groups.
Results: During this 5-year period, 180 EVR procedures were performed for AAA (median sac size 63 mm, range 41–145 mm). Eighty-eight cases were IR procedures (M: F; 78: 10, median age 71 years) and the remaining 92 were SR endografts (M: F; 83: 9, median age 75.5 years). Paired renal data was available for 142 patients with a mean follow-up of 37.4 months for the entire series (range 6–120 months). Preoperative renal function was similar between both groups with median sCr and CrC values of 113 umol/l and 57 ml/min (IR) and 110 umol/l and 58 ml/min (SR), both *P*=NS. At 7-years post-EVR, both groups showed deterioration in renal function, with median sCr and CrC values of 117 μmol/l and 55.6 ml/min (IR) and 147 μmol/l and 49.0 ml/min (SR), all *P*=NS.
Conclusions: These results suggest the sustained longer-term renal safety of AAA repair by EVR with both IR and SR fixed stent grafts. Improved device durability does not appear to be at the expense of compromised late renal function, although longer follow-up with more patients is needed to fully assess the late changes following SR.

V11-7
ENDOVASCULAR ABDOMINAL AORTIC REPAIR: EFFECT OF TRANSRENAL VS. INFRARENAL FIXATION ON RENAL FUNCTION
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Objective: The purpose of this prospective study was to asses the effects of EVAR both with transrenal fixation (TRF) and infrarenal fixation (IRF) on renal function detected with serum creatinine (SCr), creatinine clearance (CrCl) estimated with the Crockcroft and Gault formula and renal perfusion scintigraphy (RPS).
Methods: A prospective study was carried out at the Department of Vascular Surgery - University of Padua, from January 2003 to June 2006. To assess renal function a RPS, SCr, CrCL were performed preoperatively and in the 4th postoperative day. A postoperative change=20% above base line of SCr and/or CrCl was considered significant for renal dysfunction. The follow-up included: dosage of SCr, CrCL, RPS and Angio-CT at 6, 12 months and then yearly.
Results: The patients enrolled in the study were 111; 57 (51.3%) received a TRF and 54 (48.7%) a IRF. Preoperative SCr concentration, intraopertaive blood loss and contrast were not significantly different between TRF and IRF. Similarly no significant change were observed for SCr and CrCL from the preoperative to the postoperative period (4th day) in both group. A significant reduction of the GFR at the RPS was observed in 11 patients (9.9%), six (10.5%) from the TRF group and five (9.2%) from the IRF group in absence of relevant variation of SCr and CrCl. In five patients (4.5%; two TRF, three IRF) the decrease was limited to a single kidney. Renal function during the follow-up period remained unchanged.
Conclusions: An early decrease of renal function is seen after EVAR at the RPS, regardless of fixation level. SCr and CrCl, estimated with the Crockcroft and Gault formula, are inadequate methods to detect early renal function impairment after EVAR. The RPS is a basilar test to detect it correctly and especially to localised the impaired kidney. No significant variation of renal function were observed during the follow-up period.

V11-8
LOW RATE OF RE-INTERVENTION FOLLOWING ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM (AAA) REPAIR (EVAR): RELATED TO A STRICT SELECTION PROTOCOL
A. Abdellaoui, M. Atwan, J.S. Abraham, J.M. Lavelle, J. Calvey, M. Bukhari, M.A. Tomlinson, P. Wilson
Lancaster and Lake District Vascular Unit, Lancaster Royal Infirmary, Lancaster, England

Objective: EVAR is associated with reduced morbidity and mortality, but is feasible in only 25–50% of patients with AAA, related to aortic neck and iliac vessel anatomical considerations. Despite careful selection of patients, and successful stent-graft deployment, approximately 10% of patients per annum require endovascular or open re-intervention procedures, often to seal significant endoleaks, which adds to the overall cost and morbidity of EVAR.
Since the introduction of EVAR in 1999 in our Vascular unit, we have employed a strict selection protocol based on favourable aortic neck and iliac anatomy, which has resulted in a low rate of re-intervention, and consequent morbidity.
Methods: Selection protocol: Patients requiring elective AAA repair were screened for eligibility for EVAR on the following anatomical considerations: aortic neck length >15 mm, aortic neck diameter <22 mm, aortic neck angulation <60 degrees, iliac artery diameter >9 mm and <14 mm with minimal tortuosity and calcification, measured by contrast enhanced computed tomography (CT), and calibrate catheter intra-arterial angiography.

Following EVAR patients underwent CT at 1,3,6, and 12 months, and annually thereafter. Patients identified with endoleaks were assessed for re-intervention. We have studied: procedure related mortality, morbidity, surgical conversion rate, endoleaks, aneurysm enlargement and graft patency.
Results: In our vascular unit, 30 patients (25 males and five females, median age 74, range 63–90) underwent EVAR between 1999 and 2005, accounting for 25% of all patients requiring non-urgent AAA repair. The median aneurysm diameter was 5.9 cm (range 5.1–9.0 cm). EVAR was successful in 29 patients (97%). Thirty-day mortality was zero. One patient had early thrombosis of an iliac limb of the stent-graft, and required femoro-femoral cross-over bypass. One patient required immediate open conversion related to failure of stent deployment due to excessive iliac calcification (protocol breech). Endoleak (type I and II) has occurred in three patients (10%) in 6 years (median follow-up: 34.5 months (1–72 months). One patient (3%) has required re-intervention to seal an endoleak (type I).
Conclusions: Patients selected for EVAR using a strict protocol of anatomical charactersistics have low perioperative morbidity and mortality, and a very low rate of re-intervention. Careful selection of patients for EVAR is essential to reduce re-interventions and their associated cost and potential morbidity.

May 20, 2007 4th Congress Day
11:00–12:30
12th Vascular Scientific Session - Vascular Minipresentation I

V12-1

TREATMENT OF CHRONIC TYPE B AORTIC DISSECTION IN A PREVIOUSLY CABG PERFORMED PATIENT WITH ENDOVASCULAR GRAFTING

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Objective: High mortality rates of surgical treatment of Type B aortic dissections played an important role in seeking newer alternative therapy modalities for the treatment of the pathology. Especially from the beginning of early 1990s endovascular grafting has become a popular option in the treatment of aortic diseases and with the increasing experience and advances in technology, in recent years it became an alternative approach for the treatment of aortic dissections.
Methods: A 56-year-old male patient with the diagnosis of chronic type B aortic dissection was referred to our institution due to the increasing diameter of the aneurysm at the descending aorta. Three dimensional reconstructions of the CT angiography showed the dissecting aneurysm started 1 cm beyond the subclavian artery with a diameter reaching 7 cm in diameter at the widest part. The coeliac artery originated from the false lumen but there was 80% stenosis at its orifice and its branches were mostly filled through collaterals from superior mesenteric artery. In the history of the patient, there was CABG operation five years ago in which LIMA was used for single vessel coronary artery (left anterior descending coronary artery) disease.
Results: Under general anesthesia, for spinal cord protection a cerebrospinal fluid drainage system was placed. Then with an 8 mm ringed ePTFE graft right to left subclavian artery bypass was performed and left subclavian artery was ligated proximally. Through femoral incision, two endovascular stent graft systems were deployed in order to exclude the thoracic aorta aneurysm. The postoperative course was uneventful and the patient was discharged on the eighth day. He has been followed regularly and free of symptoms for six months.
Conclusions: Although long-term results of endovascular grafting in the treatment of acute and chronic dissections is not known, promising mid-term results and low mortality and morbidity rates when compared with the surgery makes the endovascular grafting procedure an alternative attractive method to classical open surgery in the treatment of acute and chronic type B aortic dissections.

V12-2

EXTRACORPOREAL CIRCULATION IN PATIENTS WITH VASCULAR DISEASES

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Objective: Reconstructive surgery on thoracic and thoracoabdominal aorta, vena cava inferior associated with high rate of complications, including paraplegia, acute renal failure, hepatic insufficiency, coagulopathy. In spite of complexity and traumatism of such operations the ischemic lesion of the appropriate organ during aortic clamping is the main reason. Search of the adequate methods of vital inner organs defense during reconstructive operations on greate vessels.
Methods: From 2004 to 2006 we performed 109 reconstructive vascular operations with cardio pulmonary bypass. The main indications for surgery were: thoracic and thoracoabdominal aneurysm – in 70 patients (seven patients had clinical manifestation of aneurysm rapture); recoarctation of the aorta – in 18 patients; congenital deformation of aortic arch – in 13 patients; hypoplasia of abdominal aorta – in three patient; aneurysm of ascending aorta with aortic valve insufficiency and coarctation of the aorta – in four patients; and tumor of the right kidney with thromb-tumor of inferior vena cava and the right atrium – one patient. In 79% of the cases we used the distal arterial perfusion by femoral vessels cannulation (femoral vein – femoral artery), in 17% - left heart bypass. Total Cardiopulmonary bypass was used in four cases (4%), in two of them hypothermia arrest of circulation also used.
Results: Operative mortality rate was 37.5% for emergency cases (three from seven patients) and 5.5% for remained surgeries. Six patients died during operation due to cardiac failure. One patient died in 8 days after surgery due to massive thromboembolism of the pulmonary artery. Seven patients died in 1 and 3 days after surgery due to haemorragic complications and multiple organ dysfunction. Thirty days mortality rate was 7.7% (eight cases from 103 patients). Paraplegia took place in three patients (3.2%). In three patients from 95 survivors (3.2%) expracorporeal treatment of acute renal failure had to be performed.
Conclusions: Extracorporeal circulation gives sufficient rate of protection for spinal cord, kidneys and abdominal cavity organs during the main part of reconstructive operations on aorta and great vessels.

V12-3

ENDOVASCULAR COVERAGE OF DESCENDING AORTA INTRA-LUMINAL MASS WITH A THORACIC STENT-GRAFT: A CASE REPORT

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Objective: To describe diagnosis and management of descending thoracic aorta intra-luminal mass responsible for bilateral femoral embolism in a 47 years old Caucasian woman affected by uterine fibroma, who came to our Emergency Department for acute lower limbs ischaemia, successfully treated with urgent thromboembolectomy.
Methods: Once excluded cardiac and abdominal aorto-iliac source of embolism, transthoracic/transesophageal echocardiography with colordoppler revealed an elongate peduncolate intraluminal floating mass in the proximal third of descending thoracic aorta with a small implantation base close to the isthmus. Angio-CT and contrast-enhanced MRI confirmed the diagnosis. Imaging and histologic examination of femoral emboli assessed the thrombotic nature of disease. Vascular malignancy of aorta as angiosarcoma was suspected, but confirmed neither by these data, nor by immunohistochemical and tumoral markers search, which resulted negative. Moreover, aortic biopsy was at high-risk for embolism. However, treatment of thoracic aortic mass potentially responsible for further and life-threating embolism was necessary: after careful evaluation of the less invasive approach, we decided to cover the aorta at the site of mass with a stent-graft dedicated to endovascular treatment of thoracic aortic disease. First, the patient underwent pan-hysterosalpingo-ophorectomy, in order to gain easily the infrarenal aortic access necessary for endograft deployment, if considering calibers of thoracic devices incompatible with iliac-femoral district diameters of the patient. Then, under general anaesthesia the patient underwent endovascular coverage of the thoracic intraluminal mass with Bolton Relay™ Thoracic free-flow stent-graft. The procedure was performed by vascular surgeons in operating room, under X-ray control and with continuous transesophageal echocardiography during endoprosthesis delivering.
Results: Procedure was complication-free. Final angiography and transesophageal echocardiography documented stent-graft's regular opening and complete covering of the mass, without interferences with aortic and supra-aortic trunks vasculature. The patient was discharged symptoms-free from hospital seven days after intervention. Two-years follow-up resulted free from further episodes of peripheral embolism and imaging documented endograft's stability with progressive shrinkage of the mass. Furthermore, no signs of aortic neoplastic evolution were detected.

Conclusions: With our experience concerning endovascular management of aortic disease and by using a stent-graft dedicated to descending thoracic aorta, we treated an intraluminal mass responsible for embolism in the less invasive way possible. Procedure's success is confirmed by absence of further recurrent embolic events and progressive shrinkage of the mass without signs of neoplastic evolution at the chest spiral-CT monitoring during a 2-year follow-up period.

V12-4

VIRTUAL VASCULAR ENDOSCOPY BY MULTI-SLICE COMPUTED TOMOGRAPHY IS AN EFFECTIVE MODALITY TO DETECT AN ENTRY SITE IN CASES OF AORTIC DISSECTION

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Objective: Accurate detection of an entry site in cases of acute or chronic aortic dissection is very important to decide a treatment strategy. However, despite the recent progress of less invasive examinations, such as computed tomography, magnetic resonance imaging, and trans-esophageal echocardiography, it is still challenging to detect an accurate entry site. Our objective was to evaluate the effectiveness of the virtual vascular endoscopy (VVE) and multiplanar reformation images reconstructed from the multi-slice computed tomography (MSCT) to detect an entry site in cases of aortic dissection.
Methods: Fourteen patients were admitted to our hospital for aortic dissection from July 1, 2005 to December 31, 2006. MSCT was used to evaluate the anatomy in all cases. Six out of 14 cases, in which the false lumen was patent for a long segment, were evaluated for an entry site using MSCT. MSCT (Aquillion 64, TOSHIBA medical systems corporation, Tokyo, JAPAN) was performed after the injection of a volume of 100 ml of iohexol (Omnipaque 300, Nycomed imaging, Oslo, Norway). The acquisition of the images was performed with the patient single holding his breath (beam collimation, 0.5 mm×64; pitch, 53; table incremental speed, 43 mm/s; tube rotation, 0.5 s/rotation; tube current, 250–500 mA with 120 kVp; tube field of view, 320–400 mm). Acquisition time was 25–30 s and the total scanning lengths was 1075–1290 mm. All images were generated with the ZIOSTATION (ZIOSOFT, INC. Tokyo, Japan). Navigation through the aorta was performed in a fly-through mode and moving the cursor on multiplanar reformation images. The entry site was confirmed by operative findings including EVAR in these six cases (ascending in four, distal arch in two). Operative procedures were aortic arch replacement in two, ascending aorta replacement in two, and valve sparing aortic root replacement in one, EVAR in two.
Results: The entry site was detectable accurately in five out of six cases by VVE and MPR image from MSCT. However, in one case which had an entry in ascending aorta, information of the ascending aorta was unclear because of a floating of intimal flap, resulting in not detecting an entry site. It would be overcome with the use of ECG-gated MSCT.
Conclusions: These results was suggested that VVE and MPR images reconstructed from the MSCT could be less invasive and effective modality to detect an entry site in cases of aortic dissection, which was a very useful information to decide a treatment strategy.

V12-5

THE RESULT OF SURGICAL INTERVENTION IN ACUTE TYPE B AORTIC DISSECTION

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Objective: Acute type B aortic dissection (ABAD) is usually treated medically. But emergency surgery is needed for patients with complications, such as rupture, uncontrollable pain or organ malperfusion. The result of surgical intervention for complicated ABAD was poor. We assessed the clinical outcome of emergent surgical intervention in ABAD.
Methods: From January 1990 through January 2006, 35 patients underwent the emergency surgery in ABAD. The male to female ratio was 25:10, and the mean age was 64.9 years old. Indications for surgery were rupture in 13 patients, impending rupture in six and malperfusion in 16. The area of malperfusion were celiac artery in four patients, SMA in six, renal in 11, limb in 11 and spinal cord in three.
Results: Thirteen descending aortic replacement and six total arch replacement were performed for rupture or impending rupture. Ten abdominal aortic fenestration, five abdominal aortic replacement, five extra-anatomical bypass and three bypass grafting to SMA were performed for malperfusion. The hospital mortality rate was 34% (12/35). The mortality rate in cases of rupture was 62% (8/13), 25% (4/16) in cases of malperfusion. Preoperative status in hospital death of rupture cases were shock in 4/8 (50%) patients, CPA in 3/8 (38%), stable in 1/8 (12%). The reasons of death were LOS in four patients, MOF in three, ARDS in two, bowel necrosis in two, pulmonary bleeding in one. Kaplan-Meier 1- and 5-year survival rate were 54% and 46% in cases of rupture, 75% and 75% in cases of malperfusion.
Conclusions: The result of surgical intervention for complicated ABAD were poor. To obtain improving outcome, surgical intervention is mandatory as soon as possible before falling into a shock state is required especially in cases of rupture. Early detection and assessment of the mechanism of malperfusion and choice of appropriate operation are mandatory in cases of malperfusion.

V12-6

VASCULAR-DERIVED MESENCHYMAL STEM CELLS: THEIR ROLE IN HEMOSTASIS

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Objective: Mesenchymal Stromal Cells (MSC) of the human vascular bed form a subendothelial network in both arteries and veins and play a important role in tissue regeneration. Due to their strategic location in the subendothelium they may serve as an important factor in blood coagulation after vascular injury. Aim of the study was to evaluate their prothrombogenic potential.
Methods: MSC were derived from the subendothelium of human saphenous veins using standard culture techniques. They were identified and characterized using immuno- and histochemical methods. Their ability to express and regulate procoagulant enzyme complexes was determined. Tissue factor (TF) expression by cultured MSC was demonstrated by both immunohistochemistry and functional assays for blood coagulation.
Results: MSC isolated from the subendothelium of the human vascular bed were identified by their typical morphology (large polymorphic cells), growth characteristic (multilayer, in long-term culture they form multicellular mineralized nodules) and positive staining for CD44, a-actin and 3G5 (a pericyte marker). Intense immunostaining for TF was localized along the MSC surface. Without agonist stimulation membrane-expressed TF was able to activate factor X at a mean rate of 2.5±0.6 mol factorXa/min/cell×10E17. Prothrombinase activity was 8.5±0.5 mol thrombin/min/cell×10E15.
Conclusions: MSC from the subendothelium of the human saphenous vein express high prothrombogenic properties. These observations support the concept that MSC of the human saphenous vein are involved in blood coagulation events and therefore play an pivotal role in acute graft failure and vein graft disease.

V12-7

LATE FEATURE OF THE DISTAL AORTA AFTER REPAIR OF ACUTE TYPE A AORTIC DISSECTION

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Objective: Investigating early and late operative results of acute type A aortic dissection and the fate of the distal aorta according to an operative method in short-term follow-up.
Methods: From September 2001 to November 2006, 104 consecutive patients with acute type A aortic dissection underwent an emergent operation within 48 h after the onset. The average age was 69±13, ranging from 31 to 88 years old, 53 were males and 51 were females. There were cardiac tamponade in 33 (31.7%), systemic shock in 33 (31.7%), and malperfusion in 27 patients (26.0%). Eighty patients underwent replacement of the ascending aorta (ascending group). Twenty-four patients had total arch replacement and three had hemiarch replacement with branch reconstruction (arch group). In almost all cases, we used GRF glue in proximal anastomosis. Retrograde CP was performed in ascending group and SCP in arch group. The long-term follow-up were available for all the patients.
Results: Sixteen patients died during their hospitalization, including seven cases of ascending group and nine cases of arch group (P=0.0006). The overall hospital surgical mortality was 15.3%. There were five patients in arch group, and who had cerebral complication preoperatively, and dies of cerebral complication.
Eighty-eight cases were followed up from 1.5 months to 4.6 years, mean 1.4±1.4 years. Non-dissection related late deaths occurred in three patients.

The overall survival rate was 81.7% at 3.5 years. The communicative survival rates of ascending and arch group were 81.0% at 4.6 years and 60.0% at 3.7 years respectively (P=0.0015). The overall event free rate was 47.5% at 4.6 years. The distal aortic dilatation occurred in ten cases. Two of them needed replacement of the descending aorta. Leg ischemia due to stenosis of the true lumen was seen in one case. All of these events were seen in ascending group. The event free rate was 47.4% at 4.6 years in ascending group, and 100% at 3.8 years in arch group. Significant factors for late distal aortic enlargement were no entry resection, retrograde dissection and ascending group.
Conclusions: The hospital mortality was high for total arch replacement cases, yet the long-term result was excellent with no dissection-related deaths and no events. Postoperative aortic dilatation was strongly related with existence of entries in the descending aorta. Close follow-up are necessary for the patients with ascending aortic replacement.

V12-8
OUTCOME OF MEDICAL AND SURGICAL TREATMENT IN PATIENTS WITH ACUTE TYPE B AORTIC DISSECTION
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Objective: Optimal treatment of acute type B aortic dissection remain unclear. The aim of this study was to assess the clinical outcome of acute type B aortic dissection.
Methods: In the last 16 years, 178 patients were admitted for acute type B aortic dissection. We medically treated patients at the time of onset with antihypertensives. Surgery was considered if there is rupture, severe aortic branch malperfusion, or aneurysm expansion.
Results: Fourteen patients had rupture (three cases refuse an operaiton), six patients had leg ischemia, four patients had bowel ischemia, 11 patients had renal ischemia, seven patients had paraplegea. A total of 14 patients (8%) underwent emergency surgical intervention: two extra-anatomical bypass for leg ischemia, 11 thoracic aortic graft replacement (two open stent graft placement) and one abdominal aortic graft replacement for aortic rupture. Of the 11 patients with thoracic aortic graft replacement, three patients died of catastrophic aortic rupture. All the other patients with emergency operation lived. In 164 medically treated patients, six patients (two distal arch aneurysm and four abdominal aortic aneurysm) underwent elective operation and one patients underwent urgent operation for rapid enlargement of ulcer like projection. In four patients complicated with visceral ischemia, two patients died. In 162 medically treated patients without the death of two patients for visceral ischemia, there was no in-hospital death.
Conclusions: Medical treatment of acute type B aortic dissection produced good outcome, but the lifesaving of cases with an intestinal necrosis was difficult. Emergency repair of acute type B aortic dissection with open stent graft placement via median approach will be useful for improvement of further operation results.

V12-9
ENDOVASCULAR MANAGEMENT OF PSEUDO-ANEURYSMS AFTER PREVIOUS SURGICAL REPAIR OF CONGENITAL AORTIC COARCTATION
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Objective: Whatever the surgical technique used, false aneurysm formation is one of the long-term complications of repair of aortic coarctation. Conservative management is associated with a 100% rate of rupture. The conventional surgical approach is complex and associated with high morbidity and mortality rates. We report our experience of endovascular management of pseudo-aneurysms after previous surgical repair of congenital aortic coarctation.
Methods: Between October 2005 and October 2006, stent-grafting of pseudo-aneurysms after previous surgical repair of congenital aortic coarctation was performed in four patients. Median age was 31.5 years (range: 24–38). Two patients had undergone two previous interventions. The last previous surgery consisted of graft interposition (n=2), subclavian flap aortoplasty (n=1), and aorto-aortic bypass (n=1). Median size of the pseudoaneurysm was 31.5 mm (range: 20–58). Mean time between the last surgery and endovascular treatment was 24 years (range: 3–32). One patient was treated emergently because of hemoptysis in relation with an aorto-bronchial fistula, the three other patients were treated electively. A transfemoral approach was used in all patients. The Zenith TX2 (Cook) thoracic stent graft was used in all the patients, one patient underwent previous dilatation at the coarctation level. When present, the ostium of the left subclavian artery was always covered (n=3).
Results: No major complication occurred during the procedure and no patient died during the follow-up. One patient presented a type II endoleak which spontaneously healed during the first month. Another patient with his left subclavian artery covered presented claudication of the left arm requiring a carotid-subclavian bypass. After a median follow-up of 7.5 months (range: 1–12.9), the patients were asymptomatic and CT-scans demonstrated complete exclusion of all treated postcoarctation aneurysms without recoarctation and without any stent-graft related complication.
Conclusions: The endovascular management of pseudo-aneurysms after previous surgical repair of congenital aortic coarctation is feasible. This approach was safe and effective. Long-term clinic and imaging follow-up is mandatory.

V12-10
ENDOVASCULAR INTERVENTIONS IN THE ABDOMINAL PORTION IN PATIENTS WITH DESCENDING AORTIC DISSECTION
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Objective: Despite successful endografting of thoracic aorta, in some cases, abdominal aorta dissection remains a problem. Endovascular stenting and fenestration are effective treatments for end-organ ischemia complicating abdominal aortic dissection. We describe endovascular treatment of ischemic complications and unstable dissection in the abdominal aorta.
Methods: Between 2000 and 2006, 22 patients (16 men, mean age 49, range 25–78) with descending aortic dissection underwent endovascular treatment in the abdominal portion of aorta. Treatment consisted of: stent implantation (seven patients), fenestration (n=8), covered stent implantation (n=4) and abdominal stent-graft implantation (n=6).
Results: Successful stent implantation restored flow (except one case) to the compromised aortic branch. In three cases of fenestration, release of malperfusion symptoms was achieved. In five patients preventive fenestration was performed prior to the thoracic stent-graft placement. Covered stent implantation resulted in: complete healing of dissection (n=1), sealing of the ruptured false channel (n=1), revascularization of an aortic branch (n=1), branch occlusion as a complication (n=1). Successful abdominal stent-graft implantation resulted in: complete healing of dissection (n=1), sealing of the ruptured false channel (n=1), significant decrease of flow entering the false channel (n=4). Three patients dies (one postprocedural and two late deaths).
Conclusions: Endovascular procedures are efficacious in treatment of symptomatic malperfusion complicating dissection of abdominal aorta. Preliminary results suggest that endovascular interventions are feasible and efficacious in treatment of unstable abdominal aortic dissection. There are limitations in complete exclusion of the false channel due to multiple re-entry sites.

V12-11
ENDOVASCULAR TREATMENT OF INFLAMMATORY ABDOMINAL AORTIC ANEURYSMS
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Objective: Inflammatory abdominal aortic aneurysms are rare and occur in 1–10% of the patients with AAAs. Perianeurysmal fibrosis with involvement of neighbouring viscera, which is often present in patients with inflammatory abdominal aortic aneurysms can make open repair technically difficult and therefore hazardous. For this reason, endovascular repair (EVAR) has been proposed as the preferred approach for this condition. However, it is known that EVAR may induce a systemic inflammatory response and it has not been

clearly established if the local response after stentgraft placement could exacerabate perianeurysmal fibrosis. The aim of the study was to evaluate the results of endovascular treatment of inflammatory abdominal aortic aneurysms in a single center.
Methods: A retrospective review of 505 patients undergoing endovascular abdominal aortic aneurysm repair during an 8-year period identified four (0.8%) cases of inflammatory abdominal aortic aneurysms confirmed on preoperative spiral computed tomography. All data were reviewed from a prospectively maintained database, hospital notes, and serial CT studies.
Results: Endovascular repair was successfully completed in all four inflammatory abdominal aortic aneurysms patients. There were three men and one woman among them. The mean age was 62 (range 53–69). All but one patients had had catheterization of ureters due to stenosis connected to perianeurysmal fibrosis prior to endovascular repair. Three Zenith and one Excluder bilateral stentgrafts were implanted. There were no perioperative complications. There was one early endoleak type II in a mean 15 months follow-up period. In one patient thrombosis of stent-graft arm occurred and it was cured by thrombectomy and implantation of wallstent endoprosthesis. No aneurysmal sac enlargement was observed. There were no evidence of perianeurysmal fibrosis exacerbation found in postoperative CT controls. Reduction of retroperitoneal inflammatory infiltration was noted in one case – the size of it was reduced of 7 mm within 4 months. In one of three patients, JJ-catheters were removed from ureters since there were no hydronephrosis found in this case.
Conclusions: Endovascular repair of inflammatory abdominal aortic aneurysms is feasible, excludes the aneurysm effectively with very low periprocedural and mid-term morbidity and low reintervention rate. The impact of endograft placement on perianeurysmal fibrosis is less clear, but in current study, there was no suggestion that the degree of perianeurysmal fibrotic infiltration worsens following endovascular repair.

V12-12
SUCCESSFUL REPAIR OF A GIANT ABDOMINAL AORTO-ILIAC ANEURYSM IN A JEHOVAH'S WITNESS
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Objective: We report the case of a 76-year-old man of the Jehovah's Witness faith. We believe this to be the largest successfully operated abdominal aneurysm presenting in a Jehovah's Witness. This is very unusual and remarkable combination.
Methods: A case study.
Results: The patient reported himself to be generally fit and well, apart from hypertension. Tenderness was elicited on the left side of abdomen; this seemed to be associated with a large pulsatile mass. He was comfortable at rest.
A CT scan of abdomen confirmed the presence of a large infra-renal abdominal aortic aneurysm extending into both common iliac arteries. The aortic component of the aneurysm at the bifurcation measured 15×8.8 cm. As the aneurysm extended into both common iliac vessels, the right common iliac artery had a maximum axial dimension of 8.0×8.0 cm, and the left measured 8.8×8.7 cm. There was no evidence of a leak or obvious rupture.
This was successfully operated using an aorto-iliac Y-graft bypass technique, without the use of stored allogenic blood. Cell saver technique and Recombinant human erythropoietin (rHuEPO; Epoetin beta) were used during peri-operative period. He had good postoperative care with a multidisciplinary approach.
Conclusions: Aortic aneurysm surgery can be undertaken successfully using cell salvage and auto-transfusion in those Witnesses who will accept it and erythropoietin given postoperatively may speed recovery. The case also shows the importance of postoperative care and multidisciplinary approach in critical cases.

V12-13
ANEURYSM OF THE SUBRENAL AORTA WITH RETROPERITONEAL FISSURE AND BILATERAL RENAL CYST AND PREOPERATIVE RENAL DYSFUNCTION: CASE REPORT
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Objective: We report a case of aneurysm of the subrenal aorta with retroperitoneal fissure and bilateral renal cyst and preoperative renal dysfunction.
Methods: A 75-year-old patient, diagnosed with bilateral renal cyst which led to progressive renal dysfunction, was admitted to the hospital with chronic back pain over a period of 2 weeks. Based on the CT scan, the patient was diagnosed with a 6 cm aneurysm aortic subrenal, a 7 cm left renal cyst and a 9 cm right renal cyst.
The patient had high creatinine levels, with peak values of 2.6 mg/dl and 1.9 mg/dl. The aneurysm was replaced by an aortoaortic with 24 mm Gealweave prosthesis.
Results: The aortic clamp time was 45 min and the blood loss was 225 ml. The total intervention time was 2 h 15 min. The operation led to the immediate disappearance of the symptomatology. The postoperative course of renal function was excellent and the patient recovered from surgery uneventfully. At discharge, after 10 days the patient had a creatinine level of 1.6 mg/dl.
Conclusions: It was suggested that the short clamp time and the minimal blood loss without hemodynamic instability in course of intervention were effective for prevention of renal dysfunction associated with fissured aortic abdominal aneurysm.

V12-14
LEFT SIDED INFERIOR VENA CAVA AND AORTOILIAC ANEURYSM
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Objective: Left-sided inferior vena cava has been well-described and occurs in 0.2–0.5% of the general population. In an adult population, the prevalence of major venous anomalies related to the abdominal aorta and iliac arteries and detected by CT scan is low.
Three pairs of primitive veins (postcardinal, subcardinal and supracardinal) appear in this order and give rise to the four segments of the adult inferior vena cava. Anomalies of the inferior vena cava result from failures of regression during embryogenesis, the left inferior vena cava results from the persistence of the left supracardinal vein along with regression of the right supracardinal vein.
We present a case of inferior vena cava on the left side diagnosed by abdominal CT scan during the study of an aortoiliac aneurysm with a succesful repair. The embriology, diagnostic and intraoperative management are discussed.
Methods: A 74-year-old man was admitted complaining of a pulsatile mass in the umbilicus. He had been treated for hypertension, COPD and dislipemia for years. A right carotid endarterectomy was made ten years ago. Physical examination reveal that the lungs were clear, heart sounds normal, and femoral and more peripheral pulses were palpable.
A computed tomography (CT) demonstrated an abdominal aortic aneurysm 5 cm in diameter, a single left-sided inferior vena cava was observed that began from the confluence of the left and right common iliac veins and ascended vertically to the left side of the abdominal aorta; after receiving the left renal vein, it crossed anterior the aorta and formed a normal right-sided suprarenal inferior vena cava.
At operation the vena cava crossing the aorta on the aneurysmal neck was found. The aneurysmal neck was visualized clearly drawing the vena cava over superiorly. The aneurysm was resected and a dacron bifurcating vascular prosthesis implanted.
Results: The patient was discharged on postoperative day 10 without incident and is doing well.
Conclusions: Prior to aortic surgery, preoperative knowledge of the presence of major venous anomalies helps with operative planning and may reduce the risk of major haemorrhage. If venous anomalies are recognized in time and treated correctly, the morbidity and mortality of aneurysm repair should not be influenced.

V12-15
COMPARISON OF TRANSPERITONEAL AND RETROPERITONEAL APPROACHES IN ABDOMINAL AORTIC SURGERY
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Objective: Transperitoneal approach (TP) to aorta is the most widely accepted surgical approach in aortic surgeries. In recent years, there has been an increasing interest in the retroperitoneal (RP) approach to the aorta. The

aim of this study is to compare the transperitoneal and retroperitoneal approaches in aortic surgery for aortoiliac occlusive disease (AIOD).
Methods: A total of 153 consecutive patients who had undergone aortic surgery for AIOD, were studied retrospectively. The TP approach was used in 85 patients and the RP approach was used in 68 patients. Demographic features, intraoperative and postoperative data were analyzed and compared according to method of approach.
Results: The mean operating time (83.6±23 vs. 104.4±30 min, $P<0.001$) and mean aortic cross-clamp time (18.4±3 vs. 15.2±3 min, $P<0.0412$) were significantly longer in the RP group. Perioperative blood loss (700±350 vs. 650±330 ml, $P<0.683$) and mortality rate=30 day (1/1.2% vs. 0/0.0%, $P<0.896$) were similar between the groups. The operative 30 day mortality rate was 0.7% (1 of 153) over-all. The RP group had a sooner return bowel functions (17.1±3 vs. 24.2±5 h, $P<0.001$), earlier resumption of diet (26.4±4 vs. 31.4±5 h, $P<0.001$), shorter period of intubation (3.5±2 vs. 6.5±3 h, $P<0.001$), ICU stay (1.5±1 vs. 4.2±1 h, $P<0.001$) and hospital stay (4.0±1 vs. 5.9±1 days, $P<0.001$). Mean effort-pain scores were significantly lower in the RP group (3.8±1 vs. 5.3±1, $P<0.001$). Incidence of pulmonary complications (4.4%, 3 of 68 vs. 7.3%, 8 of 85, $P<0.001$), paralytic ileus (1.5%, 1 of 68 vs. 3.5%, 3 of 85, $P<0.001$) were also lower in the RP group. However, wound complications were more common in the TP group (4.7%, 4 of 85 vs. 10.3%, 7 of 86, $P<0.001$). Most cases in either group were related to incisional hernia or evisceration.
Conclusions: This report presents our experience with the use of TP and RP approaches in a patient population merely consisting of AIOD. The RP approach was associated with a significantly lower incidence of postoperative pulmonary complications, rapid recovery of gastrointestinal functions, shorter ICU and hospital stay, less perioperative blood loss and lower mean effort-pain scores. We conclude that the RP approach is a safe and feasible technique that exposes patients to less postoperative complications.

V12-16

EPIDURAL ANESTHESIA AND MINI LAPAROTOMY FOR THE TREATMENT OF ABDOMINAL AORTIC ANEURYSMS IN PATIENTS WITH SEVERE CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: The purpose of this study is to compare the use of epidural and general anesthesia techniques in the treatment of abdominal aortic aneurysms (AAA) through minilaparotomy in patients with severe chronic obstructive pulmonary disease (COPD).
Methods: Between March 2002 and October 2005, 23 patients with severe COPD underwent elective infrarenal abdominal aortic aneurysm repair. Endovascular therapy could not be established due to financial reasons and health insurance policies. All the operations were performed through minilaparotomy, under epidural anesthesia in 10 (Group I) and general anesthesia in the remaining patients (Group II). Pulmonary disease was diagnosed by clinical history and pulmonary function tests. The diagnosis of severe COPD was executed with the presence of one or more of the following criteria: Room air PaO_2=60 mmHg, $PaCO_2$=45 mmHg in arterial blood gas samples, FEV1=50% of predicted value and FVC=75% of predicted value in respiratory function tests.
Results: There was no significant difference between the age, sex, preoperative morbidity status, operation time and total blood loss of the patients in both groups. Postoperative intensive care unit requirement, postoperative pulmonary complications and hospital stay were significantly higher in group II. All patients tolerated surgery safely. There was one in-hospital mortality on the 35th postoperative day due to prolonged entubation and sepsis related with pulmonary infections, from group II. There was no late morbidity or mortality related with the technique in the postoperative follow-up period of the discharged patients.
Conclusions: Epidural anesthesia for abdominal aortic aneurysm repair through minilaparotomy is feasible and should be especially considered in patients with severe COPD where endovascular treatment could not be performed.

V12-17

DOES PEAK WALL STRESS CORRELATE BETTER WITH ABDOMINAL AORTIC ANEURYSM EXPANSION THAN AORTIC DIAMETER?

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Objective: Level 1 evidence clearly supports ultrasound surveillance in abdominal aortic aneurysm (AAA) <5.5 cm in maximum AP diameter, with scanning interval set according to the size of aneurysm. Larger aneurysms tend to expand at a greater rate than smaller aneurysms. However, AAA expansion is variable and difficult to predict, and size may not always predict expansion. We aimed to assess whether peak wall stress (PWS) measured through finite element analysis, correlates better with AAA expansion.
Methods: Thirty-eight patients, 31 men, median age of 76.5 (range 54–93) years, currently under AAA surveillance were studied. All patients underwent abdominal CT scan to characterise the aneurysms and measure PWS through finite element analysis. Expansion rates were derived from sequential ultrasound scans. Correlation between PWS and expansion rate, as well as between size and expansion rate was analysed using Spearman Test (SPSS for Windows v14).
Results: Mean aortic diameter was 4.68±0.74 cm and mean PWS was 0.41±0.14 MPa. Spearman rank order correlation coefficient (rs) of PWS and AAA expansion rate was 0.28 (P=0.08).
Spearman rank order correlation coefficient (rs) of aorta AP diameter and AAA expansion rate was 0.17 (P=0.30).
Conclusions: In this cohort of patients the correlation between PWS and AAA expansion rate was not significant however, the correlation was superior to that between AAA diameter and expansion rate, and this deserves further investigation.

V12-18

MANAGEMENT OF CHYLOUS ASCITES AFTER ABDOMINAL AORTIC SURGERY

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Objective: Chylous ascites is defined as accumulation of lymphatic fluid from the lymphatic vessels in abdominal cavity. It is a rare but potentially devastating and morbid complication of abdominal aortic surgery. Untreated, can be fatal, with patients dying from severe fluid and electrolyte abnormalities, malnutrition, and overwhelming infections, including peritonitis.
Methods: On 1 January 1996, a comprehensive data base was created that prospectively recorded pertinent information on all patients with chylous ascites after abdominal aortic surgery evaluated at the Clinic for Vascular and Transplant Surgery, Clinical Center Vojvodina in Novi Sad. These data were analyzed retrospectively. During this 10-year period, consecutive patients with chylous ascites after abdominal aortic surgery were evaluated using a standardized protocol.
Results: From 1996 to 2006, we treated eight cases of chylous ascites after operations on the abdominal aorta. There were seven men and one woman, with a mean age of 64 years (range: 46–82 years). Five cases (62.5%) occurred after abdominal aortic aneurysm resection, two (25%) after aorto-bifemoral bypass for occlusive disease, and one (12.5%) after resection of infected aortic grafts. Abdominal distention was the most common presenting symptom, occurring in seven of eight patients. The mean time from aortic operation to the development of symptoms was 15.5 days (range: 11–35 days). Diagnosis was confirmed by abdominal ultrasound and paracentesis, which yielded lipemic, sterile fluid in all patients. Therapeutic paracentesis was not successful when used alone, but, when combined with a medium-chain triglyceride (MCT) diet or total parenteral nutrition (TPN), it resulted in resolution of chyloperitoneum in two patients (25%). TPN alone or with paracenteses and/or diuretics was successful in two (25%) patients. Peritoneovenous shunt resolved chylous ascites in one patient not responding to diet and/or TPN. Operative ligation of the injured lymphatic channel was successful in all three (37.5%) patients treated by laparotomy when nonoperative efforts failed. Chyloperitoneum resolved in all but one (12.5%) patient. There were no death directly related to chylous ascites.
Conclusions: We reached the following conclusions: (1) Chylous ascites is a rare complication of aortic surgery; (2) The diagnosis is easily confirmed by paracentesis; (3) Nutritional intervention remains the mainstay of nonoperative treatment; (4) Repeated paracentesis should be avoided because several reasons; (5) Surgery is undertaken when conservative therapies fail; (6) Contraindications to surgical correction of chylous ascites are based on the patient's comorbidities and his or her ability to tolerate surgery.

V12-19

STANDARD OPEN REPAIR VS. MINILAPAROTOMY APPROACH FOR ABDOMINAL AORTIC ANEURYSMS: WHAT IS THE BEST APPROACH IN PATIENTS WITH ISCHEMIC HEART DISEASE?

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Objective: The beneficial effects of minilaparatomy approach in patients undergoing abdominal aortic aneurysm (AAA) repair have been defined. In this respect, we compared treatment outcome and procedure-related mortality rates of minilaparotomy technique with those of open standard repair in patients with ischemic heart disease.

Methods: We retrospectively reviewed data on 212 patients who underwent elective AAA repair via a minilaparotomy approach at our institution over an 8-year period from February 1995 to January 2003. The clinical study included 46 patients who have only ischemic heart disease as a sole risk factor. This group was matched in a case-control fashion to a group of 57 patients with similar characteristics who were operated via standard median laparotomy. All available clinical, pathologic and postoperative data were reviewed and analyzed for postoperative outcome.

Results: Mean operative times in mini- and standard laparotomy groups were 190±26 min and 165±15 min, respectively (P=0.32). Aortic clamping times did not differ significantly between two groups (61±12 min vs. 53±10 min, P=0.43). Blood requirement was lower in minilaparotomy group. Five patients (8.7%) in the standard median laparatomy group died, while one death (2%) occurred in the other group (P<0.01). In patients who have undergone traditional repair, five patients suffered from myocardial infarction and four patients required prolonged mechanical ventilation. No coronary ischemic event was noticed in minilaparotomy patients. The minilaparotomy group had significantly shorter lengths of hospital (6.2±1.1 vs. 9.3±2.8 days, P=0.03) and intensive care unit stays (7.8±2.3 vs. 14.5±3.2 h, P=0.01). Duration of adynamic ileus (1.9±0.6 vs. 2.8±1.1 days, P=0.02), return to normal diet (3.2±1.0 vs. 4.6±1.3 days, P=0.01) and day of ambulation (1.5±0.3 vs. 3.2±0.7 days, P=0.001) were significantly lower in the minilaparotomy group. The standard median laparotomy group was twice as costly as the minilaparotomy group (3200±600 vs. 5900±900 $, P=0.001).

Conclusions: The minilaparotomy technique has advantages that include less postoperative morbidity and mortality rates, early resumption of intestinal functions, reduced cost, decreased length of stay in the intensive care unit and hospital. Therefore, we believe that this approach is still a valid alternative approach in the treatment of patients with AAA having ischemic heart disease as a risk factor.

V12-20

OUTCOME OF COMMON ILIAC ARTERIES AFTER INFRARENAL ABDOMINAL AORTIC ANEURYSM REPAIR

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Objective: Introduction: The use of aorto-aortic grafts for the treatment of infrarenal abdominal aortic aneurysms (AAA) has some advantages in relation to the use of bifurcated grafts. The development of iliac aneurysms is one of the possible complications, being this the objective of our study.

Objective: Evaluate the development of aneurysms in common iliac arteries (CIA) in patients with an aorto-aortic bypass due to the treatment on an AAA. Analyze those factors that contribute to their expansion.

Methods: Between January of 1995 and December of 2005, 41 patients (middle age: 66.9) underwent surgery for the treatment of an AAA using a tube graft. The middle follow-up was of 56.9 months. Age, cardiovascular risk factors, concomitant illness, follow-up and diameter of the AAA, celiac aorta and CIA were analysed as factors that could contribute to the expansion of CIA. Statistical analysis of qualitative variables was made with χ^2 test and Kruskal Wallis test was used for quantitative variables.

Results: Patients with CIA bigger than 18 mm in the preoperative scanner, had greater expansion than patients with CIA smaller than 18 mm (P=0.01). Factors that contributed to this expansion were: diameter of the AAA (P=0.025), follow-up (P=0.020), high blood-pressure (P=0.015) and chronic obstructive pulmonary disease (P=0.015).

Conclusions: Patients with CIA inferior to 18 mm should undergone aorto-aortic bypasses for the treatment of an AAA.

In patients with CIA between 18–30 mm and diameter of AAA bigger than 61 mm, high blood-pressure, chronic obstructive pulmonary disease or life expectancy longer than five years, a bifurcated graft would be the best choice.

V12-21

PERCUTANEOUS EMBOLISATION OF VISCERAL PSEUDOANEURYSMS: MEDIUM AND LONG-TERM RESULTS

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Objective: To evaluate the efficacy and long-term results of percutaneous treatment of visceral pseudoaneurysms.

Methods: Fifty-five patients with visceral pseudoaneurysms were treated with percutaneous embolization. Pseudoaneurysms were located in the extrahepatic region (n=11), intrahepatic region (n=8), hepatic vein (n=2), splenic artery (n=9), superior mesenteric artery (n=3), celiac trunk (n=1), left gastric artery (n=1), subclavian artery (n=3), carotid artery (n=1) and renal artery (n=17).

Embolizations were performed using different materials: coils, gelfoam, plug, alcool, thrombin glue, alone or in combination depending on the morphological aspect of the lesion.

Results: Embolization was successfully performed in 52/55 patients (94.5%). In three cases the procedure was not completed for the presence of a too difficult anatomy.

In two cases a re-intervention was necessary to obtain the complete resolution of the pseudoaneurysm. In three cases (5.5%) the treatment resulted incomplete, while in two cases (3.6%) a surgical intervention was also necessary to obtain the complete resolution of the psedoaneurysm. One patient (1.8%) died for the rupture of the pseudoaneurysm after an incomplete embolization and before surgical intervention.

After a mean follow-up of 9.3 months, all patients are alive with complete exclusion of the aneurysmatic sac.

Conclusions: The percutaneous embolization of the visceral pseudoaneurysms represents a safety and efficacy procedure to obtain the complete exclusion of the sac reducing the high mortality rate of surgical intervention.

V12-22

VISCERAL ARTERY ANEURYSMS

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Objective: Visceral artery aneurysms are rare vascular malformations and the literature lacks satisfactory general information about the pathology. The aim of this study was to review our experiences in the diagnosis and treatment of visceral artery aneurysms.

Methods: We retrospectively reviewed data on ten patients who were diagnosed as visceral artery aneurysms at our institution between June 2002 and September 2005. All available clinical, pathologic and postoperative data were reviewed and analyzed for postoperative outcome.

Results: Four splenic artery aneurysms, two hepatic artery aneurysms, five renal artery aneurysms, one superior mesenteric artery aneurysm and one inferior mesenteric artery aneurysm, in total of 13 visceral artery aneurysms were diagnosed in ten patients. All the patients were treated except one patient with bilateral renal artery aneurysms. One patient required emergent surgical treatment due to splenic artery aneurysm rupture. Only one patient underwent endovascular treatment i.e. coil embolisation for superior mesenteric artery aneurysm, otherwise all the patients were treated surgically on elective basis. Surgical treatment modalities included ligation with exclusion in four patients (two splenic artery aneurysms, one renal artery aneurysm, one hepatic artery aneurysm) and resection with revascularization in four patients (one splenic artery aneurysm, two renal artery aneurysms, one hepatic artery aneurysm, one inferior mesenteric artery aneurysm). Histopathologic examination of the vascular materials revealed atherosclerotic changes majerly except one showed inflammatory vasculitic

changes. One patient required bleeding revision and mortality did not occur in any of the patients.
Conclusions: Visceral artery aneurysms are rare and potentially life threatening vascular disorders. The number of cases diagnosed every year increases with advanced radiologic diagnostic methods and screening programs. Careful consideration and early management of these malformations is life saving.

V12-23
EXPERIMENTAL STUDY OF EFFECTIVE APPLICATION METHOD OF BIOLOGICAL GLUE
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Objective: In order to evaluate the most effective methods of fibrin glue as a haemostatic sealant, we experimentally investigated differences in the hemostatic effect due to differences in the application method, waiting time after application, and temperature environment using Bolheal®.
Methods: Three needle holes were made on the polytetrafluoroethylene graft was used. The end of it was connected to a syringe type infusion pump and the other end was connected to a monometer. The pressure was measured after leaking solution from any area of needle hole. Fibrinogen solution (A, 0.3 ml) and thrombin solution (B, 0.3 ml) of the fibrin glue was applied on the needle holes by the following four methods. Protocol 1) Group 1 (n=6): dripping methods: dripping solution A and B respectively. Group 2 (n=6): spray method: spraying A and B solutions simultaneously using an application nozzle at a pressure of 0.75 mmHg atmospheres. Group 3 (n=6): rub-and-spray method: rubbing solution A on the needle holes, then spraying A and B solutions using an application nozzle. Group 4 (n=6): rub-and-rub method: rubbing solution A on the needle holes, then rubbing solution B. In order to evaluate haemostatic sealant under different waiting time (30 s, 1, 2, 3 min) as a protocol 2 and temperature (15, 25, 35) as a protocol 3, two groups (group 3 and 4) were conducted.
Results: Protocol 1) The pressure tolerance value was 22±8 in Group 1, 64±10 in Group 2, 109±16* in Group 3, and 113±7* in Group 4, showing significantly higher values in Groups 3 and 4 (P*<0.05 vs. Groups 1 and 2). Protocol 2) The pressure tolerance values in Groups 3 and 4 were 27±8 and 39±6 at a waiting time of 30 s, 67±10 and 47±9 at 1 min, 78±10 and 91±16 at 2 min*, and 109±16 and 113±7, respectively (the results of Protocol 1), at 3 min*, showing that the pressure tolerance increased with prolongation of the waiting time, and significant differences were noted between the values at 2 min or longer and at 30 s (P*<0.05 vs. 30 s). Protocol 3) No significant difference due to temperature was noted in the two groups.
Conclusions: Compared to the current dripping and spray methods, more effective hemostasis could be obtained by rubbing.

V12-24
SPONTANEOUS RECTUS SHEATH AND RETROPERITONEAL HEMATOMA CAUSED BY SINGLE DOSE TINZAPARIN THERAPY
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Objective: Low molecular weight heparins (LMWHs) are the mainstay of both the prevention and therapy of acute venous thromboembolic events (VTE). In recent years, LMWHs have been widely tested in several studies. Daskalopoulou and colleagues described the effectiveness and safety of LMWH tinzaparin sodium for long-term deep venous thrombosis therapy (DVT).
Retroperitoneal and rectus sheath hematoma (RSH) has been described with the use of nadroparine, enoxaparin and dalteparin (2.3). RSH has been described in the literature in relation to anticoagulant therapy, hematological disorders, trauma, physical exercise, coughing, sneezing, pregnancy, and hypertension. The most frequent predisposing factor is anticoagulant therapy, and the most important precipitating factor is coughing.
We report a patient with no known risk factors for bleeding, who developed a rectus sheath and retroperitoneal hematoma after being treated with a single dose of tinzaparin for acute deep venous thrombosis of the left lower limb.
Methods: A 72-year-old woman was admitted to our clinic with acute deep venous thrombosis. She was started on a therapeutic dose of tinzaparin, one dose daily. After the single dose of tinzaparin applied subcutaneously on her admission, she complained of the sudden onset of severe pain in the left lower quadrant. A multi-slice spiral computerized tomography scan of the abdomen with contrast showed a mass of homogeneous density in the left rectus sheath with extravasated contrast and a downward extension of this hematoma into the intra- and retroperitoneal area. Her tinzaparin was stopped, and she was transfused with five units of packed red cells. An IVC filter was applied to the inferior vena cava in order to prevent pulmonary embolism.
Conclusions: In conclusion, early diagnosis of hematomas can be achieved and conservative treatment applied in large hematomas, and surgical intervention can be avoided in patients given anticoagulant therapy. An IVC filter may be used in these patients to allow a break from anticoagulant therapy or if it is contraindicated.

V12-25
INTRAMURAL HEMATOMA OF AORTA AS A COMPLICATION OF WARFARINATION
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Objective: Warfarin is used in the treatment of many diseases and has well known adverse effects, mainly haemorrhagic, which become increasingly common in patients over the age of 75 years. It is well documented that the margin between safety and risk narrows in this age group. We describe here a patient with a serious haemorrhagic complication which has not been previously reported.
Methods: An 87-year-old man was brought to emergency department with acute aortic syndrome. He had senile demantia and a history of pulmonary embolism. He was maintained on warfarin therapy three months prior to thia accident. The laboratory test revealed prolonged prothrombin time (INR prolonged to 4.44). A computed tomographic scan of the chest revealed intramural hematoma of the entire aorta. Because of old age and co-morbidity, conservative treatment was adapted successfully for type A dissection.
Results: After normalization of INR, he was discharged instable condition. Two months later, follow-up CT scan revealed completely healed intramural hematoma.
Conclusions: We describe a previously unreported complication of warfarin therapy in a patient over 75 years of age, to add to the cautions in prescribing this drug in patients of this age group.

V12-26
OCCLUSIVE ARTERIAL DISEASE AFTER RADIOTHERAPY FOR TESTICULAR CANCER: CASE REPORT
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Objective: Radiation injury to arterial occlusion is a rare and late complication of radiotherapy. Numerous adverse reactions may occur sary to radiation therapy. A well-known side effect is radiation induced occlusive lesions and the enhancement of normally occurring atherosclerosis. We report a case of symptomatic right iliac and femoral artery occlusion after radiation therapy for carcinoma of the testis.
Methods: A 60-year-old male had been treated with ionizing radiation for testis carcinoma 20 years before. He was admitted to our clinic for rest pain, numbness, and weakness of the right lower extremity. In physical examination, no arterial pulse was detected in the affected extremity and ankle/brachial pressure index was 0.4. Selective lower extremity angiography demonstrated complete occlusion of the right distal external iliac, common and proximal superficial femoral artery occlusion, which was presumed to be the result of previous radiation therapy (Figure-1A-B). Coronary, carotid, and upper extremity angiography were normal. All routine blood tests were normal.
Results: Patient was treated surgically under general anesthesia. Iliofemoral bypass was performed with polytetrafluoroethylene (PTFE) graft. The specimen from the femoral artery was sent for histopathologic examination. Immediate success was obtained and we did not observe any vascular problems. Histopathologic examination of the resected arterial sections revealed fibrotic changes in the intima, media and thrombotic changes in the vessel lumen. The patient was discharged on the 6th postoperative day with no sign of lower extremity ischemia.
Conclusions: In conclusion, different mechanisms of injury leading to arterial occlusion have been proposed. The symptoms vary in type and severity, but are consistent with peripheral arterial occlusive disease. To alleviate symptoms and prevent limb loss, reconstructive vascular surgery is advocated.

V12-27

SURGICAL TREATMENT OF RENOVASCULAR HYPERTENSION IN 44 PATIENTS WITH HOSTILE AORTA AND/OR RENAL ARTERY LESIONS

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Objective: Aorto-renal bypass is a primary method for reno-vascular hypertension (RVH) treatment in patients after unsuccessful transcutaneous angioplasty. This procedure cannot be accepted in patients with high operative risk and/or in those with hostile abdominal aorta or renal artery branches lesions.
The purpose of our study was to evaluate the surgical treatment results of alternative to aorto-renal bypass methods.
Methods: From 1980 to 2006, we have performed a total of 164 revascularization operations in 156 patients with ischemic kidneys. In 28.2% of them (*n*=44) the alternative surgical methods were performed. The indication for surgery in 24 patients was renal insufficiency due to ischemia and in 20 - uncontrolled pharmacologically hypertension. The selection of the alternative surgical technique depended on location of atherosclerotic lesions. In cases with advanced atherosclerosis or aneurysm of the abdominal aorta, non-anatomical grafts were performed: hepato-renal (*n*=16), spleeno-renal (*n*=11), ilio-renal (*n*=1), supradiaphragmatic aorto-renal (*n*=1) grafts. In patients with severe lesions located in renal arteries or their branches, the extracorporeal reconstruction of the vessels following auto transplantation were performed (*n*=15).
Results: The short and long-term follow-up was based on arterial pressure measurements and serum creatinine levels. Graft and renal artery patency were evaluated using Duplex-Doppler scan or angio-CT.
Complete recovery or clinical improvement were observed in 84% of patients.
Conclusions: Alternative to aorto-renal bypass methods are effective in the RVH and nephropathy treatment in patients with atherosclerotic lesions in the abdominal aorta and/or in renal artery.

V12-28

PREVENTION OF THE ENDOLEAK TYPE II, IN THE ENDOPROSTHESES IMPLANTATION WITH THE INJECTION OF THE THROMBOTIC SUBSTANCE IN THE ANEURYSMATIC SAC

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Objective: The EVAR is predicated on elimination of arterial perfusion from the aneurysm sac. Continued arterial perfusion of the aneurysm sac may occur, however, after EVAR. This persistent perfusion has been termed endoleak and has been observed in different clinical trials involving endovascular stent repair. We have a experimental study in the pig for evaluation of the situation of the sac after the injection of the fibrin for provocation of the sealed periprostheses space.
Methods: Twelve Landrace pigs were used in this study. The abdominal aorta was exposed from the level of the renal arteries to the aortic trifurcation. After clamping, a longitudinal aortotomy was performed with sufficient length to close the arteriotomy, with a fascial of bovine pericard patch angioplasty of the infrarenal aorta create an abdominal aorta aneurysm. Before to close the arteriotomy a pressure sensor monitoring device of telemetry signals was implanted into surgically created aneurysm sac. The postoperative maduration period a month. After this period, the animals are anesthetized in similar condition of first time and for femoral arteriotomy is placed a Wall-graft 8 mm of diameter between the proximal and distal necks with the exclusion of the aneurysm sac in the. In the implantation of the grafts in the half of the animals were performed with the implantation of a catheter into the sac for the injection of the glue solution (Glublan R2) for provocation the thrombosis into the sac. The evaluation is performed one month after with angiogram study and Duplex ultrasonography evaluation.
Results: Experiments were completed in al twelve pigs. The study show that in a 60% of the animal with the injection of glue in the sac is detected as a thrombosis and occlusion of the sac with exclusion of the lumbar and collaterals vessels. In the group without injection of the thrombin injection only the 10% of the collateral vessels are closed. The thrombus detected in the sac is a red thrombus with a medium organization with fibrin solidified.
Conclusions: These findings suggest that embolization of the perigraft endoleaks, which results in thrombosis of both the endoleak and the aneurysm sac, should prevent the course of progressive aneurysm growth and rupture. Clinically an open endoleak and thrombosed aneurysm sac may be created by inducing thrombosis of the aneurysm with a glue insertion into the sac into the sac during initial stent-graft treatment.

V12-29

MICROVASCULAR ANASTOMOSES OF FREE ILEO-CAECAL FLAP TRANSFER ALLOW FOR IMMEDIATE VOICE RESTORATION IN PATIENTS AFTER ABLATIVE SURGERY IN THE NECK

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Objective: Patients with total pharyngo-esophageal reconstruction due to advanced hypopharyngeal carcinoma have remained a challenging field in digestive surgery. Modern microvascular anastomose techniques have started a new period in reconstructive cancer surgery. We introduced program of free ileocaecal segment transfer for such reconstruction.
The aim of our study is to evaluate the efficacy of vascular anastomoses used to maintain viability of transferred flaps.
Methods: One-stage free microvascular ileocaecal segment transfer after circumferential laryngo-hypopharyngo-esophagectomy were performed in 12 patients. Advanced squamous carcinoma (T3, T4) of hypopharynx was the indication for surgery in all cases. There were nine male and three female patients. The ages ranged from 38–63 years (mean of 52.2 years). Free ileocaecal flap auto transplanted to the neck consisted of pharyngo-caecostomy, caeco-esophagostomy, ileo-tracheostomy, and permanent tracheostomy. The following anastomoses were performed under a microscope: end-to-side anastomosis between ileocolic vein and internal jugular vein, and end-to-end anastomosis between ileocolic artery and superior thyroid artery, lingual artery or end-to-side anastomosis with external carotid artery.
Results: The most common intraoperative complication was graft ischemia related to the microvascular anastomosis insufficiency or kinking of the vessels. This complication was observed in two patients. All failures were repaired immediately with reanastomosis.
Also, the most common complication after surgery was graft necrosis due to vessels thrombosis – three patients (on 7th, 11th and 29th postoperative day) resulted in graft removal. New autograft was not performed because of infection or patient general condition. Reconstruction with musculo-cutaneous flaps were performed in two patients few weeks later.
The power of speech due to Bauhini valve vibration was restored in nine patients immediate after reconstructive surgery. The intelligibility of speech ranged between 55–70%.
Conclusions: Despite a relatively high rate of ischemic complications, we believe that the most important benefit of microsurgical reconstruction is that it allows for one-stage operation, early adjuvant radiation therapy, immediate restoration of swallowing and good voice function. Although some patients with an advanced hypopharyngeal squamous carcinoma have a poor prognosis, this technique allows a better quality of life for a probable short life span.

V12-30

ANGIOGENESIS STIMULATION USING GENE TRANSFER FOR COMPLEX TREATMENT OF CHRONIC LOWER LIMB ISCHEMIA: PRELIMINARY RESULTS OF CONTROLLED CLINICAL STUDY

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Objective: To improve results of lower limb ischemia treatment using gene transfer of vascular endothelial growth factor (VEGF) and angiogenin (ANG).
Methods: Overall 42 patients with distal forms of lower limb arterial occlusive diseases were included in the study. Study group consisted of 26 patients (22 male, 4 female) aged 40–70 years, maximal distance to pain ranged from 40–160 m. Four patients had small trophic ulcers on toes. Duplex scanning, tredmil-test, angiography, percutaneous detection of tissue oxygen tension, radionuclide imaging were made in all the patients before and after gene transfer procedures. Original gene constructions (naked and adenoviral recombinant plasmids) with VEGF (ten patients), ANG (13 patients) and their combination

(three patients) were administered by percutaneous intramuscular injections into tibial muscular group of affected lower extremity. This procedure was independent method of treatment in ten patients (subgroup A), in the others 16 patients (subgroup B) this method was complementary to femoro-popliteal autovenous bypass (14) and arterialization of calf and foot superficial venous blood system (2). Control group consisted of 18 similar patients treated only with traditional conservative or surgical methods.
Results: There were no major side effects in our study.
Long-term results were assessed in 35 (83.3%) patients, the follow-up ranged from 6–30 months. All the patients of subgroup A demonstrated positive clinical results: increase of distance to pain in 3–5 times, healing of trophic ulcers. Special methods of examination revealed increase of ankle-brachial index (P=0.06), tissue oxygen tension (P<0.05), perfusion of lower extremities muscles (P<0.05), and reduce of restoration time during tredmil-test (P<0.01). Patients of the subgroup B demonstrated better results of the same methods of special examination (including quality of life indices) compared with similar patients undergone only reconstructive vascular operation. Patients with initial II stage of ischemia demonstrated the better results than ones with III stage.
Conclusions: Complex surgical treatment of chronic lower limb ischemia using angiogenic genes transfer can be considered as a path leading to improvement of surgical treatment results in the patients with distal forms of lower limb arterial occlusive diseases.

May 20, 2007 4th Congress Day
11:00–12:30
13th Vascular Scientific Session - Vascular Minipresentation II

V13-1
PREVENTION OF KIDNEY INJURY AFTER ACUTE ISCHEMIA WITH THE ADMINISTRATION OF PROSTAGLANDINS: (PGE1 AND ALFADEX, CYCLIC GLUCOSE OLIGOMER)
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Objective: There are occasions when the kidney is subjected to more or less prolonged periods of ischemia, after which a cell lesion occurs which manifests clinically as acute renal failure. The purpose of this paper is to quantify morphologically the cell protection provided by PGE1 for the renal glomerulus after a period of normothermal acute renal ischemia.
Methods: Seventy male adult Wistar rats were used. All of the animals underwent solitary, right-sided nephrectomy. They were divided into two groups: one group was perfused with PGE1 and the other with saline solution immediately after triggering acute renal ischemia with a non-traumatic artery clamp. The periods of ischemia were 15 min and 1 h. The recovery periods ranged between 24 h and 7 days. At the end of this period, the animals were anesthetized and killed. Both the right (control group) and left (test group) kidneys have been studied histologically and morphometrically.
Results: Mortality during the study was 31% (18.5% in the PGE1 group and 11.4% in the saline group). The weight of the test kidneys treated with saline was greater than in the PGE1 group (1.771±0.455 g and 1.55±0.34 g, respectively). After 30 min of ischemia, acute tubular necrosis lesions were observed, being more marked in the group treated with saline than with PGE1.
From the morphometric viewpoint, no significant differences were found between the control group (normal) and the test group treated with PGE1 in terms of glomerular diameter (P<0.101), roundness factor (P<0.239), glomerular perimeter (P<0.092) and glomerular volume (P<0.059), while significant differences were found between the control group and the saline group in terms of area (P<0.000), diameter (P<0.000), perimeter (P<0.000) and volume (P<0.000).
Conclusions: The increase in renal weight found after ischemia is less in the PGE1 group than in the saline group. This was because of the reduced edema formation in the renal parenchyma as a result of the cytoprotective and anti-inflammatory effect of PGE1. Compared with saline, PGE1 has a cytoprotective effect that can be measured morphometrically, although it can be considered moderate.

V13-2
A STUDY OF THE EFFECTS OF CLOPIDOGREL AND ASPIRIN ON ARTERIAL WALL AFTER INTIMAL INJURY IN HEALTHY AND ATHEROMATOUS ANIMALS
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Objective: The purpose of this research work was to evaluate experimentally the effects exerted by an atherogenic risk factor-high fat diets- on the development of atheromatous lesions of the arterial wall induced by traumatic intimal injury treated with aspirin or clopidogrel.
Methods: The study involved a sample of 72 Spanish Giant-New Zealand rabbits 75 mg which were divided into two groups of 32 animals per group; one was fed on a normal diet and the other one received an atherogenic diet for 30 days. These groups were divided into two subgroups of 18 animals each one, in one of these subgroups intimal injury was induced by a Fogarty balloon catheter 3 Fr and in the other one no injury was induced. Finally each subgroup of 18 animals were divided into three subgroups of six animals per group treated with clopidogrel, aspirino placebo respectively for 30 days. A clinical evaluation, a mortality rate, a permeability rate, a microscopic analysis, a morphometric analysis and an analysis of variance were made, considering significative differences when P<0.05.
Results: In the subgroup fed on atherogenic diet and with intimal injury induced, the treatment with aspirin or clopidogrel gave less intensive lesions though it was not possible to observe whether one had major benefits than the other one.
Conclusions: The treatment with aspirin or clopidogrel has a beneficial effect in the prevention of the development of both the lesions in the vases by atherogenic diets and the thrombotic events caused by intimal injury.

V13-3
WEGENER'S GRANULOMATOSIS: UPPER LIMB ISCHEMIA
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Objective: Presentation of a rare clinical case of a patient with Wegener's Granulomatosis and upper limb ischemia.
Methods: A 55-year-old male, with non-insulin-dependent diabetes (for 10 years), high cholesterol, former tobacco abuse, presented in August 2004 with fever, fatigue, anorexia, malaise, myalgias, arthralgias, non-productive cough and occasional epistaxis, starting two weeks before.
The patient was first admitted in a small district hospital, under the care of the internal medicine department. The chest X-ray and the thorax Computerized Tomography Scan revealed parenchymal nodular densities in the left lung. The blood analysis showed a high white blood cell count and a high C-reactive protein serum level. The other biochemical parameters were within normal reference values. The first interpretation was pulmonary tuberculosis, so the patient was admitted and initiated standard medication, with no success. The patient was then transferred to a central hospital, under the care of the Pneumology Department, and submitted to a nasal mucosal biopsy, which supported the diagnosis of Wegener's Granulomatosis. A pulmonary parenchyma biopsy was suggested, however the patient refused it. The patient was medicated with corticosteroids and had a very good clinical response.
In April 2005, he was first evaluated by the Angiology and Vascular Surgery Department of Centro Hospitalar Vila Nova de Gaia. He complained of left upper limb claudication and lack of muscular strength in the arm and forearm, for five months. The patient presented ischemic ulceration in the 2nd to 5th left fingers, with focal necrosis, dating back to the last 15 days. He also complained of left upper limb coldness and rest pain for the previous 48 h. There were no palpable brachial, radial or cubital pulses. No brachial, radial or cubital doppler signs were detected.
Results: The patient underwent an angiographic examination that revealed left axilar artery occlusion and brachial thrombosis. A left subclavian-radial bypass with inverted left greater saphenous vein was performed. In the early postoperatory, the patient had brachial and radial palpable pulses, and bi-phasic cubital flow at doppler examination. At the discharge, the radial systolic blood pressure was symmetric.
In the present time, the patient is completely asymptomatic and there was a complete healing of the ischemic lesions.
Conclusions: The diagnosis of Wegener's Granulomatosis is a difficult one. The amount of clinical symptoms is enormous. This is a rare clinical case with an interesting and challenging diagnosis of a small-vessel vasculitis affecting a large artery in the upper limb.

V13-4

LATE DILATION OF CRYOPRESERVED ARTERIAL ALLOGRAFTS. OUR EXPERIENCE

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Objective: To review our experience with cyopreserved allografts in aortic and femorodistal arterial reconstruction. To determine late dilation of these allografts in follow-up.
Methods: From 2000 to 2006, twenty-four patients underwent arterial surgery revascularisation with 96 cryopreserved segments. Nineteen patients with critical limb ischemia underwent distal revascularisation because of absence of ipsillateral internal saphenous vein. Also, five patients, one sary aortoenteric fistulae and four graft infection of the abdominal aorta, underwent in situ repair with cryopreserved arterial allografts.
Results: Twenty-four patients with a mean age of 73-year-old underwent cryopreserved allograft revascularisation. Follow-up was done with CT scan in case of aortic surgery and ultrasound in case of distal revascularisation. One patient with anterior tibial artery revascularisation had a dilation of the cryopreserved allograft of 3.5 cm in transversal diameter 15 months after surgery. One patient lost to follow-up appeared in Urgencies department three years later with a dilation of the aortic body cryopreserved allograft with a transversal diameter of 13 cm. A third patient is under control with a stable dilation of the aortic cryopreserved allograft of 4 cm 40 months after surgery. In all operated cases (2), dilation occurred out of the suture lines.
Conclusions: In our experience cryopreserved allografts seems to be an alternative in case of infection of aortic graft and in absence of internal saphenous vein. Dilation of allografts is not a usual complication but follow-up must be done periodically in order to detect them.

V13-5

HISTOLOGICAL STUDY OF THE AORTA WALL AFTER THE IMPLANTATION OF SENSORS FOR EVALUATION OF INTRASAC PRESSURE IN THE ABDOMINAL AORTIC ANEURYSM

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Objective: To evaluate the histological changes after the implantation of a sensor for study of the intrasac pressure in a model of the abdominal aorta aneurysm in the pig.
Methods: Ten pig (all male) weighing 12–16 kg (mean 13.7) were utilized to evaluate the histological changes in the arterial wall after the implantation of the sensor for evaluation of intrasac of abdominal aorta aneurysm pressure.
The study is performed after of the creation artificial aneurysm in the abdominal aorta the implantation a sensor pressure for telemetry in the sac between the arterial wall and the endoprostheses implanted. A histological analysis of the arterial wall for evaluation of changes in the layers induced for the sensor. Necropsy was the performed. The retroperitoneum was inspected for any evidence of pathology. The infrarenal aorta was resected and ligated 2 cm above and below, respectively the aneurysm was then pressure-fixed within 10% formalin. The specimens were trimmed, the sensor wires were carefully removed and the specimens were processed through graded alcohols, clearing agent, and embedded in paraffin. Three types of slides were produced from each specimen: hematoxylin-eosin, Masson trichrome and Verhoeff van Giesson elastic stain. The native arterial wall aorta of site a sensor, were analyzed.
Results: The results of the study show myointimal hyperplasia following implantation of sensor for pression evaluation in aneurysm sac after the endovascular. Histological evaluation, show the normal mural architecture and smooth muscle and elastic lamina were present but effaced by the sensor compression. There was some degeneration of the smooth muscle and replacement by fibrous connective tissue with hyperplasia. The thickness of the neointima varied from approximately the thickness of the around in the groups with the endoprostheses. There was no evidence signal of significant inflammation around the sensor. Some of the sensor wires entered the tunica media of the aortic wall repair.
Conclusions: The experimental results indicate that for all the sensor-wire configurations tested, la presence of sensor had a minimal effect on the arterial wall of aorta.

V13-6

THE ROLE OF CONSERVATIVE MANAGEMENT IN UPPER LIMB ISCHAEMIA

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Objective: Few studies report the use of conservative management in the treatment of acute upper limb ischaemia. A literature review of the management of acute upper limb ischaemia and retrospective series is presented.
Methods: A literature review was performed to assess the use of operative, radiological and conservative managements for acute upper limb ischaemia (AULI). A retrospective analysis of patients treated for AULI in our hospital over the last decade was carried out. The management used and clinical outcome were recorded.
Results: A total of 203 papers were retrieved, of these no randomised controlled trials nor were prospective studies found. A total of 28 good quality studies were included for review, these were all retrospective assessments. The consensus from the literature review was that operative management (embolectomy) is the most commonly used and best first line treatment for AULI. There was an absence of studies in the literature that used conservative anticoagulation management as a primary therapy with it being used only for patients considered unfit for surgical treatment. In our series of seventeen patients with AULI, one was treated surgically and sixteen patients were treated conservatively with anticoagulation as the primary therapy. Fourteen patients from the sixteen were treated successfully with conservative therapy with resolution of symptoms at long-term follow-up. The remaining two patients required surgery after a period of conservative management had failed leading to a full resolution of symptoms. Fourteen from sixteen patients deemed suitable for conservative therapy were treated successfully (88%), this was comparable to published reports using embolectomy as the primary management.
Conclusions: In selected patients conservative anticoagulation management (with a low threshold for intervention) is a viable alternative to surgical intervention as a first line therapy in acute upper limb ischaemia.

V13-7

ARTERIOVENOUS FISTULA COMPLICATIONS SEEN IN PATIENTS WITH CHRONIC RENAL FAILURE AND ITS SURGICAL TREATMENT

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Objective: Hemodialysis is the most frequently preferred method among dialysis methods in chronic renal failure. The frequency of complications and the need for surgical repair was evaluated in arteriovenous fistulas in hemodialysis patients.
Methods: In our clinic between March 2001 and May 2001, 980 arteriovenous fistulas were opened for entering hemodialysis in 886 patients who had been diagnosed for chronic renal failure. Three hundred and eighty five (43%) of patients were female and they had an average age of 45 (17–73) years old. Five hundred and seventy six (58%) of patients have had radiosephalic A-V fistula [118 (20%) anatomic snuff box, 458 (80%) ankle and forearm], 386 (39%) have had brachiosephalic basilic A-V fistula, three patients (0.3%) have had femorosaphaneous fistula, 11 (1%) have had A-V fistula with access graft and four patients have had A-V fistula with bovine urinary fistula.
Results: The ratio of opened A-V fistula in the first three months is 87% in radiosephalic A-V fistula and this ratio is found 92% in brachiosephalic basilica fistula. The most frequently seen A-V fistula complication is early and late fistula occlusion (18.4). The other complications seen in A-V fistula are hematoma, venous aneurysm, edema related with venous hypertension, dialysis entry spot infection, pseudoaneurism related with interference, hand ischemia and contracture.
Patients who have had bleeding and hemotoma were taken into operation again and the bleeding spots were repaired or cauterized. Aneurisoctomy was performed in 20 patients having venous aneurysm by ligaturizing distal and proximal ends of vein segments. Six of the patients having pseudoaneurism occurring as a result of interference were treated with primary repair and two of them had safen interposition. In eight patients having ischemia hand ischemia findings disappeared after fistula legislation. Seventeen patients has had edema as a result of venous hypertension; A-V fistula legislation was performed in 11 patients and banding was performed in six of them.
Twelve of the patients having early trombosis have had trombectomy and A-V fistula worked again. Eleven patients having tromboflebit and cellulite

were treated medically with appropriate antibiotics. In our patient group cardiac failure related with high venous turn was not seen. During treatment patients were taken into hemodialysis with temporarily placed central venous catheters.
Conclusions: In addition to identifying and providing optimum conditions for hemodialysis entry, removing the complications with appropriate surgical treatment will increase the rates of openness of otogen anteriovenous fistula without complications for long-term and increase the life quality of patients.

V13-8
THE TREATMENT OF INOPERABLE PATIENTS WITH VENOUS ULCERS WITH MEDICAL HONEY (HONEYSOFT®)
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Objective: Conventional treatment of venous ulcers involves support and compression of the skin and superficial tissues. The use of honey in the treatment of venous ulcers is now under investigation. We report our experience about medical honey at the treatment of inoperable patients with venous ulcers.
Methods: When patients with venous ulcers was admitted to hospital, the operation (SEPS and/or saphenous ablation) is preferred as a first choice in our institution, medical honey (HONEYSOFT®) was applied to all ulcers (n=20) for a dressing material at inoperable patient group.
The most commonly reported procedure is to clean the site first with saline, spread honey on the wound and cover with a dry dressing, which is changed daily. This technique is modified that saline is not used and not changed daily. So that HONEYSOFT® is the prepared dressing material that honey is embeded in it. All dressings were changed to provide an appropiate epithelising the day after. The compressing bandages are applied to all patients. The becoming full thickness of skin is accepted as a complete healing. The control group was not established for ethical reasons.
Results: Fifteen of patients was male, three of female. Two patients had venous ulcers at bilateral limbs. Mean age was 47, 67 (20–77), mean duration of ulcer was 11.5 months (1–30 months), mean ulcer field 99.61 cm^2 (2x3 cm-20x20 cm), mean honey traetment time 40.72 days (25–70), mean healing time was 44.73 days (28–72), Four patients with venous ulcers were sly admitted to hospital so that after a car accident, an electric shockwave, too tight compresion stocking (n=2). Two ulcers was unhealed. patients with venous ulcers had also peripheral atherosclerotic occlusive disease (PAOD) and one of them was diabetic and heavily smoker. Four patients were diabetic, PAOD (n=2), smoker (n=16), obesity (n=8) and morbid obesity (n=4), lateral malleol venous ulcer (n=2), Behçet Disease (n=1). Positive correlation was not found between ulcer duration and treatment time (Spearmans test), ulcer size and healing time. Between treatment time and healing time has showed pozitive correlation (P<0.001) (Pearson correlation). There was no difference at age, diabetic, smoking patient group. Test was not done at PAOD patients because of ulcers unhealed.
Conclusions: Honey quickly reduces inflammation, swelling and pain.
All these findings suggest that honey when applied topically, is an ideal dressing for the treatment of inoperable patients with venous ulcers.

V13-9
QUALITY OF LIFE (QOL) ANALYSIS IN VARICOSE VEINS TREATED WITH ENDOVENOUS LASER THERAPY (EVLTS): CAN THE SHORT FORM 8 BE USED AS THE GENERIC QOL ASSESSMENT TOOL?
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Objective: Quality of Life (QoL) is a crucial outcome measure following treatment for varicose veins. The Short Form 36 (SF36) is the current 'gold standard' generic QoL instrument in this situation. We aimed to assess whether the new, shorter, simplified Short Form 8 (SF8) was as responsive to change as the other generic and disease specific QoL assessment tools in varicose veins.
Methods: We studied 117 patients treated with endovenous laser therapy (EVLT) for primary varicose veins. Seventy-four women and 43 men, median age 49 (range 18–83) years were CEAP graded (C2=84, C4=31, C5=2). Patients completed SF36, SF8, EuroQoL and AVVS prior to and at 1, 6, 12 weeks and 1-year post procedure. Responsiveness of data was analysed using the Friedman test (across all time points) and Wilcoxon's ranked sum test (two time points).

Results: SF36 results;

- At one week post procedure, significant decline (P<0.05) were observed in 4 of 8 SF36 domains (general health, vitality, role emotion, mental health are not significant).
- At one year post procedure, across all time point; significant improvements (P<0.05) were observed in 6 of 8 SF36 domains (role emotion and social function are not significant).

EuroQoL:

- At one week post procedure, significant decline (P<0.05) was observed.
- At one year post procedure, across all the time point, significant improvement (P<0.05) was observed.

AVVS:

- At one week post procedure, significant decline (P<0.05) was observed.
- At one year post procedure, across all time point, significant improvement (P<0.05) was observed.

SF8 results:

- At one week post procedure, significant decline (P<0.05) were observed in 5 of 8 SF8 domains (general health, bodily pain and mental health are not significant).
- At one-year post procedure, across all time point; significant improvements (P<0.05) were observed in all SF8 domains.

Conclusions: The SF8 is as responsive to QoL changes following treatment for varicose veins as the SF36 and may replace the 'gold standard' in the future.

V13-10
INTRAABDOMINAL ORGAN INJURY LOCATIONS IN OUR INFERIOR VENA CAVA INJURIES CASES
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Objective: Injuries of the inferior vena cava (IVC) are diagnosed during surgical exploration and almost allways with abdominal multisystem organ injuries. Combined VCI and intraabdominal organ injuries are especially unreliable and a gradual and carefull priority method must be used.
Methods: We prospectively collected data on all IVC injury patients at Our Hospital, an urban level I trauma center between January 2000 and December 2005. There were 16 patients with IVC injuries, nine (56.25%) had stab wounds, five (31.25%) blunt injuries and two (12.5%) gunshot wounds. All cases were men. Average age was 22.4±5.3 years (ranged between 10 and 36 years). We prospectively collected data on all IVC injury patients at Izmir Atatürk Education and Research Hospital, an urban level I trauma center between January 2000 and December 2005. There were 16 patients with IVC injuries, nine (56.25%) had stab wounds, five (31.25%) blunt injuries and two (12.5%) gunshot wounds. All cases were men. Average age was 22.4±5.3 years (ranged between 10 and 36 years). After controlling the hemorrhagy, injury's location was determined precisely. Then, injury region was controlled with a side – biting Satinsky clamp which permits as light venous return and primarily repaired with lateral venorrhaphy using 5-0 polypropylene suture. Retroperiton was closed. General surgeons performed the necessary repairs for intraabdominal organ injuries.
Results: The only patient with politrauma in our series died in early postop period. Our mortality rate was 6.25%. We performed colostomy to five and tube gastroduodenostomy to three cases. We had to perform splenectomy in three (60%) of five cases with blunt trauma. Patients were evaluated with noninvasive colored Doppler ultrasonography before and three months after discharging and patency of the IVC's were confirmed and there was not any stenotic complication.
Conclusions: In vena cava hemorrhagies, firstly bleeding is taken under control and then injury area is determined and vena cava injury is repaired. For repair procedure both controlling the hemorrhagy and precisely determining the injury area are necessary. Organized evaluation, control, exposition and repair increase the successful outcome chance.

V13–11

IS SAPHENOPHEMORAL JUNCTION INTERRUPTION NEEDED WHEN ENDOLASER THERMOSCLEROSIS OF VARICOSE VEINS IS DONE?

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Objective: Endolaser thermosclerosis (ELT) in surgical treatment of varicose vein disease (STVVD) is an easy and less invasive ambulatory method than classical stripping procedure with good functional and cosmetic results. The aim of these study was to investigate if sapheno-phemoral junction interruption (SJI) associated to ELT play a role in STVVD recurrence.

Methods: This is a retrospective observational study. From February 1999 to November 2006, 96 legs from 85 patients were treated by mean of ELT applied inside saphena magna without SJI: Group I. Thirty eight more legs from 26 patients were treated in the same manner inside saphena magna with SJI: Group II. In group I most of the patients were fatter than group II (93.7 vs. 10.3, $P<0.0001$), with difficult groin access. In all cases severe saphenofemoral reflux was tested. The C.E.A.P. functional status was not different (3.6 in group I vs. 3.7 in group II). All procedures were performed using a diode laser source under local anaesthesia after eco-Doppler mapping on ambulatory way. A microsurgical Müller operation was associated in both groups. Pearson's χ^2 and Fisher's exact tests were performed. Student's *t*-test independent groups was used. Kaplan–Meier actuarial studies were applied.

Results: No mortality or mayor complication were found on surgical procedures. No wound infection, lymphocele, lymphorrhagia, paresthesies, haematomas or hyposthesia were noted. In a 4.8 years follow-up (7.5 to 0.2 years) the functional status became in 1.4 in group I vs. 1.3 in group II, (P= n.s.). Duplex studies (6–24 months of follow-up) showed 30% permeability in saphenofemoral junction in group I but no reflux. Diameter reduction and flow, decreased to <10% in these cases. In both groups the saphena vein was occluded but one in group I, which needed re-operation two years later.

Conclusions: Endolaser thermosclerosis in surgical treatment of vein varicose disease without saphenophemoral junction interruption can be an acceptable option, mainly in difficult groin access in patients with important obesity.

V13–12

TECHNIQUE AND RESULTS OF ENDOVENOUS LASER TREATMENT OF THE INCOMPETENT GREATER SAPHENOUS VEIN

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Objective: Evaluate the efficacy of laser treatment of incompetent greater saphenous veins and the range of fluence to obtain complete occlusion at short and long-term evaluation.

Methods: Prospective clinical study by patients presenting incompetent greater saphenous veins.

Results: Our study included 145 patients (145 limbs) presenting incompetence of the greater saphenous vein ranging in diameter from 6 to 17 mm (median: 8.08 mm) followed-up for one year by clinical and Echo-Doppler examination.

The treatment was effective in 97.93% of cases after one month and 94.12% after six months, considering that three patients were lost to the study (7.22%). At one year, 87.6% showed complete occlusion of the GSV, considering that seven patients were lost to the study (7.22%).

Results show that complete occlusion was obtained in the long and short-term only when fluence ranged from 52.98–53.42 J/cm of treated vein.

Incomplete occlusion or early recanalization occurred at levels of between 32.15 and 34.84 J/cm.

Conclusions: Endovenous laser treatment is an effective technique that in some cases can replace stripping provided power levels are >53 J/cm.

V13–13

CAROTID BODY TUMORS

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Objective: The purpose of this study was to summarize our experiences in diagnosis and surgical treatment of carotid body tumors.

Methods: Fourteen patients with carotid body tumors diagnosed and treated between October 2001 and November 2005 at our institution. Diagnosis were established by Doppler ultrasonography and computed tomography or magnetic resonance imaging in all patients. Angiography was performed in six patients to evaluate vascularity of the tumors and to perform embolization before surgery to facilitate the treatment. The mean follow-up period was 16 months (range 1–35 months).

Results: The size of the tumors varied between 2.5 cm to 10 cm. Total resection of the tumors was performed in all patients. In two patients, the tumor was found to be firmly adherent to the internal carotid artery and the arterial continuity was established by saphenous vein graft interposition. Neither postoperative deaths nor strokes occurred. In one patient, vocal cord paralysis and hoarseness occurred postoperatively, but the patient exhibited significant improvement in nerve functions six months after surgery. Recurrence of the tumors was not observed during the follow-up period in any of the patients.

Conclusions: Surgical resection is the treatment of choice for carotid body tumors; however, it requires meticulous dissection and established experience to decrease the incidence of postoperative complications.

V13–14

PROLONGED STENOSIS OF AN INTERNAL CAROTID ARTERY: CEA WITH PATCH ANGIOPLASTY OR VASCULAR GRAFT INTERPOSITION

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Objective: To compare the long-term results of the internal carotid artery grafting and CEA with patch angioplasty in case of prolonged stenosis of ICA.

Methods: We examined 222 patients who underwent CEA with patch angioplasty for the period from 1983 for 2003. Seventy-four operations were performed in patients with prolonged atherosclerotic plaque from 4–6 cm, 10 operations were performed with plaque length >6 cm.

Since 1997 in cases of prolonged atherosclerotic stenosis of an internal carotid artery more than 5 cm we use technique of PTFE grafting of ICA. There were performed 81 operations for nine years.

The long-term follow-up and patency of the arteries in the postoperative period were estimated by means of color duplex scanning (CDS).

Results: In group of patients CEA with patch angioplasty the average follow-up period was 62 months. The stroke was defined in 3.3% of cases in homolateral hemisphere. According to CDS data the frequency of significant restenosis (>60%) and occlusion after CEA gin patients with plaque up to 4 cm was 9.5%, plaque 4–6 cm longwise was 29.7%, plaques >6 cm longwise in 60% cases.

In group of patients after ICA grafting (81 patients) there were examined 30 (37%) in the long-terms follow-up. The average follow-up period was 24 months. There was not any stroke in this group. The grafts were patent in this group in all 30 cases, in one (3.3%) case we found non-significant restenosis <50% of proximal anastomosis.

Conclusions: In our study the long-term results of carotid artery bypass grafting in patients with extended stenosis of ICA (>5 cm) were better than results of CEA with patch angioplasty. So, we can recommend carotid artery bypass grafting in cases of stenosis longer than 5 cm.

V13–15

DIFFUSION-WEIGHTED MAGNETIC RESONANCE IMAGING FOR COMPARISON OF OUTCOME IN THE TREATMENT OF CAROTID ARTERY STENOSIS WITH DIFFERENT APPROACHES – PRELIMINARY FINDINGS

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Objective: Carotid artery disease is a major cause of ischemic stroke. Many stenoses are inaccessible surgically and many patients are considered high-risk to undergo carotid endarterectomy. Carotid artery stenting is an evolving and less invasive technique for the treatment of carotid artery disease and is the leading alternative to carotid endarterectomy. The first and only published large prospective multicenter study that compared results of

angioplasty and surgery was CAVATAS, which documented a high but almost equal number of traceable clinical complications due to cerebral ischemia in both groups. Diffusion weighted magnetic resonance imaging (DWI) offers the possibility of making even small and therefore asymptomatic distal embolic lesions visible.
Methods: We prospectively examined 14 patients who underwent carotid endarterectomy and 12 patients who underwent carotid artery stenting. DWI was performed on the day before as well as the day after the intervention.
Results: Distal embolic lesions were detected at DWI in one patient of carotid endarterectomy group and in one patient of carotid artery stenting group, which revealed no statistical difference. None of the patients of both groups developed post procedural complications.
Conclusions: We observed no significant difference regarding post-interventional DWI-lesions. Therefore carotid endarterectomy as well carotid artery stenting are suitable methods for treatment of carotid artery stenosis and DWI studies should serve as an additional surrogate endpoint of further studies to enable an objective comparison of both methods.

V13-16
FOLLOW-UP IN CAROTID ARTERY STENTING (CAS): OUR EXPERIENCE
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Objective: Carotid stenting (CAS) could be a valid alternative to endarterectomy (CEA) to treat carotid stenosis to prevent stroke.1 Nevertheless this procedure seems to have a major embolic risk, some trial results, recently published, seem to demonstrate that this treatment, considering immediate and long-term complicance, is as good as endarterectomy 2–5.
Methods: In our Center, from December 2003 to December 2006, have been treated 216 carotid lesions by endovascular technique (CAS). Carotid stenosis were asymptomatic in the 74% of patients (150 male – 66 female; mean age 73.7 years – range 56–86). Procedure were done with a transcervical surgical access in 111 cases, transfemoral in 104 and in one case transomeral. Ninety-two percent of patients were controlled at 1-3-6-12 months and then every year with ultrasound of the epiaortic vessels and with a neurologic evaluation. Restenosis presence were evaluated using velocimeter parameters as recently reported in lecterature 6 and considering morphologic parameters as reported by Fleming et al. 7.
Results: One month mortality rate was 0.46% (a patient died for acute myocardial infarction). During or after surgery we had 12 TIA (5.55%) and five minor stroke (2.31%).
Mean follow-up was 6.08 months (range 1–24) during we registered a mortality rate of 1.44% (three patients) due to not neurological causes. We found an asymptomatic occlusion at one month (0.48%); major neurological event were not registered in the follow-up.
Conclusions: Our experience demonstrate CAS validity in carotid stenosis treatment, as observed in CAVATAS and SAPPHIRE that demonstrate a substantial equality between endovascular and surgical technique. 2, 3 This, for us, show that carotid stenting could become the routine treatment in carotid stenosis, especially in elderly patients, considering recently papers that demonstrate a restenosis incidence rate <10%. 3-4 Actually real CAS long-term benefits are unknown because are not available long-term results. Seem that we need to uniform ultrasound parameter control to have a correct evaluation in CAS follow-up.

V13-17
SENSITIVITY AND SPECIFICITY OF CEREBRAL OXIMETRY IN PREDICTING THE NEED FOR SHUNTING IN CAROTID ENDARTERECTOMY UNDER LOCAL ANAESTHESIA
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Objective: Cerebral oximetry (CO) has been shown to correlate well with transcranial Doppler measurements in monitoring cerebral perfusion in patients undergoing carotid endarterectomy (CEA). The aim of this study is to assess the reliability of CO in predicting the need for shunting of patients undergoing CEA under local anaesthesia (LA).
Methods: A prospective study of 41 consecutive patients undergoing CEA under LA (from August 2004 to October 2006) under one vascular surgeon in a tertiary referral centre was conducted. Patients undergoing surgery under general anaesthesia were not included in this series. The Somanetics INVOS® CO was used for cerebral monitoring in all patients. The percentage falls in CO regional oxygen saturation (rSO_2) on the ipsilateral side following carotid artery clamping were recorded. A drop in rSO_2 of more than 20% was considered an indicator of cerebral ischaemia that may predict the need for carotid shunting. Patients were only shunted if clinically indicated based on neurological manifestations. The series consisted of 37 men and 4 women (median age; 73 years, range; 62–85 years). The median ASA grade was 3.
Results: Six patients required carotid shunting based on neurological manifestations. The median clamp time was 29 min. No patient suffered any permanent peri-operative neurological deficit. In the group of patients that required shunting (6/41) the median percentage drop in rSO_2 was 22% (range; 14–40%) whereas in the non-shunted group (35/41) the median percentage drop in rSO_2 was 7.5% (range; 0–30%). Only one patient in the non-shunted group had a significant drop in rSO_2 (30%) (false positive) and one patient in the shunted group had a non-significant drop in the rSO_2 (14%) (false negative). This represents a sensitivity of 83.3% and a specificity of 97.1%.
Conclusions: Cerebral oximetry has shown a higher specificity than sensitivity in selecting patients for carotid shunting in patients undergoing CEA under LA. A 20% drop in rSO_2 is a reliable cut-off in predicting the need for shunting.

V13-18
CAROTID ARTERY STENTING WITH A UNIQUE EMBOLIC PROTECTION DEVICE
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Objective: This is a single-Institution retrospective review to verify feasibility of Carotid Artery Stenting (CAS) by using an unique cerebral protection device.
Methods: From 2001 to 2006, we intended to use the Boston Scientific EPI-Filter™/Filter Wire EZ Embolic Protection System, a simple easy and quick distal-filter, to protect 290 cases of CAS. Case selection was based on compatibility between internal carotid artery dimensions and device's nominal diameter indicated by the factory; no further selection criteria, as vessel anatomy or plaque composition, were applied. We considered the rapidity in EPI-Filter™/Filter-Wire EZ deployment, the necessity for further skills to support its engagement of internal carotid artery, the failure in its use.
Results: We quickly crossed stenosis and gained a site of safe distal-filter landing in internal carotid artery at the first attempt in 247 cases (85%, group-A); in two of these, difficulties in filter's opening were observed. In the remnant 43 cases (15%, group-B), we were not able to perform filter's deployment quickly: we engaged the stenotic vessel after two or more attempts in 32 cases (11%) and after 0.014-inch extra-support guide-wire positioning in distal internal carotid artery ('buddy-wire technique') in eight cases (3%); in three cases (1%) distal filter positioning failed and an unprotected procedure over a 0.014-inch extra-support guide-wire was performed. We observed perioperative and early 30-days postoperative neurological complications in nine cases (3.1%): two major strokes (0.7%), four minor strokes (1.4%), 3 TIA (1.0%). Four of them (45%) belonged to group B.
Conclusions: After these results, Boston Scientific Embolic Protection System resulted able to quickly cross carotid stenosis and get ready to cerebral protection in the most of our intention-to-treat cases (group A), so shortening as much as possible the unprotected phase of CAS with distal-filters. In group B cases, we observed challenging anatomy of carotid axis, mainly referable to internal carotid artery's tortuosity (kinking, coiling) or acute angulation of emergence from bifurcation. On the basis of our experience, we actually prefer to use proximal-clamping neuro-protection systems in presence of challenging carotid vessel's anatomy, in order to avoid as much as possible unprotected endoluminal manoeuvres potentially responsible for procedural adverse events.

V13-19
A RISK ASSESSMENT/MANAGEMENT CLINIC REDUCES PREDICTED MORTALITY IN PATIENTS WITH PERIPHERAL VASCULAR DISEASE
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Objective: Nurse-led assessment/management has been described to effective in addressing risk factors in patients with peripheral vascular disease (PVD). We aimed to evaluate whether this transfers into a reduction in predicted mortality due to coronary heart disease (CHD).
Methods: We prospectively studied a consecutive series of 75 patients (49 men; median age 65 [IQR: 56–74] years), diagnosed with PVD referred to a

nurse-led risk assessment/ management clinic, where protocol driven care was utilised to manage, hyperlipidaemia, hypertension, antiplatelet medication and lifestyle advice regarding smoking and exercise. Patients' quality of life was assessed using the Kings' College VascuQol questionnaire. Patients were followed up at three months. Predicted mortality due to CHD was calculated using the PROCAM and Framingham risk scores.
Results: a) Procam score: There was reduction in predicted mortality from 14% to 10% (P<0.000*) b) Framingham score: There was reduction in predicted mortality from 14% to 11% P<0.000*) c) King'scollege vascuQoL: There was also statistically significant improvement in the from a median of 4.4–4.8 (P<0.030*) *Wilcoxon signed rank.
Conclusions: Nurse-led risk assessment/management clinics for patients with PVD are effective in reducing predicted morbidity and mortality due to CHD, as well as improving patients' quality of life.

V13-20
HEMODYNAMIC PROGNOSIS OF THROMBOTIC COMPLICATIONS OF INFRAINGUINAL RECONSTRUCTIONS ON THE PATIENTS WITH A CRITICAL LIMB ISCHAEMIA
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Objective: The greatest number of femoropopliteal and femorodistal graft thrombosis at the patients with critical limb ischaemia (CLI) occur within the first 12 postoperative months. It was proved that the cause of it were technical and judgments errors made during reconstruction and also poor outflow. Today there are no precise tactical protocols taking into account the magnitude of peripheric resistance that complicates forecasting outcome of a revascularization of an extremity at CLI.
Objective: To study opportunities of invasive and noninvasive methods of diagnostics in the evaluation of a peripheric resistance and forecasting thrombotic complications.
Methods: At 109 patients with CLI we were used orthostatic stress testing by transcutaneous oxymetry, measurement of the outflow of the distal vascular bed and intraoperative flowmetry for evaluation of microcircular reserve and peripheric vascular resistance. Intraoperative measurements were made before reconstruction on the artery at the site of distal anastomosis. Indication for surgery were rest pain (n=57), ischemic ulcer and gangrene (n=52). Forty-eight femoropopliteal (from them 12 consecutive two-level infrainguinal reconstructions) and 60 femorotibial (from them eight pedal artery) bypass were executed (in situ saphenous vein –5.5%)
Results: The primary graft patency rate at 12 month was 73.4%. At 29 (26.6%) patients a graft occlusion developed within a year. Before and after reconstruction the patients with graft occlusion had a significantly lower artery discharge and orthostatic increase of 2 (60 vs. 90 ml/min and 9 vs. 24 mm merc) and flow (70 vs. 145 ml/min) than patients with patent graft. Prognostic value of high discharge for femoropopliteal bypass is 90%, for femorotibial bypass -76%, high blood flow on the shunt - 92%, high increase of 2-85%. Prognostic value of low parameters (predictive value of a negative test) is accordingly: 71%; 75%; 80%; 88%.
Conclusions: The discharge of an arteria and orthostatic growth of 2 before reconstruction, and volumetric blood stream on the shunt after operation have high correlation with immediate and med-term results of infraingvinal shunting and can be used for forecasting the results of these surgical operations.

V13-21
SIMULTANEOUS OR STAGED INFLOW/OUTFLOW REVASCULARIZATION FOR CRITICAL LOWER LIMB ISCHEMIA
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Objective: Occlusive arterial disease of the lower limbs is segmental in nature. Multilevel disease most often manifests as severe ischemia and is described as Grade III and IV according to the Fountain classification. Three main options of treatment are accepted: inflow procedure alone, simultaneous inflow and outflow reconstructions, or two-stage surgery. To compare the results of the latter two was the aim of this study.
Methods: The medical records of 588 patients undergoing lower extremity arterial reconstruction between 2000 and 2006 were retrospectively reviewed, allowing identification of 81 (16.7%) patients who had undergone simultaneous (multisegmental reconstructions) aortoiliac and infrainguinal bypasses. In 54 cases, two-segment reconstruction was performed in one stage (Group A) - 26 aortofemoral, 24 iliofemoral and four extra-anatomic (3 femoro-femoral and one axillo-femoral) bypass for inflow procedures followed by 44 femoropopliteal and 10 femorotibial grafts. With the purpose of comparison regarding perioperative mortality, limb salvage and graft patency rates, a control group was established (Group B) consisting of 28 patients with multilevel occlusive arterial disease who were treated for critical limb ischemia at the same period by inflow procedure as a first operation, but whose symptoms failed to settle. Subsequently, during the first 12 months, a femoropopliteal (tibial) graft was inserted.
Results: Results in perioperative and remote postoperative periods were analyzed regarding limb salvage and graft patency rates using a life table method. Perioperative mortality was 2.5% in Group A and 5% in Group B. The limb salvage rate was 96.3% at one year and 90.8% at five (A), and 89.1% and 80% (B) respectively. Primary overall graft patency rate was 92.2% at one year and 67.3% at five (A) and 85.1% and 60.7% (B) respectively. Sary graft patency was 93.7% at one year and 82.4% at five (A) and 87.3% and 66.6% (B). The majority of complications and deaths occurred in patients undergoing aortic inflow plus complex outflow procedures (profundaplasty and/or composite bypass conduits), in which the morbidity/mortality rates were 82.4% and 45.3%, respectively.
Conclusions: Simultaneous inflow/outflow bypass has been advocated because the cumulative risks of separate staged inflow/outflow procedures can be avoided. Simultaneous inflow/outflow bypasses are effective and safe in patients with severe, multilevel arterial occlusive disease, except when a complex outflow procedure is needed in conjunction with direct aortoiliac reconstruction. In the latter setting, a staged procedure is recommended because it may be associated with less morbidity and mortality.

V13-22
SURGICAL APPROACH TO GIANT FEMORAL ARTERY PSEUDOANEURYSM DUE TO GUNSHOT INJURY
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Objective: Pseudoaneurysms at peripheral vessels are long-term complications of gunshot injuries. Early diagnosis and open surgical repair are necessary to protect the extremity function and vitality.
Methods: In this study we were presenting our diagnostic approaches to late period distal femoral artery pseudoaneurysm due to gunshot injury and our successful revascularization with ringed expanded polytetrafluoroethylene graft interposition.
Results: Open surgical repair must be the standart approach for the symptomatic and rapidly enlarging femoral artery pseudoaneurysm.
Conclusions: Open surgical repair provide to avoid from rupture, thrombosis and embolization those threatening the function and vitality of the extremity and less invasive methods must be preserved for rare and complicated cases.

V13-23
HYBRID ILIOFEMORAL RECONSTRUCTION – OPERATIVE TECHNIQUE AND EARLY RESULTS
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Objective: Minimal invasive semiclosed iliac thrombendarterectomy by ring-stripper desobliterotom was introduced by Vollmar in 1969. The disadvantages of this technique – blind proximal transaction of the intima-media cylinder, therefore unobserved residual stenosis or intimal flap – could lead to early failure and reocclusion. The benefit of intraoperative DSA and interventional technique is two-fold: the result of the surgical recanalisation can be visualized, and residual stenoses or intimal flaps can be treated with stent implantation. The aim of study is to introduce the technique and results with this novel hybrid iliofemoral desobliteration.
Methods: Hybrid iliofemoral reconstruction (HIFTEA) was performed in 49 consecutive cases. Of those 11 were TASC B, 16 were TASC C, and 22 were TASC D morpholgy type according to TransAtlantic Inter-Society Consensus (TASC) classification. The standard ring-stripper desobliteration was performed through a single groin incision over a diagnostic guide wire previously introduced to the aorta by fluoroscopy. The guide wire as a route was than used to correct residual stenosis or to fix intimal flap by stent implantation.
Results: Initial technical success was achieved in all cases. Early reoperation was required in four cases (two femoral bleeding, one septic complication,

one distal bypass occlusion). Main follow-up was 16 months. Late restenoses were observed in two cases.
Conclusions: Combination of standard semiclosed ring-stripper iliac recanalisation with intraoperative interventional technique through a minimal invasive groin incision is a safe and effective method. Visualizing of the blind segment of the procedure by fluoroscopy allows the correction of residual stenoses or intimal flaps by stent implantation. Prosthetic material implantation or extended extra peritoneal approach can be avoided by HIFTEA. Long-term results must be analised for further evaluation of the procedure.

V13-24
CRITICAL LIMB ISCHAEMIA. EARLY RESULTS WITH COMBINED SURGICAL AND ENDOVASCULAR APPROACH
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Objective: The best treatment for complex iliofemoral disease is controversial, with both open and endovascular approaches having advantages and disadvantages depending on the details of each case.
A combined open and endovascular approach may offer the best features of either approach alone. We report our initial experience with these two combined approaches.
Methods: During a 4-year period (from 2002 to 2005), 38 iliac angioplasty and stent placement procedures were performed in four women and 34 men with limb-threatening ischemia.
Median follow-up was 16.3 months (range 12–48 months). Treatment included combined primary endovascular therapy and surgical treatment. Type of further revascularization, if required, was selected on an individual basis for each patient. Surgical treatment included four iliac-femoral bypasses (10.5%), three femoral femoral bypasses (7.9%), ten common femoral artery endoarterectomy and patch angioplasty (26.3%) and 21 femoral distal by-passes (55.3%). Endovascular treatment consisted of 30 iliac artery stenting (78.9%), two superficial femoral artery angioplasty (5.3%) and three with additional stenting (7.9%) and thee infrapopliteal arteries angioplasty (7.9%).
Results: Technical, hemodynamic, and clinical success were evaluated. No perioperative mortality or procedure failure was recorded. During follow-up four endovascular procedure failed and two required urgent surgical revascularizations, two peripherеal surgical revascularization failed and were treated with trombectomy. Primary patency of combined procedures was 84%.
Conclusions: Combined open and endovascular approaches to complex vascular disease that does not conform to one treatment approach are becoming more common as more vascular surgeons have endovascular skills and results of procedures performed in the operating room are favorable, our early results support this trend.

V13-25
ENDOVASCULAR MANAGEMENT FOR TRANSATLANTIC INTERSOCIETY CONSENSUS TYPES A, B, C AND D OF AORTOILIAC AND FEMOROPOPLITEAL ARTERIAL OCCLUSIVE LESIONS
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Objective: The preferential use of endovascular techniques to treat aortoiliac and femoropopliteal arterial occlusive disease has increased in recent years. The purpose of this study was to review our preliminary results of percutaneous transluminal angioplasty and stenting for aortoiliac and femoropopliteal arterial lesions based on the patient's TransAtlantic InterSociety Consensus (TASC) stratification.
Methods: A retrospective review was performed of all patients who had undergone endovascular treatment of TASC types A, B, C and D from January 2003 to December 2006 at Tartu University Hospital. Balloon angioplasty with adjunctive stenting was done in all patients. Preoperative and intraoperative information was obtained from the case histories; follow-up information was collected using a telephone interview.
Results: One hundred and sixty eight limbs in 151 patients were studied; 121 (80.1%) patients were men, and 30 (19.9%) were women; mean patient age was 62.2 years. According to the TASC classification, 31 (20.5%) patients were of type A, 85 (56.3%) of type B, 28 (18.5%) of type C, and seven (4.7%) of type D. The indications for interventions were claudication in 76 (50.4%), rest pain in 52 (34.4%) and tissue loss in 23 (15.2%) patients. Endovascular therapy was technically successful in all patients, and there was no perioperative mortality or limb loss. Above-knee amputation was performed after treatment failure in one patient (0.7%). Ten patients (6.6%) underwent surgical bypass after insufficient endovascular treatment. Follow-up information was available for 101 patients (66.9%). Mean follow-up was 19.6 months (range, 3–42 months). Clinical improvement was very good in 47 patients (46.5%), good or satisfactory in 39 patients (38.6%) and unsatisfactory in 15 patients (14.9%). There was no evident association between the TASC classification and clinical outcome.
Conclusions: Our data suggest that endovascular grafting to treat aortoiliac and femoropopliteal occlusive disease is safe, technically feasible and can be accomplished with good clinical results. This endovascular technique can be a viable alternative to conventional surgical revascularisation in patients with peripheral arterial disease.

V13-26
THE METHOD OF 'PARTIAL REVERSION OF THE AUTOVENOUS GRAFT' AS METHOD OF SURGICAL TREATMENT OF INFRAINGUINAL OCCLUSION AT CRITICAL LIMB ISCHAEMIA
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Objective: Reducing the amount of early and mid-term thrombotic complications after infrainguinal reconstructions in patients with inadequate dimensions of vein graft.
Methods: In patients with unfitness of autologous vein for bypass (small size in a zone proximal anastomosis), we have carried out own technique of 'partial reversion of the autovenous graft'. It enable to improve essentially 'inflow' and to frame hemodynamically more adequate conical graft. The feature of this method is that during preparation of a graft from a proximal part of autologous vein under the control of vision we excised 1–2 valves (including ostial one), then cut off distal segment of vein, reversed and anastomosed it with a proximal unreversed segment end-to-end. The hemodynamic adequacy was evaluated not only by a configuration and diameter of the graft, but also by the gradient pressure between proximal and distal anastomosis after blood flow inclusion. In this investigation the importance of the assessed runoff has been studied (before completion of the distal anastomosis, the outflow conditions were measured). After reconstruction was made flow measurements.
Results: One hundred and thirty four patients with critical lower limbs ischaemia (CLI) were received a primary femoro-popliteal or femorodistal reconstruction. Indications for surgery in both groups were: rest pain (n=70), ischaemic ulcer and gangrene (n=74). Sixty-eight femoropopliteal (from them 14 consecutive two-level infrainguinal reconstructions) and 66 femorotibial (from them ten pedal artery) bypass were performed. In 31 patients we have carried out method of 'partial reversion of the autovenous graft'. In 103 patients control group we have used the technique reversal and in situ vein bypass. Patients in both groups were similar in outflow rate. Early and intermediate thrombotic complications in zone reconstruction were found in 29 (28.2%) patients control group and in four (12.9%) patients under consideration group (P=0.01). There were significant differences in the preoperative pressure gradient between anastomosis (9.5 vs. 17.8 mm merc; P=0.01) and graft flow velocity (115.5 vs. 140.5 ml/min; P=0.05). In all patients undergone the described above procedure we did not find early thrombosis.
Conclusions: Taking into account that all patients were operated for a CLI in the absence of a high-grade with good functional result, we consider it possible to use the method of 'partial reversion of the autovenous graft' as an alternative to in situ vein bypass. The method allows to improve early and mid-term results of infraingvinal reconstructions, but requires the further evaluation of long-term results.

V13-27
PERIPHERAL ARTERIAL OCCLUSIVE DISEASE AND DEPRESSION
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Objective: The study evaluates three aspects: 1. the occurrence of depression symptoms in respondents with peripheral arterial occlusive disease (PAOD), 2. the quality of life (QoL) in respondents with PAOD, 3. the effect

of age and Fontaines stage of PAOD on gravity of depression symptoms and on QoL in respondents with PAOD.
Methods: The study is prospective and cross-sectional. Dates were obtained during year 2006. The total number of respondents was 42 (28 male, 14 female). The number of respondents in accordance with Fontaine was following: stage IIA – 4, stage IIB – 16, complicated stage II – 9, stage III – 6 and stage IV – 7 respondents. The average age of all respondents was 65.4 years (age range 45–78). The evaluation of occurrence of depression symptoms was performed by means of self-assessement Zung-SDS and evaluation of QoL was performed by means of Czech version of international generic European Quality of Life Questionnaire – EQ-5D Version. Statistical analysis was determined by means of analysis of variance and descriptive analysis for evaluation of QoL questionnaire.
Results: The mean index of depression (SDS index) certifies the presence of signs of minimum or light depression in patients with PAOD. The above-mentioned aspects proved statistically significant dependence of QoL in patients with PAOD on depression symptoms (P<0.001), on age (P<0.01) and on Fontaines stage of PAOD (P<0.01). We proved statistically significant dependence of depression symptoms in patients with PAOD on age (P<0.01) and on Fontaines stage of PAOD (P<0.01).
Conclusions: They are significantly higher occurrence of depression symptoms in respondents with PAOD with an increasing age and with weighty Fontaines stage of PAOD. The QoL in patients with PAOD is on low level. The results show the existence of the association between PAOD and depression symptoms with its negative effect on QoL in patients with PAOD.

V13-28
PROTEINS ASSOCIATED WITH EXPANSION OF ABDOMINAL AORTIC ANEURYSMS IDENTIFIED BY PROTEOMIC ANALYSIS
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Objective: Aneurysms of abdominal aorta (AAA) are usually asymptomatic until they reach a large size where they may rupture. Identification of new predictors of the expansion of small AAA might give us further pathophysiologic insight and a more nuanced indication for surgery. The aim of this study was to identify potential biomarkers associated with AAA expansion.
Methods: Abdominal aortic wall material from nine cases of asymptomatic AAA was used. The patients had undergone AAA-surveillance in the Viborg Aneurysm Screening Study, and were referred to surgery if the AAA became more than 5 cm in maximal diameter. Mean annual expansion rate was calculated.
Samples were analyzed for protein composition by two-dimensional gel electrophoresis (2D PAGE). Image analysis was used to detect protein spots, which were significantly correlated to AAA expansion rate. Protein spots that showed significant correlation were excised from the gel and subjected to in-gel tryptic digestion for identification by tandem mass spectrometry. Spearman's correlation analysis was used for statistical analyses.
Results: Ten protein spots in AAA wall material showed strong positive or negative correlation with AAA expansion rate. Five proteins in six spots were identified; significant positive correlations were found concerning serotransferrin (r=0.95, P=0.0038), Ig α-2 chain C region (r=0.94, P=0.005), glyceraldehyde-3-phosphate dehydrogenase (r=0.94, P=0.005) and in two spots transforming growth factor-beta-induced protein ig-h3 (r=0.77, P=0.005 and r=0.77, P=0.004).
Beta-2-glycoprotein one showed a significant negative correlation with AAA expansion rate (r=-0.73, P=0.004).
Conclusions: AAA expansion rate was significantly correlated to changes in amounts of a set of proteins in the vascular wall which may be related to remodelling processes in the tissue/extracellular matrix. These results show the value of a proteomic approach in identifying potential biomarkers for prediction of natural history of AAA.

V13-29
MANAGEMENT OF BILATERAL CAROTID BODY TUMOUR IN PARAGANGLIOMA SYNDROME: A CASE REPORT
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Objective: Carotid body tumour (CBT), especially when associated with multiple paragangliomas, is a complex pathology, difficult to manage in both diagnosis and therapy. To avoid dreadful complications linked to inappropriate treatment, the disease should be approached.
In a multidisciplinary way. In the following case report, we analysed and discuss the role of genetics in multiple paragangliomas for diagnosis and choice treatment, also regarding technical demanding surgical resections.
Methods: A 38-year-old woman had undergone several surgical procedures to remove recurring multiple paragangliomas (left jugulo-tympanic and carotid glomus tumours) resulting in complex peripheral iatrogenic nerve lesions and occlusion of the internal left carotid artery. The patient presented with suspected right new CBT.
Results: CBT diagnosis was confirmed and complete surgical removal performed without complications.
Preoperative investigations showed positivity to SDHD gene mutation. Therefore, different locations were suspected and a thoracic CT showed a new paraganglioma in the anterior mediastinum. Based on the genetic analysis, surgical treatment was not indicated and a close follow-up of the thoracic lesion performed. The thoracic lesion did not increase during the first year of follow-up and the patient is well and free of disease in other locations.
Conclusions: This case demonstrates how genetic investigation may represent an important diagnostic tool in diagnosis and choice of treatment. Surgery is not always the best treatment and indications for surgical removal of complex CBT are reviewed.

Cardiac Posters

1

LEFT ANTERIOR DESCENDING CORONARY ARTERY ENDARTERECTOMY: 15-YEAR RESULTS

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Objective: The aim of this retrospective study was to determine the early and long-term outcomes of the endarterectomy on the left anterior descending coronary artery (LAD) during coronary artery bypass grafting.
Methods: Between July 1992 and December 2006, 286 patients underwent LAD coronary endarterectomy during coronary revascularization. There were 221 (77.3%) men and 65 (23.7%) women with a mean age of 58.9±10.3 years. One hundred and sixty nine (66.5%) patients had a previous myocardial infarction, 109 (42.9%) were diabetic. Most of the patients (61.1%) had a left ventricular ejection fraction >50%, and in 38.9% patients the ejection fraction was between 30–50%. The average length of the endarterectomized segment was 5.2±2.7 cm (1–12 cm) and the average length of arteriotomy was 2.2±1.5 cm (1–10 cm). The left internal mammary artery was grafted to the LAD in 237 patients (82.9%). The mean follow-up was 152.4±4.2 months and the median angiographic follow-up time was 15 months (1–109 months).
Results: The early mortality was 8.1% (23 patients). The late mortality was 2.8% (8 patients). An inotropic support was required in 61 (24%) patients and 14 (5.5%) patients required intraaortic balloon pump support. Perioperative myocardial infarction was observed in six (11.1%) patients. Recurrent angina was present in 28 (9.7%) patients. Actuarial 10-year survival was 87.8%. Graft patency rate was found to be 78.3% in 60 (20.1%) patients.
Conclusions: Despite the presence of diffuse coronary artery disease, coronary artery bypass grafting with LAD endarterectomy offers excellent results with low hospital mortality and morbidity, and favorable long-term survival.

2

LEFT VENTRICULAR PSEUDOANEURYSM, SEEN AFTER MYOCARDIAL INFARCTION: PRESENTATION OF FIVE PATIENTS

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Objective: Left ventricular pseudoaneurysm is a very rare complication following acute coronary syndrome, which results from a free wall rupture in which confined by pericardium. In this study our five patients experience was presented.
Methods: The study population comprised five patients diagnosed with left ventricular pseudoaneurysm at our department. The diagnosis was mainly done by echocardiography and subsequently by angiography. Definitive diagnosis was supported by magnetic resonance imaging. Surgical repair was performed in all patients. With the surgical resection of pseudoaneurysm, additional endoaneurysmorrhophy procedure was done in all patients. In three patients, coronary bypass surgery to target vessels could not be performed due to entrapped by repair. In two cases CABG was added. One patient was had mitral valve replacement. IABP was used in three patients.
Results: There were three males and two females. Mean age was 66.8+10.8 years. The main symptoms were shortness of breath and chest pain. Mortality was not seen in any patient. The mean duration of hospital stay was 11 days. All patients were discharged without any symptoms of heart failure.
Conclusions: Due to possibility of rupture and sudden cardiac death, surgical repair is essential when a left ventricular pseudoaneurysm is diagnosed. Surgical repair can be done with acceptable results. Magnetic resonance imaging is good option to obtain definitive diagnosis of left ventricular pseudoaneurysm.

3

'COMPARTMENT SYNDROME' OF THE RIGHT CORONARY ARTERY AND ITS TREATMENT

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Objective: Unexpected severe right heart failure (RHF) during cardiac operations is a life threatening complication often resulting in patient's death. We noticed that there is often either an edema or traction on the epicardial fat covering the right coronary artery (RCA). Dissection of the fat should therefore have a similar function as a fasciotomy and release the pressure or traction on the RCA. We report our experience with this approach.
Methods: Whenever there is unexplained sudden RHF and either edema of the epicardial fat covering the RCA or traction with adjacent tissue is visible, we perform immediately a deep dissection of the epicardial fat stretching from the right ostium to the margo acutus of the right ventricle.
We report five cases. One patient suffered from RHF 3 days after double valve replacement. He was referred back to the theatre needing continuous open reanimation. Three patients suffered of RHF after CABG procedures while still in the theatre, one patient with acute myocardial during an OPCAB procedure.
All patients received deep dissection of the epicardial fat tissue.
Results: All patients recovered after the dissection, none died.
Conclusions: There seems to be indeed a compartement of the RCA perhaps due to the anatomy with the artery being covered with a mass of epicardial fat. Dissection of the epicardial fat has a similar effect as a fasciotomy in general surgery. It is easily done and shows in some instances instantaneous recovery of the right ventricle. It should always be done first in intraoperative RHF.

4

THE EFFECT OF RENAL DOSE DOPAMINE USE ON RENAL TUBULAR FUNCTION IN DIABETIC PATIENTS WHO UNDERWENT CORONARY BYPASS SURGERY

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Objective: It was shown that renal dose dopamine has no beneficial effect on renal functions in coronary bypass surgery. However, there was no detailed evaluation of the diabetic subgroup patients in whom the renal functions were affected more rapidly following coronary bypass surgery. A prospective randomized study was performed in diabetic patients undergone coronary bypass surgery to evaluate the clinical results of the prophylactic use of 'renal dose' dopamine perfusion.
Methods: Forty consecutive diabetic patients from the elective waiting list were prospectively randomized into two equal groups: those in Group A received dopamine infusion at 'renal dose' (2.5–4.0 mg/kg per min) starting from induction of anaesthesia for 48 h, whereas those in Group B served as untreated controls. Measurements were made of daily urine output (ml/kg), fluid balance (input/output), serum creatinine, and blood urea and creatinine clearance at 3rd and 5th days. Statistical comparisons were made using Mann–Whitney *U*-test.
Results: The two groups were matched in terms of age, time and temperature on cardiopulmonary bypass, number of grafts performed and perioperative hemodynamic status. No differences were detected in the serum creatinine, creatinine clearance and blood urea between the groups. Control subjects (Group B) showed a significantly decrease ($P<0.001$ independent *t*-test) in creatinine clearances (at 3rd and 5th days), compared with the data of group A. In group A the creatinine clearances (3rd and 5th days) showed an increase ($P=0.001$, paired *t*-test) whereas in control group (group B) the creatinine clearances decreased. Patients treated with dopamine (Group A) demonstrated less increase in serum creatinine level at 3rd and 5th days than in the control group ($P<0.001$, paired *t*-test).
Conclusions: Dopamine given at 'renal-dose' appears to offer renal protection in diabetic patients with normal heart and kidney functions undergoing elective coronary surgery.

5

EVALUATION OF THE INFLAMMATORY RESPONSE IN PATIENTS UNDERGOING CORONARY BYPASS GRAFTING

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Objective: Demonstrate that the Left Ventricular Assistance Support (LVAS) system is superior to the Closed Perfusion System (CPS) in terms of reducing the inflammatory response and improving the clinical outcome of patients undergoing beating heart CABG.

Methods: From January to December 2006 we selected 144 patients undergoing beating heart CABG: 122 males and 22 females, aged 66±9.4 years old. According to the even or odd ending numbers of their medical records, the patients could be assigned to the (LVAS) or (CPS) group. Seriated blood analysis were performed at specific times: T1 (induction of the anesthesia), T2 (beginning of the left anterior descending artery (LAD) anastomosis, usually performed as first graft), T3 (infusion of Protamine), T4 (sternal closure), T5 and T6 (6th to the 12th hour period after entering the intensive care unit), T7 and T8 (first and second postoperative day). The following parameters were studied: Troponine CK-MB, Cytokines (Interleukine 1-β, interleukine 6, TNF-α), release of neutrophil elastase as well as platelet activation by serial dosage of ß-thomboglobulin, coagulation factors, monocyte and platelet count. The exclusion Criteria: serum creatinine >2 mg/dl, Re-op CABG, carotid artery occlusion, concomitant valve disease.
Results: From the data obtained, the patients assigned to the The CPS group had a greater cytokine level than those assigned to the LVAS group. There was a significant increase in IL-1 and IL-6 during the procedure with a maximum peak at T4, while the increase in TNF-α and C-reactive protein was seen in the days after the procedure. Moreover, there was a correlation seen between the degree of the inflammatory response and the clinical outcome of the patients.
Conclusions: The modified system of Left Ventricular Assistance Support during beating heart CABG results in a lesser inflammatory response during and immediately after the procedure, accompanied by a faster patient recovery.

6

SURGICAL TREATMENT OF HOCM PATIENTS WITH MIDVENTRICULAR OBSTRUCTION

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Objective: In some HOCM patients the level of obstruction may be in the mid-left ventricular cavity rather than subaortic. In addition, midventricular obstruction may be associated with the subaortic obstruction. The classic Morrow technique does not allow to perform the complete resection of the muscular bar at the midventricular part of the septum.
Methods: The presented excision of the asymmetrically hypertrophied area of the interventricular septum (IVS) causing midventricular obstruction is made from conal part of right ventricle in middle part of IVS transversely and anteriorly of the moderator band but not through the whole thickness of IVS, that is without penetration into the left ventricular cavity. This excision of IVS implies avoiding the damage of His bundle. Forty-seven patients with mid ventricuar obstruction (mean NYHA class-3.3) were operated on using this technique.
Ages ranged from 12 to 58 years (mean 33.5). The follow-up period was 48±7 months.
Results: Significant symptomatic improvement (mean NYHA class-1.3) was noted postoperatively. The mean echocardiographic intraventricular gradient in left ventricle (LV) decreased from 91.8±15.3 to 11.3±7.8 mmHg (P<0.001). Echocardiographically determined septal thickness in the middle part of IVS was reduced 28.5±8.7 vs. 15.1±6.2 mm (P<0.001).
Follow-up echocardiography showed reduction of left atrial size from 47.9±7.5 to 39.2±6.9 mm. Sinus rhythm without block of His bundle right branch was noted in all patients after surgery. With this technique, perioperative and postoperative mortality was 0%.
Conclusions: This method is effective and safe technique for surgical correction of severe hypertrophic cardiomyopathy and advisable use in cases of LV midventricular obstruction.

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SURGICAL TREATMENT OF PATIENTS WITH ACUTE CORONARY SYNDROME

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Objective: Acute coronary syndromes (ACS) are important causes of death and morbidity among coronary artery disease patients. In many patients with ACS in whom coronary artery bypass graft (CABG) is indicated, the decision is to postpone it for a few days. However, a question: 'what is the impact of early CABG in the in-hospital outcome in ACS population?' remains largely unanswered.
Methods: Between January 2006 and December 2006, of the 350 CABG patients, 176 (50.3%) had urgent surgery and 19 (6.8%) of 176 underwent emergent surgery for ACS. Patients age ranged 35–85 years 70 of them (40%) had according to EuroSCORE, a score of six and 106 patients (60%) had a score higher then 6, Euro logistic-ranged 2.28–61.8% mean. 10.6% 11 (6.3%) patients had EF <29%, 63 (36%) had EF between 30&45%, and 102 (58%) had EF >46%.
Prior MI had 40 patients (22.7%), Prior PTCA 45 (25.5%), Prior stent implantation 36 (20.45%), 90 patients (51.13%) had NSTEMI, CCS lass ranged from 3 to 4 mean 3. Forty-four patients (25%) had Left main stenosis >50%, 17 patients (9.7%) had IABP implanted preoperatively, 19 patients (10.8%) came into operating theater with cardiogenic shock, eight patients (4.5%) required additional mitral valve replacement or reconstruction because of ischemic mitral regurgitation, three patients (1.7%) required additional aortic valve replacement and seven (3.9%) had COPD;. In seven cases (3.9%) total arterial revascularization was performed; 150 patients (85.2%) had had 3-vessel disease, 24 patients (13.6%) had 2-vessel disease and two patients (1.1%) 1-vessel disease. Fifty-seven patients (32.4%) was operated without Cardio Pulmonary Bypass (CPB) and 119 (67.6%) with CPB. All patients received enoxaparin, aspirin, B-blocker GPIIb/IIIa, and anti-anginals before operation.
Results: There were nine (5.1%) Postoperative Deaths, new myocardial ischemia occurs in three patients postoperatively, in two patients acute renal failure requiring dialysis, in ten patients (5.7%) IABP postoperatively implanted, and in eight patients (4.5%) occurred postoperative bleeding requiring reoperations.
Conclusions: Based on EuroSCORE Logistic prognosis an overall mortality rate can range from 2.28–61.8% with mean. 10.6% in such patients. However we managed to reduce mortality rate of 50% (5% mortality rate) in this kind of patients. We conclude that in patients diagnosed with acute coronary syndrome, an early invasive approach is clearly superior to a conservative approach and effectively reduce mortality.

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EXTERNAL RESPIRATORY FUNCTION IN OPERATED ACQUIRED MITRAL AND AORTIC VALVE DISEASES WITHOUT LEFT VENTRICULAR FAILURE. PART TWO: EARLY POSTOPERATIVE PERIOD

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Objective: Prospective randomized clinical studies evaluating effect of the operations on normothermic cardio-pulmonary bypass with cold crystalloid cardioplegia on the functions of organs which are the most prone to damage during the procedure: mainly heart and lungs. (Numbers of research registry of our University: 502-11-818 and 502-11-432). This part evaluates the effect of the operation of advanced valve diseases on lung function in the early postoperative period in the patients without left ventricular failure.
Methods: Between February 2002 and November 2004 year, 332 patients with valve diseases (117 mitral, 215 aortic) were operated on. Investigated group consists of 27 non-smokers, 21–78 year old, nine female, 18 male, 16 with aortic, 11 with mitral valve diseases, 22 in NYHA III, five in NYHA class IV, with LVEF 55.6±6.5% (42–66%) randomly chosen before operation pursuing excluding criteria (smokers, pulmonary diseases; left ventricle, kidney, or liver insufficiency; stroke; inability to co-operate; obesity, to be operated on moderate hypothermia; emergency operations and re-operations).
Bodypletysmography, spirometry, and diffusing capacity for CO data collected in the early postoperative period (on 7–22 postoperative days, 10±4 on av.) were compared to the preoperative values, and with American Thoracic Society (ATS) norms.
Results: Following patients' data values were significantly worse after operation: percent actual/predicted of: thoracic gas volume (ITGV P<0.01), expiratory reserve volume (ERV P<0.05), residual volume (RV P<0.05), vital capacity (VC P<0.001), total lung capacity (TLC P<0.001) (restriction), and FEV1 (P<0.001), peak expiratory flow (PEF P<0.001), forced expiratory flow 25 (FEF 25 P<0.01), and FEF 75 (P<0.01) (obturation); moreover alveollar volume (VA, P<0.001), and single breath Lung Diffusing Capacity for Carbon monoxide measurements: percent-normal (TLCO P<0.001), Hemoglobin standardized (TLCOc; P<0.05), body surface area standardized (both TLCO/BSA P<0.001, and TLCOc/BSA P<0.05), and alveollar volume standardized TLCOc (TLCOc/VA P<0.05) - whereas TLCO/VA insignificantly. After changing the position from sitting to supine most changes were similar to properative, but fall in percent-normal Residual Volume (RV P<0.05). Despite statistical significance, none of improper values excided 30% of given norm.

Conclusions: Operative treatment of acquired valve diseases without ventricular failure on normothermic CBP and cold crystalloid cardioplegia in the early postoperative period significantly aggravates present earlier both restrictive lung dysfunction, and membrane related lung diffusing capacity for CO impairement; and also cause obstructive changes. Respiratory adaptation to supine position is almost unaffected. Despite statistical significances, all the changes remain in the mild range.

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3D – DIMENSIONAL CT- AORTOGRAPHY ENHANCES ACCURATE DIAGNOSTIC EVALUATION FOR COMPLEX THORACIC AORTIC SURGERY

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Objective: Surgery for complex thoracic aortic pathology implies precise and adequate preoperative diagnosis and planning. CT scan is a fast and minimally invasive technique for diagnosing thoracic aortic disease. Volume rendering (VR) and 3D – images allow a more accurate evaluation of the pathology and may facilitate surgical strategy.
Methods: All patients scheduled for aortic surgery underwent thoracic multislice CT aortography (MSCTA) during the arterial phase of contrast enhancement. The volumetric data were displayed as 2-dimensional transversal images and processed using VR techniques. All data sets were analyzed in two separate sessions for diagnosis and surgical planning.
Results: Successful aortic surgery was performed in patients with thoracic aortic aneurysm and/or dissection: 1. Congenital abnormalities of the aortic arch and the supra-aortic branches; 2. Evaluation of an aortic arch stenosis (hypoplastic aortic arch) after previous emergent Bentall procedure & hemiarch replacement; 3. Precise evaluation/location of a pseudoaneurysm within the mid descending aorta after trauma; 4. Evaluation of extensive calcification and adhesions in re-do surgery to perform an apico-aortic conduit.
Conclusions: MSCTA is an excellent imaging technique for comprehensive evaluation of the thoracic aorta, because it enables visualization of the aortic lesion's size, location and extent. Furthermore it permits panoramic views of the aorta and assessment of its branches and neighbourhood structures.

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EFFICACY OF PARASTERNAL SINGLE INJECTION BUPIVACAINE (MARCAIN) FOR INTUBATION TIME, ABG PARAMETERS, NARCOTIC INTAKE AND PAIN RELIEF AFTER OPEN HEART SURGERY

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Objective: Post surgical pain usually causes the patients some complications such as discomfort, atelectasia, pulmonary infection, longer intubation period and finally longer hospitalization.
In different surgeries, especially thoracic and upper abdomen surgeries, patients suffer from severe pain. The present study has tried to investigate the effects of long-term local analgesic agents on patients' length of intubation period, their ABG parameters and the dose of morphine needed in the first 24 h as well as visual pain score in post op period among open heart surgery patients.
Methods: This is a prospective randomized blind study. There were two groups of case (44 patients) and control (50 patients). Firstly, bupivacaine (marcaine) was injected only single time in both sides of sternum among case patients immediately before sternal closure while the controls had no intervention. Then, the patients were investigated regarding intubation period length in ICU, ABG parameters, morphine intake and their visualized analogous score (VAS) pain. The data were analyzed through SPSS statistical package.
Results: Mean age in case and control groups were 54.2 years and 49.8 years respectively. Mean CPB time was 85 min in control and 86.8 min in case group.
Mean surgery time was 4.35 h in case group and 4.44 h in control (very close in both groups).
Mean intubation length in case group was much shorter than control (about half), 4.8 h in cases vs. 9.5 h in controls. In the other words, the case subjects were extubated about two times more quickly than the control group.
Mean Pco_2 and mean Po_2 in case group were slightly lower in different checking times in post-op period (PV<0.008). The significant point is that the patients in case group needed less morphine compared to those in the control group. The mean dose for the patients who needed morphine was 1.95 mg in post op perid in case group while 3.1 mg in control (PV<0.009).
Finally, VAS parameters in case group were significantly less than those in control, showing less pain among case patients.
Mean VAS in the first 8 h post-op was 5.8 in controls vs. 3.5 in the case group (PV<0.001).
Conclusions: Patients' pain relief by long time local analgesic agents in early post op period can not only make open heart surgery patients be extubated and weaned from the ventilator sooner but it can also lower their pain and their need to narcotics injections as well.

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ECMO TO BRIDGE INCORRECTIBLE POSTISCHEMIC VENTRICULAR SEPTAL RUPTURE TO CARDIAC TRANSPLANTATION

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Objective: Cardiogenic shock following postischemic ventricular septal rupture is traditionally treated with emergent surgical repair, even if survival is invariably poor when the infarcted area is large. Recurrent septal defects are frequent and further decrease hospital survival. Left ventricular assistance has been proposed to bridge unsuccessfully repaired septal ruptures to transplantation. We describe a patient with unrepaired ventricular septal rupture who underwent bridge-to-transplant with ECMO.
Methods: A 49 years old male body builder had acute myocardial infarction treated with fibrinolysis. Coronary angiography demonstrated acute occlusion of the anterior descending coronary artery, which was treated by stent-PCI and IABP. Enzymes were: total CPK 9081 IU/l, CPK-MB fraction 1415 IU/l, LDH 5240 IU/l, Troponin I >80 ng/ml. Echocardiography showed a large apical septal rupture and poor left ventricular function (EF 10%). Right heart catheterization revealed a cardiac index of 1.4 l/min, cardiac output 2.86 l/min, mean pulmonary artery pressure 37 mmHg with mean wedge pressure of 26 mmHg, interventricular right to left shunt with pulmonary flow/systemic flow rate of 2.3.
Results: Femoral ECMO was instituted to prevent right-to-let shunting and systemic desaturation during cardiac assistance. Eight hours later a suitable heart donor became available and the patient underwent orthotopic cardiac transplantation after 15 h of ECMO. He had an unremarkable postoperative course and was discharged on postoperative day 15.
Conclusions: Ventricular septal rupture with massive myocardial infarction and poor ventricular function constitutes a very high-risk subset of patients. Left ventricular assist device may be used as a postrepair bridge-to-transplant. In this setting recurrent or new septal defects lead to intracardiac shunting and lethal cyanosis. A viable alternative is ECMO without surgical repair as a bridge-to-transplant.

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AORTIC VALVE SPARING PROCEDURES IN EMERGENCY TREATMENT OF ACUTE TYPE A AORTIC DISSECTION

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Objective: Aortic valve sparing procedures have become popular in the last decade to treat patients with aortic root pathology without aortic valve disease. In emergency setting, however, despite the clear advantage of such procedures, their use is reported in <10% of patients. We report in this study our preliminary experience with valve sparing procedures in emergency setting.
Methods: During an 8-month period ten patients underwent repair of acute type A aortic dissection. Five patients presented moderate to severe aortic valve regurgitation and in four of them (mean age 49±6 years) aortic root reconstruction with valve sparing was achieved using a complete David procedure (three patients) or a modified Yacoub procedure (one patient). In one patient, with no aortic valve regurgitation, a modified Yacoub procedure was also used due to the dissection of the right coronary ostium.
Results: All but one patients survived the operations (cumulative mortality 10%). As far as the patients undergoing valve sparing operations, all of them survived and were discharged home. Mean total CPB time was not significantly different in patient undergoing valve sparing procedure compared to those receiving a classical Bentall procedure. Postoperative course was no different in patients undergoing valve sparing procedure.

Conclusions: Valve sparing procedures could be indicated in acute type A aortic dissection depending on the functional aortic valve regurgitation or the location of the intimal tear. Despite these procedures are technichally more demanding, their use in emergency setting is feasible and advisable especially in case of young patients.

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PULMONARY EMBOLISM AS A FATAL COMPLICATION AFTER OPEN HEART SURGERY

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Objective: Pulmonary embolus after cardiac surgery albeit rare, is a complication with high morbidity and mortality. In this study we examined the incidence and risk factors of pulmonary embolism after open heart surgery in 12311 patients.
Methods: This is a cross sectional study of 12311 patients who underwent open heart surgery from January 2002 to March 2006 at the Tehran heart center, Tehran, Iran. Pulmonary embolism was diagnosed for 50 cases of 12311 (0.4%), postoperatively. Demographic and operative variables of patients who had documented pulmonary emboli were compared with others who were symptom free after surgery.
Results: Of 12311 cases, 1126 (9.1%) underwent only valve surgery and 11185 (91%) underwent coronary artery bypass grafting with or without valve surgery. Pulmonary embolism developed in 50 of the 12311 (0.4%) patients, postoperatively. Of these 50 patients, three of them (6%) underwent isolated valve surgery, 37 cases (74%) had isolated CABG and the remained ten patients (20%) underwent combined CABG and valve surgery.
Univariate analysis indicated that gender, hyperlipidemia, hypertension, cerebrovascular accident, blood product using in ICU and low ejection fraction were important risk factors for pulmonary emboli after cardiac surgery. The mortality rate was 10.6% in patients with pulmonary emboli in contrast to 1.3% in those without pulmonary embolism (P<0.001).
Conclusions: According this retrospective study, it seems that beside the inevitable factors such as gender, the tight control of preventable factors like hyperlipidemia and hypertension before cardiac surgery and intraoperative control of blood elements may reduce postoperative thromboembolic events.

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THREE-LAYERED VENTRICULAR SEPTUM OF THE HELICAL HEART – FUNCTIONAL ANATOMY

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Objective: Helical ventricular myocardial band (HVMB) of Torrent-Guasp is global three-dimensional anatomical model which defines principal, cumulative vectors, integrating tissue architecture and net forces developed within the ventricular mass. Objective of this study is to demonstrate functional macroscopic anatomy of the interventricular septum (IVS) and to emphasize its clinical importance.
Methods: Three bovine and two porcine hearts ware prepared according to Torrent-Guasp's technique. Special dissection technique was undertaken with non-toothed forceps, scalpel and scissors. Blunt dissection by fingers was applied to identify predominant direction of the linear (fiber) and laminar (layer) fiber pathways.
Results: IVS displays fiber significant disarray at the boundaries of LV and RV free walls, and contains an intriguing structure that may be freshly examined by the HVMB dissection. These dissections contradict the concept that the interventricular septum belongs to the LV, since both ventricles participate in its formation. Ascending and descending segments od the HVMB provide the origin and significance of mayor 'septal fiber crossing'. Conventional low resolution ultrasound imaging of the ventricular septum previously identified the border of this crossing as hyper-echogenic 'septal line'. We suspect the overlap of the crossing of descending and ascending segments creates this 'bright line'. Histological analyses have shown that septal RV and LV fibers create a connective tissue true space. Coronary artery septal branches run through this space, a fact, which may be useful in Ross' procedure.
Conclusions: IVS belongs to both ventricles. Anatomical dissections of the IVS and boundaries of LV and RV free walls have demonstrated significant changes in principal fiber orientation, explaining IVS three-layered functional anatomy. The functional significance of this septal fiber organization has to be further examined.

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EXTERNAL RESPIRATORY FUNCTION IN OPERATED ACQUIRED MITRAL AND AORTIC VALVE DISEASES WITHOUT LEFT VENTRICULAR FAILURE. PART ONE: BEFORE OPERATION

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Objective: Little is known about respiratory function of the patients required heart operation, let alone how operation on cardio-pulmonary bypass affects lungs. Our prospective randomized clinical study was designed to evaluate the effect of the operations on cardio-pulmonary bypass with systemic normothermia and cold crystalloid cardioplegia exclusively on the functions of organs which are the most prone to damage during the procedure: mainly heart and lungs. (Numbers of research registry of our University: 502-11-818 and 502-11-432). In part one of the studies the authors address the effect of advanced valve diseases on lung function in the patients without left ventricular failure before operation.
Methods: Between February 2002 and November 2004, 332 patients with acquired valve diseases (117 mitral, 215 aortic) were qualified for their first heart operation. Investigated group consists of 27 non-smokers, 21–78 year old, nine female, 18 male, 16 with aortic, 11 with mitral valve diseases, 22 in NYHA III, five in NYHA class IV, with LVEF 55.6±6.5% (42–66%) randomly chosen before operation pursuing excluding criteria (smokers, pulmonary diseases; left ventricle, kidney, or liver insufficiency; history of stroke; inability to co-operate; obesity, to be operated on moderate hypothermia; emergency operations and re-operations).
Bodypletysmography, spirometry, and diffusing capacity for CO were compared to the control group of healthy volunteers and with American Thoracic Society (ATS) norms. Statistical analysis was made by means of commercially available program 'Statistica' with appropriate tests (non-parametric Wilcoxon-Mann-Whitney's, and Wilcoxon signed rank tests for this part of the studies).
Results: Bodypletysmography, spirometry and diffusion data of the control group not differed statistically from the norms given by ATS. Following patients' data values were significantly worse: Vital Capacity (P<0.05) – sitting position, and in sitting and supine positions: Forced Vital Capacity (P<0.001), Alveollar Volume (VA, P<0.05), Hemoglobin standardized Lung Diffusing Capacity for Carbon monoxide (TLCOc; P<0.05), and body surface area standardized TLCOc (TLCOc/BSA; P<0.001), whereas TLCOc/VA - insignificantly. After changing the position from sitting to supine most changes were similar, but patients lacked of fall in percent-normal Residual Volume (RV), unlike in RV% Total Lung Capacity. Despite statistical significance, none of improper values excided 30% of given norm.
Conclusions: Acquired valve diseases required operative treatment cause mild restrictive lung dysfunction, and significantly impair membrane related lung diffusing capacity before left ventricular failure develops, whereas remain respiratory adaptation to supine position almost unaffected.

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ABDOMINAL COMPLICATIONS ASSOCIATED WITH CARDIAC SURGERY

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Objective: Gastrointestinal complications (GI) after cardiac surgery are rare, but when they do occur, they carry a significant incidence of morbidity and mortality. The purpose of the study was: to identify the incidence of abdominal complications and to identify factors associated with its development.
Methods: A total number of 1543 cases undergoing cardiac surgery between December 2004 and December 2006 in our ward were involved in this study. We performed a multivariable logistic regression analysis to identify the risk factors for development of post-op GI copplications. Potential risk factors

considered in the logistic model were age, sex, unstable angina, EF, pre-op renal insufficiency and previous GI complications, re-do operations and the use of CPB.
Results: From 1543 patients underwent heart surgery: 1113 coronary artery bypass graft, 234 valve replacements include aortic repairs, 133 combinated valves and grafts operations and 63 other operations (including hearts tumor). The eight patients (0.51%) developed signs of acute abdominal problem in early postoperative period. In all patients various abdominal symptoms (acidosis, leukocytosis, hyperlactatemia, abdominal pain and peritoneal reflexes, renal failure and finally hemodynamic instability) were observed. Mesenteric angiography was done in two patients prior to the operation. All patients underwent emergency laparatomy. Acute mesenteric ischemia was responsible for four of the eight GI complications in three patients ischemic intestine and in one extensive bowel necrosis was found. Other events that we documented are: cholecystitis – one case, gastritis and ulcer perforation - one case and acute pancreatitis – one case and one subserosal hematoma after IABP insertion. Four (50.0%) patients died in early postoperative period (all with mesenteric ischemia or necrosis). In post mortem in all this cases extensive bowel necrosis were found.
Conclusions: Gastrointestinal complications, although of low incidence, carry a significantly high mortality, and the clinician must be alert to institute early appropriate treatment.
In our experience advanced age, postoperatively low cardiac output, prolonged ventilation time, combined valve-grafts operation and postoperative bleeding are the main clinical risk factors for GI complications.

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RESTING HEART SYSTEM – OWN EXPERIENCE

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Objective: Considering the side effects of cardiopulmonary bypass (CPB),off-pump coronary artery bypass grafting (OPCAB) was recently developed. However, the technical difficulties of OPCAB have limited its popularization and classic c CABG with CPB is still the standard method in many places. The resting heart system (RHS) as a compact system with closed circuit with minimized priming volume can be a solution to reduce adverse effects of conventional CPB. We performed CABG using RHS in ten patients and compared results with patients done with conventional CPB (CCABG).
Methods: In the study we compare ten patients underwent CABG with RHS to ten patients underwent operation with CCABG. There were no significant demographic, clinical and epidemiologic differences in both group. Premedication and anesthesia protocol are the same for all patients. Operations were performed throught a median sternotomy with antegrade, warm blood cardioplegic cardiac arrest. In angiography the dominant was triple vessel disease (17–85%). Surgery were performed on two (10%) as an emergence and 18 (80%) on an elective basis. Preoperatively 15 (75%) were CCS functional class 3 or 4. Average EuroSCORE was 3.5 (range 1–9 points).
Results: In all cases LITA were used for LAD grafting, the average number of grafts were 2.6 (range 2–4) for RHS and 2.7 (2–4) in CCABG patients. CPB time was similar in both groups 91±23 vs. 89±19 min, the mean aortic cross clamp were 36±22 vs. 40±18 min. CPK and CKMB 6 h after procedure were similar 470/30.6 IU vs. 430/34.2 IU respectively. Postoperative Leukocyte count 6 h after the operation were 10900±3200 and 12300±4800/mm^3, average HCT before RHS were 31.6±4.2% and after 26.4±4.3% vs. 32.8±3.6% before and 23.1±5.6% after CCABG. Postoperative drainage were 560±270 ml and 680±220 ml in both groups. One patient in RHS group died on the 2nd post-op day, one in CCABG group need reoperation for bleeding.
Conclusions: Coronary revascularization could be safetly performed with RHS with a security and comfort level similar to conventional method. The potential advantages of the RHS over CCABG should be investigated in further studies.

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AORTIC VALVE REPLACEMENT AFTER PREVIOUS CORONARY ARTERY BYPASS GRAFTING: EXPERIENCE WITH A SIMPLIFIED APPROACH

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Objective: Aortic valve replacement (AVR) after previous coronary artery bypass grafting (CABG) particularly in a patent left internal thoracic artery (ITA) is a challenge. Avoidance to injure the patent grafts and myocardial protection is an important issue in the management of these patients. The aim of the present study was to evaluate a simplified surgical approach in these reoperations.
Methods: Between January 2003 and June 2005, 287 aortic valve replacements were performed at our institution. Among those 19 patients (mean age 70 years, range: 62–82 years) underwent AVR after previous CABG surgery. The aortic valve gradients were between 50 and 107 mmHg.
Our operation-strategy followed the KIS-principle (keep it simple): both femoral vessels were canulated using Seldinger technique. We dissected only the area around the ascending aorta and the right atrium, to x-clamp and to perform an aortotomy and to insert a catheter for retrograde cardioplegia and a left ventricular vent. The anterior aspect of the heart and the left side, in which the internal thoracic artery was embedded and patent was left untouched, and not clamped.
Results: The mean interval between the 1st and 2nd operation was 6.5 years. Fourteen patients received biological prostheses. Four patients received an additional surgery at the time of aortic valve replacement (AVR). The mean time of the operation was 267 min, the mean AoX-clamp time was 63 min.
One patient died because of sever heart failure. All other patients had an uneventful postoperative course.
Conclusions: We believe, that the indication for aortic valve replacement in patients scheduled for CABG has to be re-evaluated. In those patiets, in which redo-surgery for new or increased valve stenosis is indicated, a simple and safe surgical option is presented.

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SURGICAL RESULTS FOR ACTIVE ENDOCARDITIS WITH RADICAL DEBRIDEMENT AND VALVE REPLACEMENT: EARLY OUTCOMES

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Objective: Surgical treatment of active infective endocarditis requires not only hemodynamic repair, but also special emphasis on the eradication of the infectious focus to prevent recurrence. This goal can be achieved by the combination of aggressive debridement of infective tissue and appropriate and adequate antibiotic treatment.
Methods: Between 01.01.2003 and 12.31.2006, 69 consecutive adult patients with clinical evidence of active endocarditis were operated on at our institution. There were 53 men and 16 women whose mean age was 56.3 years, ranging from 15 to 75. Surgery was needed because of one or more of the following complications: cardiogenic/septic shock, congestive heart failure, persistent sepsis, peripheral embolization and cerebral embolization in. Native valve endocarditis was present in 57 (82.6%) and prosthetic valve endocarditis in 12 (17.4.%) cases. The aortic valve was infected in 26 (37.6%), the mitral valve in 29 (42%), the tricuspid valve in only four (5.7%) case and both the aortic and mitral valve in ten (14.4%) patients. Annular destruction was present in six cases. Mean follow-up was 34.5 months (ranging, 4–142 months).
Results: The offending microorganism was identified in all patients staphylococci and streptococci were the most common whereas four patients had culture-negative endocarditis. Simple valve replacement was performed in 63 patients and radical resection of the valve and paravalvular abscess with the surrounding tissues was performed in six cases. Early hospital mortality was 24.6% (17 patients). Four patients (5.7%) developed recurrent endocarditis 3-10 months postoperatively. Six patients died during the follow-up, the causes of deaths were cardiac in two patients and non-cardiac in the others.
Conclusions: Preoperative heart and/or renal failure, annular abscess formation and prosthetic valve endocarditis were independent predictors for poor survival. Staphylococcus aureus was the causative microorganism significant predictors for mortality. We found male dominancy, but the type and the position of the valve and/or therapy had no significant influence on the mortality.

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THE EFFICIENCY OF MITRAL VALVE REPAIR COMBINED WITH LEFT VENTRICULAR RECONSTRUCTION OF ISCHEMIC HEART FAILURE

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Objective: To evaluate the results of the surgical treatment in patients with ischemic heart disease complicated of left ventricular dysfunction and mitral insufficiency.
Methods: From January 2003 to December 2006, 41 patients underwent surgical treatment. There were 39 men and 2 women, with a mean age 55±7, whom had prior one or more myocardium infarction, with 3–4 NYHA functional class, EF <40%, and 3–4 grade of mitral regurgitation.
To estimate mitral valve function we used 3-D echocardiography and analyzed the following parameters: grade of mitral regurgitation, localization of regurgitation jet, sizes of mitral annulus, leaflets motion, depth of leaflets coaptation, papillary-annulus distance, papillary-papillary distance, papillary-septum distance, diastolic flow in pulmonary veins, sizes of left atrium, pulmonary pressure, function and geometry of LV. For determine the necessity of surgical ventricular restoration we used preoperative modeling of 'new' LV. Based on the data of complex estimation of anatomy and function of MV apparatus and LV we choose the optimal method of surgical treatment of ischemic heart failure.
Myocardial revascularization was performed in all patients, and also mitral valve repair was performed in 34 patients (83%) and mitral valve replacement – in seven patients (17%). Surgical correction of coronary and mitral incompetence combined with left ventricular reconstruction in 18 patients (44%). Intraaortic balloon pump was used in 16 patients with EF <25%, which was introduced before one day of operation and was continued in early postoperative period.
Results: The total hospital mortality rate was 7.3%. The mean NYHA functional class decreased from 3.4±0.6 to 2.1±0.7 postoperatively. We revealed that after mitral valve repair with left ventricular reconstruction significantly decreased EDV from 293±38 to 195±41 and increased EF accordantly from 27±3 to 36±4. However, after isolated mitral valve repair EF did not increase significantly (28±5 and 29±6 postoperatively). Grade of MR decreased more significantly after combined treatment (1.2±0.4 vs. 1.6±0.6 respectively). Surgical ventricular reconstruction decreased end-diastolic diameter, as well as papillary-septum distance and papillary-annulus distance, so improvement geometry of LV leads to changes of chordo-papillary dislocation.
Conclusions: Surgical correction of mitral insufficiency in patients with severe LV dysfunction must include not only mitral annulus reduction, but also left ventricular reconstruction, which helps exclude main reasons of ischemic mitral regurgitation.

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PREOPERATIVE MYELOPEROXIDASE SERUM LEVELS DO NOT PREDICT THE POSTOPERATIVE COURSE IN OFF-PUMP CORONARY ARTERY BYPASS SURGERY

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Objective: In recent years the widely accepted hypothesis that a single unstable plaque is responsible for development of coronary instability has been challenged. Instead, widespread inflammation of coronary bed has been suggested. In patients with unstable angina transcoronary activation of monocytes and neutrophils has been demonstrated with enzyme myeloperoxidase (MPO) used as a marker of inflammation. MPO has been shown to predict risk for adverse events in patients with acute coronary syndrome. We ascertained the prognostic value of MPO in patients undergoing off-pump coronary artery bypass grafting.
Methods: MPO serum levels were assessed in 40 consecutive patients undergoing elective off-pump coronary artery bypass grafting. Blood samples were taken from the radial artery just before the surgery. Adverse cardiac events (death, myocardial infarction, reemergence of angina) were recorded at 6-month follow-up and patients' excercise tolerance was assesed at 1 month and 6 months after the procedure.
Results: Upon 6 months follow-up, no adverse cardiac events were recorded. Preoperative MPO levels did not correlate with preoperative troponin or C-reactive protein levels. We established, however, that at 1 month follow-up patients with better excercise tolerance (double product 20.000) had significantly lower preoperative MPO values (59.3±51.32 μg/l) than patients with poor excercise tolerance (double product 20.000) (162.66±190.45 μg/l; P=0.044). This remained true at 6 months follow-up.
Conclusions: MPO levels are not reliable predictor of the postoperative course in patients undergoing elective off-pump coronary artery bypass grafting. We were unable to record any adverse cardiac events. The reason for that is probably a relatively small sample of patients and their relatively good cardivascular status prior surgery.

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CHOICE OF THE OPTIMAL METHOD OF SURGICAL TREATMENT OF ISCHEMIC HEART FAILURE

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Objective: To evaluate the results of the surgical treatment in patients with ischemic heart disease complicated heart failure.
Methods: From January 2000 to December 2006, 216 patients underwent surgical treatment. There were 202 men and 14 - women, with a mean age 54±8, whom had prior one or more myocardium infarction, with 3–4 NYHA functional class, and EF <40%.
With echocardiography study we estimated left ventricular and mitral valve dysfunction. For determine the necessity and safety of surgical ventricular reconstruction we used preoperative modeling of 'new' LV. Considering the proper stroke index (SI) and the contractile EF (EFc), we determined the optimal end-diastolic volume index (OEDVI) of the 'new' LV required to maintain a normal cardiac output after left ventricular reconstruction by using the following equation- OEDVI=SI/EFc=40 ml/m^2/EFc. Precise assessment of contractility of the remote myocardium allows to avoid an inadequate LV reduction and also to determine possibility of ventricular reconstruction.
Myocardial revascularization was performed in all patients, and also surgical ventricular reconstruction was performed in 114 patients (53%), mitral valve repair – in 41 patients (19%). Intraaortic balloon pump was used in 56 patients with EF <25%, which was introduced before one day of operation and was continued in early postoperative period.
Results: The hospital mortality rate was 6.5%. All surviving patients had early and late postoperative study (from 1 month to 5 year). The mean NYHA functional class decreased from 3.3±0.7 to 2.1±0.6 late postoperatively. We revealed that left ventricular reconstruction significantly decreased EDV from 241±64 to 176±36 and increased EF from 29±7 to 38±4 accordantly. However, after isolated CABG EF did not increase significantly (31±5 and 33±7, respectively).
Conclusions: Preoperative modeling of an optimal end-diastolic volume allows to evaluate safety and efficiency of left ventricular reconstruction, as well as to choose the optimal method of surgical treatment of ischemic heart failure.

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EXPERIMENTAL EVALUATION OF COMBINED ON-PUMP/OFF-PUMP MYOCARDIAL REVASCULARIZATION USING THE MINIATURIZED DELTASTREAM©-BLOOD-PUMP-SYSTEM – EFFECTS ON MYOCARDIAL ISCHEMIA AND HEMOLYSIS

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Objective: Myocardial revascularization using a complete heart-lung-machine may contain many problems as well as complete off-pump attempts. Thus, it was the aim of the study to evaluate the effects of intermediate on-pump/off-pump myocardial revascularization using the minaturized Deltastream©-blood-pump-system on ischemia and hemolysis in comparison to standard myocardial revascularization.
Methods: In a group of eight mini-pigs combined on-pump/off-pump myocardial revascularization was performed using the Deltastream©-blood-pump-system as beating heart support for the on-pump part of the operation (group A). Seven other animals served as control-group and underwent standard myocardial revascularization with the same device as integrated pump of a complete heart-lung-machine (group B). Blood samples for CK, Troponine-I, LDH and HBDH were taken before and after the entire operation.
Results: Comparing the baseline values, the increase of CK was more pronounced in group B (176.4±41.2 to 279.7±29 vs. 274±142.7 to 288.1±118.6 in group A, P=0.0006). Troponine-I-increase was significantly higher in group B (1±0.3 to 2.9±1 vs. 1.1±0.9 to 3±3.8 in group A, P=0.002). LDH-increase was also more pronounced in group B (231.7±54.3 to 299.9±39.8 vs. 274.9±59.7 to 263.8±57.9 in group A, P=0.01) HBDH values increased significantly in group B after the operation (A: 215.9±34.7 to 200±39.2 vs. 195.4±41.7 to 274.9±51.6 in group B, P=0.02).
Conclusions: Concerning myocardial ischemia and hemolysis the current set-up might be superior to conventional ECC and thus be an alternative for high-risk candidates concerning adverse events of a complete heart-lung-machine, which, however are scheduled for complete myocardial revascularization.

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EXPERIENCE OF VALVE REPAIR WITH ANNULAR RINGS «MEDENG»

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Objective: Used suture techniques annuloplasty is complicated high incidence of residual or recurrent valvular insufficiency.
Methods: Between 2005 and 2007 in our clinic was implanted 217 annuloplasty rings 'MedEng' to 152 patients with atrioventricular insufficiency. In mitral valve position was implanted 89 rings, in right atrioventricular position - 128. The age of the patients was from 19 to 64 years (42.8±9.8). The etiology of mitral valve insufficiency were degenerative changes in connecting tissue at 28 (31.5%) patients; in nine (10.1%) cases was revealed rheumatic reason. In eight (8.9%) cases was revealed ischemic genesis, in 33 (37.1%) was diagnosed relative mitral insufficiency, owing to dilatation mitral annulus at aortic valve disease and damage mitral valve by myxoma 11 (12.4%). Annuloplasty of mitral valve was added to complex reconstructive interventions: triangular resection of posterior leaflet – 13 (14.6%); quadrangular resection of anterior leaflet – seven (7.9%); chordal transfer posterior leaflet to anterior leaflet – six (6.7%); replacement of chordae tendineae 4-0 Gore-Tex suture – five (5.6%); shortening of chordae tendineae by implantation in papillary muscle – one (1.1%); open comissurotomy – two (2.2%). In all cases annuloplasty of tricuspid valve was added to correction mitral or aorto-mitral valves. In five (3.9%) cases annuloplasty ring was implanted to patients with recurrent valvular insufficiency after deVega annuloplasty (reoperation in occasion of mitral valve prostheses dysfuntion).
Results: The hospital mortality rate was 1.3% (two patients). Echo-ECG data in patient with mitral valve annuloplasty: area of mitral orifice 4.6±0.9 and 3.8±0.4 2 after and before operation; volume of mitral regurgitation (at a volume of left atrium) 42.4±8.4 and 11.2±3.9%; size of left atrium 7.1±1.2 and 5.4±0.9 cm after and before operation. In patient with tricuspid valve annuloplasty: area of tricuspid orifice 5.1±1.8 and 4.2±0.5 2; volume of tricuspid regurgitation (at a volume of right atrium) 37.2±9.3 and 12.6±6.3; size of right atrium 5.7±0.6 and 4.9±0.7 cm after and before operation. Average diastolic gradient on atrioventricular valves did not exceed physiological dates, the area of atrioventricular orifice corresponded to settlement calculated values. We did not reveal thromboembolic complications. At absence of a mechanical prostheses and presence of sinus rhythm anticoagulation therapy was appointed to the period necessary for endothelization of ring braid – in current of three months.
Conclusions: Direct results of use of annuloplasty rings «MedEng» show their high efficiency at correction hemodinamic disturbances on mitral and tricuspid valves with low hospital mortality and minimal risk specific complications.

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PRECLINICAL STUDIES IN ORTHOTOPIC CARDIAC XENOTRANSPLANTATION

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Objective: Preclinical 90-day median survival of orthotopic cardiac pig-to-primate xenotransplants is a likely standard for clinical application. Satisfaction of published FDA Infectious Disease Guidelines for clinical xenotransplantation will also be necessary. Having achieved >90 day survival in heterotopic cardiac xenotransplantation we present our early orthotopic results. We also report on the long-term feasibility of producing and maintaining gnotobiotic potential donor animals.
Methods: Orthotopic pig (CD46) to baboon transplantation was performed (n=6). Immunosuppression consisted of: splenectomy, induction therapy with antithymocyte globulin for 5 days, FK506, rapamycin, anti-CD20 monoclonal antibody, a corticosteroid taper and TPC (an α-gal PEG polymer). No therapy was given for rejection. Cardiac function was assessed using Echo, ECG, and biochemistry. Construction of a state-of-the-art AAALAC accredited facility has allowed development of a designated pathogen-free swine colony. Key components include: creation of a surgical bubble for hysterotomy derivation of piglets, development of appropriate containment procedures, and an extensive diagnostic regimen.
Results: Two recipients survived well for >8 and 5 weeks, respectively. Both died of noncardiac causes with good heart function and preservation of cardiac histology. There was no evidence of rejection but signs of endothelial activation. Extensive diagnostic testing over 6 years has demonstrated the special breeding facility to be free of designated swine diseases.
Conclusions: These xenograft recipients represent the longest survivors of orthotopic cardiac xenotransplantation to date and show immunologically and physiologically the potential for clinical application in the foreseeable future. Experience in source donor animal production indicates that infectious disease requirements for clinical xenotransplantation can be met. This preclinical progress and the fundamental advantages of biological cardiac replacement (intrinsic power supply, lack of need for anticoagulation etc.) support continued funding for such studies that have the potential to introduce a new era in heart transplantation.

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AUTOLOGOUS INTRACORONARY MONONUCLEAR BONE MARROW CELL TRANSPLANTATION IN PATIENTS WITH END STAGE OF DILATED CARDIOMYOPATHY

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Objective: The effectiveness of intracoronary delivery of autologous bone marrow mononuclear cells (ABMMC) in patients with dilated cardiomyopathy still remains unclear.
Methods: Intracoronary infusion of ABMMC was performed in eight patients during coronary angiography. All of them had severe heart failure due to dilated cardiomyopathy. Each patient had received optimal medical treatment during 3–12 months before catheterization. On average, each patient received 4.1-5.8×10 eight nuclear-containing cells, among them 0.6-2.2×108 mononuclears and 0.7-1.9×106 CD34+cells.
Results: We observed clinical improvement in all eight patients with decreasing of the functional class of heart failure from the III-IV stage (NYHA) to the II stage after 6–12 months of follow-up. Echocardiography revealed some decrease of end-diastolic diameter of LV (5 of 7 patients) and end-systolic diameter (7 of 7 patients) and augmentation of global LV ejection fraction (7 of 7 patients).
Positron emission tomography (PET) and single-photon emission computer tomography (SPECT) study of myocardium showed improvement of perfusion and metabolic myocardial activity in patients after 3–6-months follow-up. Stabilization in clinical and PET (SPECT) data were observed during two years follow-up.
Conclusions: Intracoronary infusion of freshly derived suspension of autologous bone marrow mononuclear cells can be considered to be an efficient and safe approach to the restoration of the myocardium as adjunctive therapy to optimal medical treatment in patients with dilated cardiomyopathy.

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MINIMALLY INVASIVE OFF-PUMP VIDEO-ASSISTED ENDOSCOPIC SURGICAL PULMONARY VEIN ISOLATION FOR PAROXYSMAL STAND-ALONE ATRIAL FIBRILLATION USING IRRIGATED BIPOLAR RADIOFREQUENCY

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Objective: Atrial fibrillation is the most common arrhythmia having a strong impact on long-term stroke and heart failure prevalence and mortality. Nowadays rapid development in the field of minimizing the invasiveness and surgical ablation of AF can be observed. The aim of the study is to report on the feasibility and early results of the first Polish experience with a novel technique of minimally invasive video assisted beating heart bilateral surgical ablation for stand-alone paroxysmal atrial fibrillation using irrigated bipolar radio frequency.
Methods: Between February and December 2006, seven patients with highly symptomatic paroxysmal atrial fibrillation resistant to pharmacological treatment underwent video assisted beating heart bilateral pulmonary vein isolation using irrigated bipolar radio frequency combined with vein of Marshall dissection and left atrial apendage closure. In two patients at least two unsuccessful percutaenous ablations were performed previously.
Results: There were no complications. Ablation time was on average 88 (±12.1) s. At least one onset of atrial fibrillation (AF) was observed in 5/7 patients in the early postoperative period, in three of them an electrical cardioversion was performed. All the patients were discharged home in stable

sinus rhythm. Three patients have crossed three months time observation, one has reached six months of observation. All are in stable SR and had no MACE recorded.
Conclusions: Minimally invasive video assisted beating heart bilateral surgical ablation for stand-alone paroxysmal atrial fibrillation using irrigated bipolar radio frequency is repeatable and safe. Promising results have to be confirmed with longer follow-up of the rising group of patients.

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EARLY AND MID-TERM RESULTS OF CORONARY ARTERY BYPASS SURGERY IN PATIENTS WITH AN EJECTION FRACTION OF TWENTY PERCENT OR LESS: A SINGLE INSTITUTE EXPERIENCE

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Objective: Coronary artery bypass surgery (CABG) in patients with coronary artery disease and advanced left ventricular (LV) dysfunction has often been regarded as high-risk. The aim of this study was to describe the early and mid-term results of CABG in patients with severe LV dysfunction in Tehran Heart Center.
Methods: Between February 2002 and March 2006, forty patients with left ventricular ejection fraction (LVEF)=20% (documented by echocardiography) underwent CABG at our center. Beside CABG, other cardiac procedures due to ischemic cardiomyopathy such as valvular procedures and left ventricular aneurysm repair were included. Patients' characteristics, clinical and operative data as well as early and mid-term outcome data were analyzed.
Results: The patients mean age was 59.2±8.2 years and 82.5% of them were male. Early mortality (within 30 days after surgery) was 10% (four patients). Thirty-three of 36 patients (91.7%) were followed (mean time 21.6±11.8 months). The mortality rate in this period of time was 15.2% (5 out of 33 patients). Canadian Cardiovascular Society angina class improved from 2.38±0.95 to 0.53±1.03. LVEF was improved from 18.77%±2.15 to 30.95%±11.35 during mid-term follow-up (P<0.0001). New York Heart Association class changes were not significant 2.35±1.09 vs. 1.92±0.76 (P=0.18).
Conclusions: It seems patients with coronary artery disease and severe reduced EF represent a high-risk group that can undergo CABG safely. In this study, CABG in patients with low EF has an acceptable result in early and mid-term follow-up in point of view of mortality, morbidity and clinical symptoms.

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ECG' DYNAMICS AFTER ENDOVENTRICULAR CIRCULAR PATCH PLASTY (EVCPP)

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Objective: To learn the ECG's dynamics in patients underwent EVCPP.
Methods: In this study, we used retrospective analysis of 67 patient's histories of disease, whose underwent EVCPP. There were 62 male and five female and the mean age was 59+7. Mean graft number was 3.5+0.4. EVCPP were performed for large ventricular aneurysms extending into the septum more then 1/3. We allowed for ECG data in 12 standard leads before and first 24 h after operation.
Results: There were 62 patients with anteroseptal left ventricular aneurysms (92.5%), and five patients (7.5%) with posterobasal left ventricular aneurysm. In 44 (65.7%) patients mural thrombi were identified and surgically removed. Before operation ECG demonstrated signs of left ventricular aneurysms such as pathologic Q waves in the anterior leads along with persistent anterior ST-segment elevation, wide QRS complex without left bundle-branch block. After operation 56 (83.6%) patients had improvement of intraventricular conduction on ECG, in 44 patients (65.7%) there were R wave appearance and increase in the 1, AVL, V2-V6 leads. There was electric axis deviation in 62 patients (92.5%) as a result of geometry change. In one patient left bundle-branch block developed after surgery.
Conclusions:

- ECG signs of myocardial remodeling in early postoperative period are improvement of intraventricular conduction, increase of amplitude R wave in the 1, AVL, V2-V6 leads and electric axis deviation.
- There was positive dynamics of ECG in 83.6% cases after EVCPP. It is evidence of left ventricular's geometry normalization and effectiveness of EVCPP in patients with large ventricular aneurysms extending into the septum.

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SURGICAL TREATMENT OF HOCM AFTER FAILED TRANSCORONARY ABLATION

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Objective: The elimination of the outflow obstruction with a myocardial infarction may lead to impaired ventricular function and predispose patients sustained ventricular arrhythmias. Although it ablates part of the proximal septum, it does not alter diastiolic ventrical function. The classic Morrow technique does not allow to perform the complete resection of the muscular bar at the midventricular part of septum.
Methods: We present a five cases of HOCM surgical correction after failed. Transcoronary ablation of septal hypertrophy (TASH) in symptomatic patients.
The level of obstruction was in the mid-left ventricular cavity and thickness of IVS was maximal in middle part (30.3±3.1 mm). Follow-up (one year after TASH) showed no any symptomatic improvement and all patients had severe symptoms and functional limitations (NYHA class 3). Ventricular arrhythmias were registered by Holter monitoring after TASH in all patients. All patients were operated on using our technique. The excision of the hypertrophied area of the interventricular septum causing midventricular obstruction was performed from conal part of right ventricle in upper third part of IVS and in middle part anteriorly of the moderator band but without penetration into the left ventricular cavity. This excision of IVS umplies avoiding the damage of His bundle right branch.
Results: Follow-up echocardiography showed a significant decrease of intraventricular gradient after surgery from 83.2±11.8 to 7.1±4.8 mmHg, the septal thickness in middlle part of IVS was reduced 30.3±3.1 vs. 16.2±2.3 mm. Significant symptomatic improvement (NYHA class 1) was noted postoperatively in all patients. Ventricular arrhythmias were not registered. Sinus rhythm was noted in all patients.
Conclusions: This method is a safe and effective technique for surgical correction of HOCM with severe hypertrophy and complications.

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PRELIMINARY CLINICAL RESULTS WITH THE STENTLESS SHELHIGH NR 2000; A SINGLE CENTER EXPERIENCE

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Objective: The Shelhigh NR 2000 is a new true stentless aortic bioprosthesis, which is currently evaluated, in a multicenter clinical trial. This study was performed to evaluate early hemodynamic behaviour using a single suture line technique during implantation.
Methods: Since May 2006, 15 patients (mean age 75.6±5.6 years) underwent aortic valve replacement suffering from severe aortic valve stenosis (mean EOA 0.73±0.21 cm^2). The mean logistic EuroSCORE was 15.4±11.9% (range 4.0–83.2%). Infective endocarditis was present in two patients (13.3%), reoperation in two patients (13.3%) and concomitant procedures in four patients (26.6%). The bioprosthesis was implanted using a supraannular implantation technique. Patients were followed for complications and hemodynamics. Echocardiography was performed at discharge and six months.
Results: Follow-up was 100% completed. There was no operative mortality, however hospital mortality was 6.7% as one patient experienced multiple fatal thromboses due to heparin induced thrombocytopenia. The mean valve size was 26.6±1.3 mm. The average mean pressure gradients at discharge was 10.3±1.9 mmHg and at six months 5.7±2.2 mmHg, with an average mean EOA at discharge was 1.9±0.2 cm^2 and at six months 2.5±0.2 cm^2. One patient showed a stable trivial paravalvular leakage during follow-up. Freedom from structural deterioration was 100%. One patient was two months later reoperated due to infective prosthesis endocarditis and died during follow-up because of multiorgan failure. Histological evaluation showed no degeneration or infection.
Conclusions: Early preliminary results of the Shelhigh NR 2000 show excellent hemodyanmic behaviour.

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SURGICAL TREATMENT OF CONGENITAL HEART DISEASE IN ADULTS PERIOD

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Objective: The long-term consequences of untreated or undiagnosed, pose unique challenges in the growing population of adults with congenital heart disease seeking therapy. We presented a retrospective research of the efficacy of surgical treatment in these patients on the clinic.
Methods: From march 2001 to November 2006, 113 Patients (male 66, 47 female) aged 16–78 (mean: 34.6) years with congenital heart disease presented for surgery to our clinic. Chromosomal abnormalities existed in five patients (% 4.1), 52 (% 42.6) patients were asymptomatic (NYHA I), 33 (% 31.0) patients had mild (NYHA II), 19 (% 15.5) moderato (NYHAIII) and nine (7.3%) had severe (NYHA IIII) symptoms. Diagnosis had been established with echocardiography and 33 patients performed cardiac catheterization our hospital cardiology unit for diagnosis.

Table 1: Diagnosis of this patients and number

Diagnosis	No.
ASD (all types)	37
VSD (all types)	15
Partial AV canal	8
Aortic (subvalvular, valvar supravalvar) lesion	4
Mitral valve lesion	2
Tetralogy of Fallot	4
Coarctation of the aorta	2
PDA	7
ASD and Mitral cleft	6
Pulmonary stenosis and Patent foramen ovale	6
VSD and ASD	4
Pulmonary stenosis	3
VSD and Pulmonary Stenosis	5
Other	12
Total	113

Eleven patients presented with supraventricular arrhythmias, three patients AV block, 12 patients atrial fibrillation. All patients underwent appropriate surgical treatment.
Results: There was two early death (1.67%) due to Pulmonary hypertension and right cardiac failure. Embolic stroke related to atrial fibrication in two patients and left hemiplegia, other complications: reeksplorations for gross bleeding 6, pneumotorax 2, wound dehiscence 3, supraventricullar arrythmias 11, total A-V block and requiring pacemaker 3, pericardial or pleural effusion or requiring drainage three patients, endocarditic, and pneumonia two patients, residue gradient two (under 50 mmHg), leakage two patients (minimal). Three late death (2.48%) occurred in patients pulmonary hypertension after that right ventricular failure. Median ICU: 2±0.8 (1–5) days and hospital days: 8±7 (8–15). At mean follow-up 1–72 months.
Conclusions: Despite the long-term deleterious effects of congenital heart disease in adult patient, surgical correction can be achieved with low mortality and acceptable mortality and morbidity. All deaths and most significant complications are related to pulmonary hypertension and after that occurrence right cardiac failure. And another important complication was cardiac arrhythmia (all of type). This group could be earlier referral for surgery.

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CEREBRAL COMPLICATON RATES IN PATIENTS UNDERGOING OFF-PUMP CORONARY SURGERY WITHOUT ASCENDING AORTIC MANIPULATIONS

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Objective: Cerebral complications have very important for cardiovascular surgery. When cerebral complication occur in the patients who they have increased morbidity and mortality. As patients referred for cardiac surgery include older individuals, the prevalence of co morbid factors, such as previous cerebrovascular disease, carotid disease, aortic atherosclerosis, and reoperations, is on the rise. Avoiding manipulation of the ascending aorta in this high-risk subgroup may become a necessity to perform safe coronary artery bypass grafting (CABG) surgery. We presented without manipulation aorta in the coronary artery surgery.
Methods: We performed off-pump surgery in the March 2000 to December 2006. Twenty-four patients have been performed under this method. There were 16 male and eight female patients. Mean age was 65 (46–82) years old. Only one vessel disease accepted for this method and which disease of the vessel was left anterior descending artery. We used left internal mammarian artery for LAD revascularization in 20 patients and subclavian to LAD bypass via saphenöz vein was performed in four patients. Multiple vessels diseases were not added this study. All of the patients have been operated off-pump technique.
Results: Nineteen patients had a preoperative LVEF (%) <30, 17 patients had a history of chronic lung disease, four patients chronic renal failure and 14 patients had diabetics. Mean ICU of stay 1.2±0.7 days. One patient's postoperative bleeding requiring re-exploration, three patients' low cardiac out put syndrome, one myocardial infarction. There have not mortality and morbidity. Postoperative arrhythmia seen six patients. Five of the patients arrhythmia had atrial fibrillation. One of the patients had ventricular extrasistolic arrhythmia.
Conclusions: Off-pump coronary artery bypass surgery is very dependable especially without manipulation aorta. Avoiding aortic manipulations in patients with severe atherosclerosis of the aorta, carotid disease, and a previous history of cerebrovascular accidents is technical feasible and is associated with a low risk of mortality and good short-term results. Adopting this practice may reduce the incidence of stroke and improve early outcome in this subset of patients.

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COMPARISON OF BEATING HEART CORONARY ARTERY SURGERY AND CONVENTIONAL CABG WITH REGARD TO COST EFFECTIVENESS

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Objective: In this study we aimed to compare conventional coronary artery bypass surgery (CCABG) with off-pump coronary artery bypass (OPCAB) for coronary artery disease by means of cost.
Methods: The study is a prospective nonrandomized study. Data of 294 patients who have been operated in our clinic for coronary artery disease were prospectively collected between March 2001 and through July 2005. There were 147 patients in conventional CABG group (Group 1), and 147 patients OPCAB group (Group 2).
Results: Group 1 had statistically significant high costs in terms of service costs, operative procedure costs, intensive care costs, blood transfusion costs and total hospitality costs.
Conclusions: OPCAB procedure when performed under appropriate indications can be applied with less cost than CCABG and can be achieved safely and with successful results by experienced surgical teams.

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VAC SYSTEM AS TREATMENT OF DEEP STERNAL INFECTIONS AFTER CARDIAC SURGERY: OUR EXPERIENCE IN 110 CASES

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Objective: Postoperative deep sternal wound infection occurs in 0.6–16% of patients underwent to cardiac surgical procedures by median sternotomy. The objective of this study is to compare a quite new therapy called VAC System to traditional dressing-methods to understand which is more safe, reliable and cheap.
Methods: From January 1997 to June 2006, 110 patients underwent to cardiac surgery operations in median sternotomy out of 7267 (1, 51%) presented deep sternal wound infections. The median age was 68.5±15 years; 59% male and 41% female; 24% with body mass index >30; hyperglicemia was in 27%, pulmonary cronic disease in 18%; hospitalization time before surgery

was 4.2±2 days; 44% underwent myocardial revascularizations, 25% valve operations; 10% vascular procedures and 21% combinated procedures; we compared the group A, composed by 60 patients treated with VAC System, which was renewed at ward once on two days, to the group B, formed by 50 patients treated with traditional daily dressing changes.
Results: VAC System was removed after a mean of 15.3 days, and 98.6% of patients in A group had definitive surgical closure. In hospital staying after surgical closure was 5.3 days. None death was VAC related and 30-day survival was 98.6%. In B group, 86% of patients had definitive surgical closure after a mean of 17.5 days of antibiotic irrigations; in hospital staying after surgical resolution was 4.8 days; endocarditis was 4% and 30 day survival was 92.6%. There are no significative differences of costs between two groups and the antibiotics –outlay was comparable.
Conclusions: VAC System is a safe and fast technique which allows fast development of a more suitable local tissue to have a successful reconstruction procedure; it is well complied by the patients, even because they are not forced to stay in bed and in particular situations the they can also keep on therapy on day hospital. We recommended an early use of it to avoid mediatinitis complications and to have fast hospital discharge.

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PREOPERATIVE STATINS REDUCE ATRIAL FIBRILLATION FOLLOWING CORONARY SURGERY REVASCULARIZATION

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Objective: Recent evidences support the decisive role of inflammation in atrial fibrillation (AF) following coronary artery bypass grafting (CABG) and there is growing evidence that statin has cardiac antiarrhythmic effects. The aim of this study was to assess the efficacy of preoperative statins in preventing AF after CABG.
Methods: Over a two-year period, all 423 consecutive patients undergoing CABG were enrolled. Patients with a documented chronic AF, permanent pacemaker, and those having inflammatory diseases that required therapy with steroids or non-steroidal anti-inflammatory drugs were excluded. The final population study consisted of 405 patients (66 ± 9 years, 81% men). Patient and procedural variables associated with postoperative AF were identified by univariate and multivariate logistic regression analysis.
Results: Postoperative AF occurred in 29.5% of the patients with preoperative statin therapy compared with 40.9% of those without it (P=0.021). No statistical differences between development of AF and type, dose or duration of preoperative statin therapy were observed (P=0.905, P=0.904 and P=0.596, respectively). In a multivariate logistic regression model, preoperative statins was associated with 47% reduction in risk of postoperative AF development (OR 0.53, 95% CI 0.34–0.84, P=0.007). Other variables independently associated with AF were age, prior history of AF, and postoperative intra-aortic balloon-pump.
Conclusions: Preoperative statins may reduce postoperative AF development after CABG. Patients undergoing elective revascularization may benefit from a preventive statin approach.

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SUPERFICIAL AND DEEP STERNAL WOUND INFECTION AFTER MORE THAN 9000 CORONARY ARTERY BYPASS GRAFTS: INCIDENCE, RISK FACTORS AND MORTALITY

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Objective: Sternal wound infection (SWI) is an uncommon but potentially life threatening complication of cardiac surgery. Predisposing factors for SWI are multiple with different frequency in various studies. The purpose of this study was to assess the incidence, risk factors and mortality of SWI after coronary artery bypass graft (CABG) at Tehran heart center.
Methods: This study prospectively evaluated multiple risk factors in 9201 CABG patients who developed post CABG sternal wound infection (SWI) from January 2002 to February 2006 at Tehran Heart Center. Cases of SWI confirmed based on criteria of centers for disease control and prevention. Deep SWI (mediastinitis) categorize according to Oakley classification.
Results: In the period of study, 9201 CABG were performed with total SWI rate of 0.5 for deep SWI against 1.1% for non-SWI CABG patients. Female gender, preoperative hypertension, high functional class, diabetes mellitus, prolonged intubation time (more than 48 h) and re-exploration for bleeding were significant risk factors for developing SWI (P=0.05) in univariate analysis that among these risk factors, hypertension, female gender and re-exploration for bleeding were also significant in multivariate analysis (P=0.05). Rate of SWI was relatively similar in three groups of prophylactic antibiotic regimen (cefazolin, cefazolin+gentamycin and cefazolin+amikacin, 0.5%, 0.5% and 0.34% respectively).
Conclusions: Two risk factors namely hypertension and female gender rarely reported in other studies, were found significant in our study, although further studies are needed for better documentation. On the other hand, importance of several risk factors such as cigarette smoking and obesity mentioned in other studies were not approved by our study. Low rate of SWI in our institutes and others needs persistent work.

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THE BROKEN HEART IN SCANDINAVIA

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Objective: The nature of cardiac injuries in Scandinavian countries is not well characterized.
Methods: We evaluated our experience of cardiac injuries treated at one of the largest University Hospitals in Sweden and at Denmark's busiest medical center during the last 10 and 6-year-period respectively.
Results: We found 23 patients with cardiac injuries, of whom 11 were penetrating, 9 blunt, and 3 iatrogenic. The penetrating wounds involved the right ventricle in 4, left ventricle in 5 and pericardium in 2. A blunt rupture of the right atrium was found in two and myocardial contusion in 7. Patients with cardiac penetration or rupture presented in shock and underwent urgent surgery. Three patients died: two due to exanguination and one due to massive cerebral lesions.
Conclusions: Our data reflect the Swedish and Danish experiences of cardiac injuries: there are relatively few cases, alcohol and drug misuse is the principal risk factor, and there were no gunshot wounds. The outcome was excellent using an aggressive way of management.

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RE-OPERATION FOR AORTIC FALSE ANEURYSMS: OUR EXPERIENCE AND STRATEGY FOR SAFE RE-STERNOTOMY

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Objective: To review of our experience with re-operation for aortic false aneurysms (FA) and to present an analysis of the relevant surgical approaches and risks.
Methods: From May 1999 to January 2007, 12 patients underwent a total of 14 re-operations due to aortic false aneurysms, with an incidence of 3% of all thoracic aortic cases. Cardiopulmonary bypass (CPB) and cooling were started before sternotomy in all cases. Three different strategies were adopted for patients depending on the position of the FA in the mediastinum as indicated by a preoperative CT scan. These included: deep hypothermic circulatory arrest (18 °C), moderate hypothermia (28 °C) and mild hypothermia (32 °C). In two patients, the sternotomy ruptured the FA causing profuse haemorrhaging. In all the other cases sternotomy was performed without complication. The repair consisted in simple repair by direct suture (11 cases) or extensive repair by refashioning the anastomosis (3 cases).
Results: Two hospital deaths occurred with a hospital mortality rate of 14.2%. Permanent neurological deficit developed in one patient. Transient neurological deficit in the form of left lower limb weakness was observed in one patient. False aneurysm recurrence developed in two cases. Among patients present at follow-up (10 survivors), four are in NYHA class I and six in class II.
Conclusions: Aortic false aneurysms carry a high mortality and morbidity rate. Nevertheless, we believe that selecting the right strategy according to the position of the FA in the chest can reduce surgical risk, thus permitting relatively safe re-sternotomy.

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ANALYSIS OF CEREBRAL AND CARDIAC COMPLICATIONS IN THE EARLY POSTOPERATIVE PERIOD AFTER SURGICAL TREATMENT OF PATIENTS WITH COMBINED ATHEROSCLEROTIC LESIONS OF CORONARY AND CAROTID POOL

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Objective: To estimate results of single- and stage-by-stage treatment of patients with atherosclerotic lesions of coronary and carotid arteries (CA).
Methods: Evaluation of functional reserve of myocardium perfusion was performed by scintigraphy using Tl201 at stress testing conditions with adenosine. Reserve of brain blood circulation was examined with electro-impedance tomography at dosed isocapnical hypoxia in the background. There were identified criteria for functional reserve of cerebrum perfusion. Evaluation of heart and cerebrum perfusion reserve allows differentiating high-risk patients with combined atherosclerotic lesions of coronary and carotid pools to choose the optimal tactics of surgical treatment.
We performed surgical operations in 59 patients. Mean age of the patients was 52.6±6.7 years old. In 53 (89.8%) patients exertional angina of III-IV FC (CSS) was noticed. In six (10.1%) cases progressive angina was registered. Fifty (84.4%) patients have previously had myocardial infarction (MI). Multivascular lesions of a coronary bed were revealed in 56 (95%) cases; stenosis of left coronary arterial trunk was detected in three (5%) cases. All CABG procedures were performed with CPB. An average number of shunted arteries was 3.5±0.9. Twenty-nine (49.1%) of the patients have had transitory ischemic attacks (TIA) of cerebrum in anamnesis, 10 (16.9%) have had ischemic stroke (IS). In the rest 20 (34%) patients hemodynamically significant CA stenoses were clinically asymptomatic. In 40 (67.7%) cases stenotic (>75%) lesion of CA was unilateral, in 19 (32.3%) cases - bilateral. Carotid endarterectomy (CEA) with autovenous patch of the ICA orifice was performed under pharmaco-hypothermic brain protection conditions.
Results: Twenty-six (44%) patients, with significantly reduced indices of cerebral blood flow reserve at satisfactory myocardial perfusion reserve, were subjected to stage-by-stage surgical treatment. CEA was performed at the first stage, CABG – at the second stage in 10–14 days. In this group of patients there were registered three (11.5%) TIA cases in the early postoperative period. Thirty-three (66%) patients with low reserve of both coronary and brain circulations were subjected to single-stage surgical myocardial and brain revascularization. Among them in four (12.1%) patients TIA were registered in the early postoperative period. In one (3%) case perioperative MI was detected.
Conclusions: At differential approach at choosing tactics for surgical treatment risk of brain and cardiac postoperative complications is not higher than at the stage-by-stage operations.

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CORONARY BYPASS SURGERY IN YOUNG ADULTS. A LONG-TERM SURVEY

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Objective: Coronary bypass grafting is probably the most extensively studied technique of all surgical procedures. However, there is little information on its long-term outcome in young patients. The aim of this study is analyzing the long-term clinical outcome of this technique when performed in young adults.
Methods: We included in this retrospective study all patients aged 40 years or younger undergoing coronary bypass surgery in our unit in the 18-year period comprised between January, 1989 and December, 2006. Relevant clinical data were retrieved from the patients' clinical records. Follow-up data was obtained by means of personal or telephone interviews with the patients themselves or with their relatives.
Results: There were 42 patients (3 females, 39 males), mean age 36.9 years (range 29–40 years). Nineteen of them (18.6%) suffered a previous myocardial infarction. Left ventricular function was impaired (ejection fraction lower than 50%) in six instances (5.9%). Twenty-two patients (50%) underwent surgery in a state of unstable angina. The indication for surgery was 3-vessel disease in 17 patients, 2-vessel disease in 17 patients and single vessel disease in seven instances, and in six cases the main steam of the left coronary artery was affected. Surgery was carried out with extracorporeal circulation and cardioplegic arrest of the heart in 40 instances and off-pump in the remaining two subjects. A total of 102 grafts were constructed (mean of 2.4 grafts per patient), 56 (54.9%) of them being arterial. There were no hospital deaths. Mean hospital stay was of 8.1 days and only four patients (9.5%) suffered relevant perioperative complications. One patient (2.3%) was lost for follow-up. Cumulative follow-up was 389.1 years, with a mean of 9.5 years per patient. There were five late deaths, all of them of cardiac origin, with an estimated actuarial probability of survival of 81.4%. Thirteen patients suffered 17 major cardiac non-lethal complications, with an estimated actuarial freedom from cardiac morbidity of 43.9%. Major peripheral vascular morbid events occurred in nine patients, the estimated actuarial probability of freedom from peripheral vascular complications being of 62.1%. Overall actuarial freedom from any cardiovascular lethal or morbid event was estimated in 27.7%.
Conclusions: Perioperative mortality and morbidity is low in young patients undergoing coronary bypass surgery. However, these patients present a high-risk of suffering major adverse events of cardiovascular origin in the long-term.

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THE ROLE OF CYTOIMMUNOLOGIC MONITORISATION IN HEART TRANSPLANTATION

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Objective: The aim of this study to show the effect of the cytoimmunologic monitorization and its role on the patient's follows-up period after the heart transplantation.
Methods: Between 2002 and 2005, five patients had heart transplantation at Gulhane Military Medical Academy Hospital. All of the patients were male. Mean age was 41±14 (18–55). Donor hearts were implanted to all patients orthotopically. The first patient was followed-up only with cytoimmunologic monitorization and only one endomyocardial biopsy was performed. The third patient was followed-up with endomyocardial biopsy and cytoimmunologic monitorization. The other three patients were followed-up only with cytoimmunologic monitarization.
Results: The total and average follow-up periods were 6.1 patient years, 17±13.2 months (2–35 months), respectively. The first patient had two times rejection episode in three months. Viral infection was diagnosed in the third patient who had painful muscle spasm in both lower extremities and values of CD4/CD8 were under 0.4. CD4/CD8 values were suddenly increased in the fourth patient and urinary infection was diagnosed. There was no mortality in early period (<30 gün). One patient died because of sepsis in three months.
Conclusions: Cytoimmunolojic monitorization is a simple technique to evaluate the immunologic prophile of the patients and it may decrease the taking rate of the endomyocardial biopsy.

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RESULTS OF PARTIAL STERNOTOMY DURING SURGERY FOR CONGENITAL HEART DISEASE IN THE ADULT

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Objective: Repair of congenital heart defects with limited sternotomy in older children and adults have been reported to result in significant reduction in perioperative morbidity. We reviewed our experience with partial sternotomy in older children/adults with congenital cardiac defects.
Methods: Twenty-three patients (5 female, 18 male) operated for congenital cardiac defects between 2003–2006 were reviewed for pre- and perioperative data including respiratory, cardiovascular functions, postoperative hemorrhage as well as transfusion and postoperative pain-killer requirements. A 3–5 cm midline sternotomy with 'I' or inverted 'T' shape along the corpus of the sternum to retain stability.
Results: The mean of the patients was 23±8.6 (range 16–57) years. Sixteen patients had atrial septal defects, four had ventricular septal defect and three had subaortic discrete membrane. The mean aortic clamp and bypass times were 42.4±30.2 and 66.6±40.1 min, respectively. The mean mechanical ventilation time was 3.1±2 h; only two patients were kept on ventilator for >6 h. The mean amount of perioperative hemorrhage from the mediastinal tubes was 240±55 ml and transfusion requirement was 1.2±0.8 units of packed red cells. The mean duration of hospital stay was 8.4±5 days. Two patient stayed in the hospital for 16 and 28 days, respectively. Excluding two patients whose hospital stay were 16 and 28 days, 6.1±2.2

days. Preoperative and postoperative FVC at 1st month was 87.6±6.6% vs. 78.3±10.1% of the expected (P<0.05). No wound or hemorrhage-related complications were observed.
Conclusions: Partial sternotomy allows adequate exposure with limited postoperative blood loss and transfusion requirements. It results in better cosmetics and excellent chest stability resulting in rapid restoration of preoperative respiratory function.

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BEHAVIOUR OF VALVED BOVINE JUGULAR VEIN CONDUIT (CONTEGRA) AFTER UNIFOCALISATION

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Objective: Because of shortage of small-size homografts, we had to resort to small-size Contegra conduits, even in lesions with potentially increased pulmonary arterial pressures, in particular pulmonary atresia, ventricular septal defect and major aorto-pulmonary collateral arteries (PA/VSD/MAPCAs). The objective of this study was to determine function of Contegra grafts implanted in the right ventricular outflow tract (RVOT) after unifocalisation in very young patients.
Methods: Of the 27 patients who received 12 and 14 mm Contegras from October 2002 to December 2006, nine had undergone MAPCAs unifocalisation either as primary (n=7) or staged (n=2) procedure. Characteristics include the following: association of Di-George syndrome in four patients, median age of 166 days (range, 83–604 days), weight of 6.4 kg (range, 3.6–10.0 kg) and comprehensive Aristotle score of 16.0 (range 13.5–21.0). Median z-value of the implanted 12 mm (n=7) and 14 mm (n=2) Contegras was 1.9 (range, 1.2–3.3). VSD was left open totally (n=3) or partially (n=3) in six patients. Follow-up echocardiography and heart catheterization findings were reviewed.
Results: There was one early death from multi-organ failure at postoperative day 12. One patient died late: at day 206 from RSV pneumonia. Mean follow-up for the seven survivors is 19±8 months. Five patients underwent on 11 occasions interventional dilatation of the right and/or left pulmonary artery with stent placement in four. Maximal echo-Doppler gradients through the conduit are at last follow-up under 30 mmHg in six patients and 36 mmHg in the remainder. Competency of the Contegra valve remained stable in three survivors and slowly decreased in four. Regurgitation is actually Grade 0 to 1 in four patients and Grade 2 in three. Freedom from reoperation for conduit dysfunction/failure is 100% at month 32.
Conclusions: At mid-term follow-up, the Contegra graft retained satisfactory function, even in the setting of stenosed pulmonary arteries that required dilatation and stenting. Small-size Contegras appear to be valuable alternative to small-size homografts for RVOT reconstruction after MAPCAs unifocalisation.

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EARLY RESULTS OF CORONARY ARTERY BYPASS GRAFTING AND PERCUTANEOUS CORONARY INTERVENTION IN PATIENTS WITH ACUTE CORONARY SYNDROME

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Objective: The optimal variants of surgical treatment and its effectiveness in patients with acute coronary syndrome (ACS) remain controversial.
Methods: Prospectively 92 patients who had undergone CABG (n-39) and PCI (n-53) between the periods of 1999 to 2005 were analyzed. Demographic dates of the patients undergone CABG (1st group) and PCI (2nd group) were compared. Average age of patients in groups were 57±8 vs. 56±10 (P>0.05), male gender 85% vs. 87% (P>0.05), prior MI 69% vs. 68% (P>0.05), EF<0.5 in 31% vs. 30% (P>0.05), PVD 28% vs. 15% (P>0.05), previous CABG 8% vs. 17% (P>0.05), diabetic type II in 46% vs. 28% (P>0.05), LMCA disease evaluated in 26% vs. 8% (P<0.05) respectively. According to clinical form of ACS they were divided into none 'ST' elevated ACS (NSTEACS) 95% and 'ST' elevated ACS (STEACS) 5%. Further the patients were stratified into higher (51%) and lower (49%) risks of unfavorable coronary events (UCE). Higher risk of UCE observed in 68% vs. 38% (P>0.05) and lower risk of UCE in 32% vs. 62% (P<0.05) respectively. In accordance with the timing of operations in contingent with higher risk of UCE emergency/urgent operations conducted in 88% vs. 63% and early operations in 12% vs. 37% respectively. Likewise, patients with lower risk of UCE urgent operations conducted in 25% vs. 52% and early manner of invasive strategy in 75% vs. 48% respectively. In our trail 2.2% of patients had undergone hybrid revascularization. Index revascularization in groups comprised of 3.71±0.9 vs. 1.9±0.2 respectively.
Results: Early clinical results and effectiveness of operations CABG and PCI were comparatively analyzed on the basis of following criteria as: Perioperative myocardial infarction, lower cardiac output (CO) syndrome, recurrence of angina, early clinical success, TIA, hospital and 30-day mortality. There were no significant changes in variables when the groups compared except in lower CO syndrome 23% vs. 2% (P<0.05) and recurrence of angina which was significantly frequent in PCI group 0% vs. 11% (P<0.05) respectively.
Conclusions: PCI preferred as a prior method in regaining coronary perfusion within a shorter period in patients with ACS. In patients with higher risk of UCE it is necessary to conduct CABG or PCI in an emergency/urgent manner except concomitant and redo CABG procedures, which in turn increases its initial risk. whatever may be the clinical situations all patients with complicated LMCA disease dictates necessity conducting operations in an emergency manner. CABG in higher risk patients should be conducted with prophylactic counterpulsation (IABP).

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CORONARY ARTERY REVASCULARIZATION WITHOUT CARDIOPULMONARY BYPASS AFTER A CARDIAC STAB WOUND

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Objective: We would like to discuss the importance of the urgent approach for the cardiac penetrating injury using off-pump technology under the literature view.
Methods: We present a case, 19-year-old man who had been wounded with a stab, which was localized at the junction of the left side of the manubrium sterni and 5th intercostal space. We performed cardiorapthy and coronary artery revascularization to the transected left anterior descending artery using off-pump technology in emergency room because of the hemodynamic instability of the patient.
Results: A 19-year-old man presented to the hospital having stab wounds to the chest where was localized at the junction of the left side of the manubrium sterni and 5th intercostal space that was 3 cm skin incision occurred by a stab. In his first examination, there were no detectable vital signs, such as; arterial blood pressure, pulse and breathing, but electrical activity was present of the heart. The patient was intubated immediately and was started to cardiopulmonary bypass. At the same time, an anterolateral thoracotomy was performed in left 5th intercostal space both to control the bleeding and to diagnose the cardiac stab wound. It was seen that the stab wound had transected the left anterior descending coronary artery (LAD) at the junction of the middle. The cardiac wound was repaired with pledgeted mattress sutures and the proximal side of the LAD was ligated. After then, the patient showed signs of progressive myocardial ischemia and required internal defibrillation because of ventricular tachycardia and fibrillation. Persistent hypotension and recurrent ventricular fibrillation led to the decision to proceed with revascularization without transport of the patient to the operating room. Left internal thoracic artery (LITA) had been transected; the LITA was anastomosed to the distal side of the transected LAD. The anastomose was performed on the beating heart using an atraumatic clamp for stabilization the anastomose side.
Conclusions: Off-pump coronary artery bypass surgery can be safely used in cardiac stab wound with coronary artery injury, with using this technique some adverse effects of the cardiopulmonary bypass can be advocated.

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DIRECT COMMUNICATION BETWEEN THE RIGHT PULMONARY ARTERY AND THE LEFT ATRIUM: A NEW CLASSIFICATION AND SURGICAL EXPERIENCE

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Objective: There are only 64 cases of direct communication between the right pulmonary artery and the left atrium (RPA-LA) we found in the litera-

ture; and only three publications, with the description of two cases in each. The aim was to study the anatomic variations of the direct communication RPA-LA, to develop the classification of this anomaly and to present the surgical experience of our center.
Methods: From November 1999 till November 2004, three patients (pts) at the age of 3 years 6 months, 8 years 9 months and 10 years 6 months were operated on; two of them were males. SaO_2 before repair was 66, 69 and 83% respectively. All the patients had normal drainage of pulmonary veins, two had ASD. The repair was made using the median sternotomy under hypothermic perfusion. ASD along with the ligation of the direct communication RPA-LA was closed in two patients. Left atriotomy with the suture of the direct communication was made through the LA in one patient.
Results: Our classification is based on a) pulmonary vein drainage anatomy; b) localization of direct communication origin from RPA (proximal or distal); c) presence or absence of aneurysm. In compliance with pulmonary vein (PV) drainage anatomy we marked out three types of communication – with normal PV drainage (1), partial (2) and total (3) anomalous drainage. The first two types had two subtypes – proximal (1.1) and distal (1.2), each of them had two more subdivisions – with aneurism and without aneurysm (B). In two cases the type of RPA-LA communication was 1.2A and in one case – 1.1A. The result in two patients was good: the shunt across communication was absent, SaO_2 was 96%. In one case (with intact atrial septum) the control echocardiography revealed a moderate residual RPA-LA shunt. Successful endovascular procedure with Sideris button device was made 6 months after the fist operation.
Conclusions:

1. Nine anatomic variants of the RPA-LA communication were identified in accordance with this new classification. Surgical strategy must be based on the anatomic type of pathology and concomitant malformations.
2. Ligation of the RPA-LA communication by means of CPB and median sternotomy is a safe and reliable method of surgical repair of this anomaly.

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CORONARY ENDARTERECTOMY – IN DIFFUSE CORONARY ARTERY DISEASE/AN ADJUNCT TO CABG

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Objective: Fifty-seven patients underwent coronary endarterectomy as part of CABG over a period of 7 years. Of these, 42 were males and 15 females. Their age ranged between 45 and 68 Years. Forty were diabetics. Thirty-four had sever LV dysfunction (EF <30%). Forty-six patients underwent routine surgery, remaining 11 emergency surgery. Endarterectomy was performed for LAD, RCA and circumflex artery in 27, 16 and 14, respectively. IABP used in 14 patients. Four patients died in the immediate postoperative period due to low cardiac out put and rhythm disturbances. The follow-up period was 6 months to 3 years. Two patients died after 6 months due to MI and rhythm disturbances. Follow-up was clinical, 2-D Echo, X-Ray and ECG.
Endartercetomay on its own or as an adjunct to CABG is a viable option in cases with diffuse coronary artery disease.
Methods: Fifty-seven patients underwent coronary Endarterectomy as an adjunct with coronary bypass surgery. Under G.A. all patients are connected to CPB with two stage single venous cannula and ascending arterial return (SARNS, CALMED-USA). Membrane oxygenator used in all patients (Dideco, Polystan). Ante grade cold blood cardioplegia was used in all patients. Coronary Endarterectomy performed in LAD, RAS and Circumflex artery in 27, 16 and 14, respectively. Complete Endartercetomay performed as and when necessary. Saphenous vein used in 47 patients and IMA in 11 patients. IABP support was required in four patients. Postoperative stay in the ICU was between 48 and 72 h. Adrenaline, Nor-Adrenaline and Dopamine was used. Lignocaine or Cardarone were used to control rhythm disturbances. Re-operation was performed for bleeding in six patients.
Results: Four out of 57 patients died in the immediate postoperative period due to low cardiac output and rhythm disturbance. Two patients died at the end of 6 months due MI. at the end of one year ten patients developed grade one angina. The remaining patients at the end of 3 years needed anti-failure and anti-anginal medications.
Conclusions: Coronary Endarterectomy is a viable option in patients with diffused artery disease were maximal medical therapy did not produce the relief. This procedure can be performed along with the CABG as adjunct with acceptable mortality in patients who otherwise were considered not for surgery.

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STERNAL WOUND INFECTION AFTER CARDIAC SURGERY

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Objective: In cardiac surgery, sternal wound infection following median sternotomy is a serious complication, associated with prolonged hospitalization, increased costs and morbidity. The aim of this retrospective study was to investigate the sternal wound infection rate in patients undergoing open heart surgery.
Methods: Between October 2004 and August 2006, a total of 1134 consecutive adult patients underwent open-heart surgery in our institution. There were 871 patients (76.8%) who underwent coronary artery bypass grafting (CABG), 131 (11.5%) patients had valve surgery, 44 (3.9%) patients had combined CABG and valve replacement, while 88 (7.8%) patients underwent various other procedures. All statistical evaluations were performed with the SPSS version 11.
Results: Overall infection rate were 2.6% (n=30). Twenty-nine (2.55%) patients had superficial wound infection and one (0.09%) had deep wound infection. There was no significant difference in infection rate between groups depending on procedures. Thus, 2.3% (n=20) of patients were infected in CABG group, 4.6% (n=6) in valve group, 2.3% (n=1) in combined CABG and valve surgery group, and 3.4% (n=3) in patients with various other procedures. A variety of causative organisms were found with Staphylococcus aureus (20%) and Staphylococcus epidermidis (56.7%) dominating. The time interval from the operation to the diagnosis of sternal infection was 16.4±7.1 days.
Conclusions: Wound infection is a common postoperative complication in cardiac surgery. In conclusion, despite of acceptable overall sternal infection rate in our institution, we believe that detailed investigation of possible mechanisms for its reduction would provide better results.

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SHOULD CLOPIDOGREL BE STOPPED PRIOR TO URGENT CARDIAC SURGERY?

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Objective: Clopidogrel with its high activity of inhibition of the platelet aggregation, is actually widely used in the treatment of unstable angina by reducing the early and mild risk of death, non fatal MI or non fatal stroke, with a no significant increase in the risk of major fatal or transfused bleeding.
We reported our surgical experience of patients undergoing open heart surgery in emergency without interrupting the clopidogrel.
Methods: Between June 2004 and June 2006, 366 patients underwent CABG in our institution, 56 of them have been operated in emergency (15%), 71% male, 53% suffered from hypertension, 45% from diabetes, 40% tobacco, 22% from hyperlipidemia the mean EF of the left ventricle was about 52%, 41% of these patients were under Clopidogrel, and operated in emergency for accident of PTCA (13%), Unstable angina with severe triple vessels (53%), and Left mean stenos is (34%). Forty percent only of our patients profit from off-pump surgery, all the others had been operated with pump. There is no use of any kind of anticoagulation in the first 5 days following the surgery, no aspirin, or any kind of heparin, and this what ever is the platelet count.
Results: The mean postoperative bleeding is 900 ml (vs. 700 ml in the group with no clopidogrel), the mean blood transfusion was 02 units of blood, and one unit of PFC. Only one patient needed the use of platelet transfusion.
One patient had been re-operated for bleeding, one patient died from a massive GI bleeding at day 2 after his surgery. The mean duration of CSU stay was 1.2 days and the total in hospital stay was 6.1 days.
Conclusions: Our study shows that CABG in patients under clopidogrel can be performed with a very low risk of mortality and morbidity, and that the postoperative bleeding is not usually exclusive to within the surgical site, and could be a disaster if the routine anticoagulation is applied.

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EARLY TO MID-TERM OUTCOME OF PATIENTS UNDERGOING COMBINED CORONARY ARTERY BYPASS AND AORTIC VALVE REPLACEMENT WITH A 17 MM MECHANICAL PROSTHETIC VALVE: THE EFFECT OF PATIENT PROSTHESIS MISMATCH

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Objective: Patient-prosthesis mismatch (PPM) occurs in subsets of patients undergoing aortic valve replacement and has an implication on the outcome of the patient. This study reports the early to mid-term outcome among patients who have undergone combined coronary artery bypass and aortic valve replacement with a 17 mm mechanical valve.
Methods: Between January 2000 and December 2005, 30 patients underwent the combined procedure. These patients could be divided into two groups on the basis of postoperative effective orifice area index (EOAI) - group A (n=17)-moderate PPM (EOAI 0.65–0.85 cm/m^2), group B (n=13)-severe PPM (EOAI <0.65cm/m^2). The preoperative, intra-operative and postoperative data of these patients were compared.
Results: Group A patients were taller (mean height 163 cm vs. 152 cm, P<0.001), weighed less (55 kg vs. 75 kg, P<0.001) and had lower mean body surface areas (1.52 vs. 1.81, P<0.001)) as compared to group B. Seventy-five percent in each group had severely calcified valves. Follow-up was 94% complete and echocardiographic follow-up averaged 34 months (ranged 12–56 months). There was no hospital mortality. Actuarial 5-year survival was 91% for both groups and no patient required reoperation. In both groups all patients were in NYHA class 1 or 2 and there were no difference in mean gradient at last follow-up (16 mmHg in both groups).
Conclusions: Selected patients with severely calcified valves may experience good clinical results with the use of modern small diameter bileaflet prosthesis.

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LONG-TERM OUTCOME AFTER CABG IN PATIENTS WITH LEFT VENTRICULAR DYSFUNCTION: DOES THE TYPE OF CARDIOPLEGIA MATTER?

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Objective: To find out if the method of cardioplegia can affect the long-term outcome of patients with left ventricular dysfunction who underwent first-time coronary artery bypass grafting (CABG)?
Methods: Fifty patients awaiting first-time CABG who have left ventricular ejection fraction (EF) <40% were prospectively randomised to receive either the standard St Thomas' Hospital crystalloid cardioplegia No 1 (STH1) or a similar solution where blood was the only difference (BSTH1). For each group the clinical and angiographic characteristics and the operative outcome data were compared. Survival curves were derived and compared for each group. Early (30-days) and long-term mortality and morbidity for both groups were analysed. Univariate and multivariate analysis were performed to evaluate predictors of postoperative survival.
Results: Late mortality occurred in nine cases (18%); six patients in BSTH1 (24%) and three patients in STH1 (12%).
The mean age was 62.4+1.7 for STH1 vs. 60.5+2.1 for BSTH1.
The mean EF was 35.8+0.9 for STH1 vs. 32.2+1.2 for BSTH1.
1, 3, 5, 8-year mortality in each group. (The unadjusted survival rates were 96%, 92%, 88%, 76% for BSTH1 group compared to 100%, 100%, 96% and 96% for STH1 group.
Twenty-five patients (61%) of the 41 survivors had complete relief of angina; 13/19 in BSTH1 (68%) and 12/22 in STH1 (55%). signs of CHF were still evident in seven patients (37%) of BSTH1 and also in seven patients of STH1 group (32%). Three of the survivors in BSTH1 developed dysrrhythmias (16%), while five in STH1 (23%). Angioplasty and stents were needed in three patients in STH1 group (13.6%) and only in one in BSTH1 (5.2%).
Conclusions: BSTH1 enhanced postoperative myocardial protection, but has no advantage on long-term mortality or morbidity.

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THE DIFFERENTIATED SURGICAL STRATEGY OF ONE-STAGE OPERATIONS IN PATIENTS WITH COMBINED CORONARY-CAROTID DISEASE

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Objective: To develop surgical strategy in patients with combined coronary-carotid disease depending on severity of each of vascular regions affection.
Methods: Carotid endarterectomy (CE) in combination with Coronary bypass has been performed in 181 cases (162 men and 19 women, mean age 57±6 years). The indication to one-stage operation was hemodynamically significant lesion of a carotid artery in combination with severe disease of coronary arteries. There was hemodynamically significant bicarotid disease in 26 patients, the significant manifestation of cerebrovascular symptoms observed in 46% of cases. All patients were in class IV according to CCS, 28% of patients had left main disease, and seven patients had LV aneurysm. Depending on severity of each of vascular regions affection the following surgical strategies have been used: 1. CE before the perfusion, 2. CE during the parallel normothermic perfusion, 3. CE during the hypothermic perfusion.
Results: Total frequency of cerebral and cardiac complications (ischemic stroke and perioperative myocardial infarction) was 4.4%; the mortality rate after one-stage operations was 3.3%.
Conclusions: One-stage blood perfusion restoration in carotid and coronary arteries allows to provide optimum protection for the brain, and the myocardium.
CE before the perfusion is indicated for patients with hemodynamically significant lesion of carotid arteries in case of stable cardiac status. CE during the parallel normothermic perfusion should be done in patients with unstable coronary blood circulation and-or hemodynamic, and also in case of high-risk of development of coronary complications (left main disease, critical stenosis of coronary arteries). CE during the hypothermic perfusion should be done in patients with bicarotid disease, especially in case of the occlusion of the contrlateral internal carotid artery.

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EXTRACORPOREAL CIRCULATION IN PATIENTS WITH VASCULAR DISEASES

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Objective: Reconstructive surgery on thoracic and thoracoabdominal aorta and vena cava inferior is associated with high rate of complications, such as paraplegia, acute renal failure, hepatic insufficiency, coagulopathy. Despite complexity and traumatism of such operations the ischemic lesion of the appropriate organ during aortic clamping is the main reason of failure. Search of the adequate methods of vital inner organs defense during reconstructive operations on great vessels is critical.
Methods: From 2004 to 2006, we performed 109 reconstructive vascular operations with cardio pulmonary bypass. The main indications for surgery were: thoracic and thoracoabdominal aneurysm – in 70 patients (seven patients had clinical manifestation of aneurysm rapture); recoarctation of the aorta – in 18 patients; congenital deformation of aortic arch – in 13 patients; hypoplasia of abdominal aorta – in three patient; aneurysm of ascending aorta with aortic valve insufficiency and coarctation of the aorta – in four patients; and tumor of the right kidney with thromb-tumor of inferior vena cava and the right atrium – one patient. In 79% of the cases we used the distal arterial perfusion by femoral vessels cannulation (femoral vein – femoral artery), in 17% - left heart bypass. Total cardiopulmonar bypass was used in four cases (4%), in two of them hypothermia arrest of circulation was conducted.
Results: Operative mortality rate was 37.5% for emergency cases (three from seven patients) and 5.5% for remained surgeries. Six patients died during operation due to cardiac failure. One patient died in 8 days after surgery due to massive thromboembolism of the pulmonary artery. Seven patients died in 1 and 3 days after surgery due to haemorragic complications and multiple organ dysfunction. Thirty days mortality rate was 7.7% (eight cases from 103 patients). Paraplegia took place in three patients (3.2%). In three patients from 95 survivors (3.2%) expracorporeal treatment of acute renal failure had to be performed.
Conclusions: Extracorporeal circulation gives sufficient rate of protection for spinal cord, kidneys and abdominal cavity organs during the main part of reconstructive operations on aorta and great vessels.

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POST INFARCTION VENTRICULAR SEPTAL DEFECTS – SURGICAL REPAIR AND 12 YEARS FOLLOW-UP

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Objective: A post infarction ventricular septal defect (VSD) is potentially fatal complication of myocardial infarction (MI) which still remains a very difficult problem with regard to medical management and surgical intervention. Our objective is to analyze long-term results of surgical post infarction VSD repair in single institution.
Methods: In a period 1987–2004, we have operated on 15 patients with post-infarction VSD (12 male, three female, mean age 58±8 years) at Clinic for

Cardiac Surgery, ICVD-CCS Belgrade, Serbia. Pre- and postoperative variables were collected from the individual patient charts. Mortality was calculated and a Cox proportional hazards regression model was used to identify independent predictors for early and late mortality. Mean follow-up was 5.9 years (range 1–12).
Results: Average time between MI and VSD onset was 4.6 days (range 3–7). Cardiogenic shock was present in six (40%) patients. Ten patients (66.6%) were operated on within 72 h, three (20%) 5 days and three (13.4%) 14 days after VSD onset. Preoperative diagnostics included TTE and catheterization in all, while two patients needed additional TEE examination. Anterior VSD was present in eight (53.3%) and posterior VSD in seven (46.7%) patients. Single coronary artery disease (CAD) was present in ten (66.6%), double CAD in four (26.6%) and triple CAD in one (6.6%) patient. Surgical approach to VSD through the MI zone was possible in 13 (86.7%) patients, while in two (13.3%) the right ventricular and the right atrial (via tricuspid valve), approaches were preferred. Additional single (LAD) and double (LAD, OM1) CABG were done in four (26.6%), and one patient, respectively. Left ventricular linear placation was done in 12 (80%) and Dor's operation in one patient.
Hospital mortality was 33.3% (5 patients). Ten survivors were submitted to long-term follow-up. Late mortality was 6.6% (one patient, died of CVI after 12 years). Nine patients are still alive and eight of them are in NYHA I and II, while one is in NYHA IV grade (late onset of residual leak).
Conclusions: Urgent repair and preoperative cardiogenic shock were independent predictors of early mortality. Statistically, we could not find significant influence of VSD localization and pre-existing coronary artery disease on late survival in our series.

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CORONARY ARTERY SURGERY PROFILE IN PATIENTS OLDER THAN 70 YEARS

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Objective: To assess the differences on atherosclerosis risk factors and hospital mortality in patients older than 70 years in whom a CABG was performed.
Methods: Prospective observational study of 1100 consecutive patients in a University Hospital undergoing CPB to perform a CABG. Off-pump procedures were excluded. Atherosclerosis risk factors and hospital mortality were prospectively collected. The SPSS pack (SPSS 12.0 inc. Chicago IL.) was used for statistical analyses. P <0.05 were considered significant.
Results: Patients older than 70 years were 36.6%, and the rest were the youngest group. The mean age was 74.3 years for elderly and 53.8 for the youngest group. Higher atherosclerosis risk factors in the elderly group were hypertension (65 vs. 49%, P<0.001), diabetes (41 vs. 30%, P<0.001) and females (45 vs. 31%, P<0.001). Lower atherosclerosis risk factors in the elderly group were hypercholesterolemia (29 vs. 45%, P<0.001), smoking (40 vs. 61%, P<0.001) and obesity (20 vs. 43%, P<0.001). Hospital mortality was 7.1 in elderly and 2.9 in the youngest group (P<0.01).
Conclusions: Elderly patients undergoing CABG procedures showed a higher incidence of hypertension, diabetes and females, with a lower incidence of hypercholesterolemia, smoking and obesity. His hospital mortality is greater than the young patients as an independent prediction factor.

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TOTAL REPAIR OF ATRIOVENTRICULAR SEPTAL DEFECT WITH RIGHT VENTRICLE OUTFLOW TRACT OBSTRUCTION

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Objective: Complete correction of atrioventricular septal defect (AVSD) associated with right ventricle outflow tract obstruction (RVOTO) has been reported to account for an increased surgical risk. The aim of this report is to summarize the experience in total repair of AVSD with RVOTO.
Methods: Between January 2000 and January 2007, 20 consecutive children with AVSD and tetralogy of Fallot (AVSD-TOF), (n=13); AVSD and Fallot's type double outlet right ventricle (AVSD-DORV), (n=6); AVSD and pulmonary atresia (AVSD-PA), (n=1); underwent complete correction. Multiple ventricular septal defects (VSD) were observed in two cases (10%), criss-cross malformation in one case (5%), and situs ambiguous with common atrium in one case (5%). Two patients (10%) had previous palliation. Mean age at repair was 2.7±2.3 years (range 3 months to 12 years). Mean gradient across the RVOT was 62±14 mmHg. All children underwent closure of septal defect with two-patch technique. Closure of VSD necessitated a combined right atrial and right ventricular approach especially at DORV. LAVV annuloplasty was performed in eight (40%) patients and its replacement with mechanical valve in two (10%). One patient with situs ambiguous required Mustard-type procedure. Four patients (20%) required a transannular patch.
Results: Four (20%) hospital deaths occurred in this series. Causes of death included progressive heart failure in two patients, cardiac dysrhythmias in one patient and multiple organ failure in the other patient. Two patient required late reoperation due to severe LAVV regurgitation in one case (mechanical valve was replaced at third p/op day), and VSD recanalization (closure of the residual VSD with Amplatzer septal occluder at fifth p/op day) in another case. The mean follow-up time was 36±26 months. All patients survived and are in NYHA functional class I or II. At follow-up, the mean gradient across the RVOT was 14±5 mmHg, significantly lower than preoperatively (P<0.001).
Conclusions: Complete repair in patients with AVSD-RVOTO seems to offer acceptable early and mid-term outcome in terms of mortality, morbidity, and reoperation rate. The RVOT should be managed in the same fashion as for isolated TOF; however, a transatrial transventricular approach especially at DORV is our approach of choice.

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RESULTS OF THE SURGICAL REPAIR OF AORTIC MALFORMATIONS COMBINED WITH CONGENITAL CARDIAC ANOMALIES

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Objective: The aim of the study was to analyze direct results of the surgical correction of aortic anomaly combined with congenital heart defects.
Methods: From 2003 to 2006, 38 patients underwent surgical correction. There were 18 (47.4%) males, 20 (52.6%) females. The mean age of the patients was 68±34 days and the weight – 3.7±1.6 kg. Thirty-five patients had aortic coarctation combined with following pathology: ventricular septal defect (VSD) – 23; transposition of great arteries (TGA) – 3; total anomalous pulmonary vein connection (TAPVC) - 2; common atrioventricular septal defect (CAVSD) - 1; aortic stenosis - 3; atrium septal defect (ASD) – 2; cor triatrium – 1. Another three patients had aortic arch interruption and VSD. Surgical correction was performed all patients provided by median sternotomy in conditions of deep hypothermia with cardiac arrest during aortic reconstruction.
Results: For adequate aortic reconstruction in 86.9% of cases was used extended 'end-to-end' anastomosis. In 13.1% of cases aortic anastomosis was enlarged by PTFE patch. All that patients had hypoplastic aortic arch. Mean cardio-pulmonary bypass time – 85±23 min; mean time of cardiac arrest - 27±5 min. There were three (7.8%) deaths. No reinterventions had to be conducted.
Conclusions: One stage repair of the aortic malformations and congenital heart defects via median sternotomy was safe and adequate method which could provide good surgical results.

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CHANGES IN THE PULMONARY VEINS IN PATIENTS WITH ATRIAL FIBRILLATION AFTER RADIOFREQUENCY CATHETER ABLATION WITH USING COMPUTED TOMOGRAPHY ANGIOGRAPHY SCANNING

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Objective: The arrhythmogenic foci in the pulmonary veins (PVs) and left atrium (LA) can be successfully eliminated by radiofrequency catheter ablation (RFA). The most dangerous complications are the atrial-oesophagus fistula and the stenosis of the PV which can occur in 27% cases. Exact determination of individual anatomy and dimensions of PVs is important to reduce the frequency and degree of these complications.
Methods: One hundred and ninety-six patients with different types of AF were examined from 2000–2005. All patients underwent angiography scanning using SCT technique, with multiplane reconstruction (MPR) and three-dimensional reconstruction (3D). There were estimated: the correlation between the PV ostia and spine, the correlation between the esophagus and the LA. These data helped to achieve PV isolation exactly in the ostias.
Results: The outcome of RFA was assessed in 38 patients at different time intervals. In our study none of the patients had significant (>50%) PVs stenosis. 91 PVs were estimated in patients after ostial ablation of PVs. In these cases 18 veins were reduced from 18–40% (mean - 20%). Right superior PV were reduced

in five patients, left superior PV – 10, right inferior PV in 1 pt, left inferior PV in one patient, and trunk – 1. The narrowing from 13–20% was observed in 5 PV; from 20–30% 8 PV and the maximum - 30–40% were in five cases of PVs. 20 PVs were estimated in patients after linear ablation in LA by using CARTO system. In these cases nine veins were reduced from 18–48% (mean – 45%). The maximum of narrowing – 40–50% was in 5% cases.
There were no reliable significant differences in the PVs narrowing after ablation of elective PVs (31.85 ± 5.8%) and after linear ablation in LA (26.75 ± 4.4%) (P<0.7).
Conclusions: Isolation exactly in the PV ostias, using cooled type catheter and reducing temperature resulted in effective outcome of RFA and absence of severe PV stenosis. SCT is a highly effective method of estimating anatomy of PVs and LA, displaying and monitoring PVs stenosis. This information should be used while planning intravascular surgery of atrial fibrillation.

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EARLY RESULTS OF SURGICAL TREATMENT OF THE ACQUIRED HEART DISEASES AND CARDIAC TUMORS IN ELDERLY PATIENTS

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Objective: The purpose of the present investigation was to evaluate early results of surgical treatment of the acquired heart diseases and cardiac tumors in elderly patients.
Methods: We analyzed 136 elderly patients aged 65 years and older, undergone cardiac surgery in Acquired Heart Disease Department Bakoulev Center of Cardiovascular Surgery, between 2001 and 2005. There were 76 men (55.9%) and 60 women (44.1%) with a mean age of 67±1.5 year (range 65–77 years). The overwhelming majority of patients (77.2%) were in NYHA class IV, 15.4%-NYHA class III, and 4.4%- NYHA class II.
Associated cardiac and/or extracardiac diseases were most often presented by arterial hypertension (54%), chronic obstructive pulmonary disease (25%), diabetes mellitus (13%) and chronic renal failure (8%).
Depending on a kind of surgical intervention patients were distributed on subgroups: isolated aortic or mitral valve replacements (MVR) - 62 patients (45.6%), MVR and tricuspid valve plasty (TVP) - 30 (22.1%), mitral, aortic and tricuspid valves replacements - 14 (10.3%), mitral and aortic valve replacements and TVP - 18 (13.2%), in 12 cases (8.8%) cardiac tumors (mixoma) were removed.
Twenty-four patients (9.6%) were operated previously: 19 (13.9%)-closed mitral comissurotomy, three (2.2%) - MVR, two (1.5%) -AVR. The causes of replacement of mitral and aortic valves were dysfunction of the prosthetic valves in four cases and prosthetic valve endocarditis in 1.
Results: In-hospital mortality in elderly patients varies from 4.2–8.6% depending on volume of surgical treatment. There were following complications in the postoperative period: acute heart failure in 25 patients (18.4%), pulmonary insufficiency - 11 (8.1%), bleeding - 7 (5.1%), required retoracotomy – 4 (2.9%), neurological disorders - 10 (7.4%) and arrhythmias - 27 (20%). At the moment of discharge home (15–18 day after operation) in majority of patients there were improvements in hemodynamic and clinical conditions.
Conclusions: Early results of surgical treatment of acquired heart diseases and cardiac tumors in elderly patients are good. Modern cardiac surgical techniques and clinical practices reduced the impotence of the age factor. Therefore, cardiac surgery should not be withheld on the bases of age alone. Qualily of life will be evaluated in future.

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THE FIRST EXPERIENCE OF APICAL AORTIC CONDUITS IN YOUNG CHILDREN WITH COMPLEX LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION

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Objective: One of the most actual problems in pediatric cardiac surgery is treatment of complex left ventricular outflow tract obstruction. Nowadays cardiac surgeons have various operative techniques to relieve left ventricular outflow tract obstruction such as Konno, Konno-Rastan and Konno-Ross procedures. However, in some clinical situations, like conditions that preclude a median resternotomy, severe aortic hypoplasia, performance of similar operations is associated with technical difficulties and high postoperative mortality. An aortic valve bypass (left ventricle apical-aortic conduit (AAC)) is an alternative strategy in these situations. The purpose of this study was to present our first institutional experience with the apical-aortic conduit implantation in children.
Methods: From January 2006 to September 2006, apico-aortic prosthetic-valved conduits were implanted in two children at the age of 3 and 2.7 years respectively, who had severe left ventricular (LV) outflow tract obstruction. These children previously underwent open-heart surgery. The indications for implantation of apico-aortic conduit rather than Konno, Konno-Rastan or Konno-Ross procedures were conditions that precluded a median resternotomy: mediastinitis in one patient, diffuse aortic stenosis, technical complexities and high-risk of postoperative mortality.
Results: Both patients are alive. Reduction of mean left ventricular-to-aortic peak gradient in the early postoperative period from 145±5 to 15±1 mmHg was demonstrated (P<0.001). Three and six months later echocardiography showed an adequate function of the apico-aortic conduits and 12±1 mmHg gradient between the left ventricle and the aorta.
Conclusions: Apical aortic conduit is effective in relieving complex left ventricular outflow tract obstruction and improving left ventricular performance with acceptable short-term and mid-term results. Apical aortic conduit provides an acceptable alternative to the Konno, Konno-Ross or Konno-Rastan procedures in selected group of patients, who are at exceedingly high-risk for the standard procedure. Avoidance of resternotomy and cardiopulmonary bypass can be appealing treatment strategy in moderate-risk children with complex left ventricular outflow tract obstruction.

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LONG-TERM EFFICACY OF DIFFERENT MODIFICATIONS OF MAZE-3 PROCEDURE FOR SURGICAL TREATMENT OF CHRONIC ATRIAL FIBRILLATION

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Objective: At present the Maze-3 operation is considered to be a gold standard surgical procedure for restoration of sinus rhythm and atrial contractility in atrial fibrillation (AF). It is unknown, which type of operation is the most effective and safe in patients with chronic AF, including those with congenital and acquired heart diseases. This study presents long-term results of different modifications of surgical treatment for chronic AF.
Methods: From September 2000 to November 2006 we performed 180 combined operations for chronic AF and mitral valve disease treatment (MV plasty or prosthesis implantation), including 100 radical operation for chronic AF: 35 patients (pts) underwent Maze-3 operation, 48- a irrigated RF modification of Maze-3 and 17- a cryo-modification of Maze-3 operation. Mean age of patients was 45.7±12.6 years (range 27–67 years), AF duration was 3±2.3 years (12 months-7 years). Average preoperative LA dimension was 6.34±1.5 cm (4.5–8.4 cm). All patients were NYHA class III-IV.
Results: From the 100 patients who underwent radical surgery for chronic AF, 1 pt (1.5%) died in hospital as a result of spontaneous rupture of the LV posterior wall after RF modification of the Maze-3 operation and LA plication. In general, by the time of discharge 82% of patients had sinus rhythm. None of our patients needed pacemaker implantation for postoperative AV block or sinus node dysfunction at hospital discharge. Results of the different types of the Maze-3 operations were evaluated after 60±10.3 months by Santa Cruz scale with scores ranging from 0–4. All patients with sinus rhythm (n=75. 81%) had score 4, atrial contractile function of both atria was preserved in all of them up to five years after surgery. Four patients who had score 3 needed permanent pacemaker implantation at long-term follow-up, as their atrial function is preserved.
Conclusions: Our experience shows the reproducibility of different modifications of Maze-3 operation with overall long-term effectiveness over 80%. The cut-and-sew technique or cryo-modification of the 'Maze-3' procedure are currently preferable in patients with moderately increased LA. It is necessary to strictly follow the protocol of procedure technique, as well as to combine the operation with the reduction of LA cavity and left atrial appendages closure.

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THE FIRST EXPERIENCE OF MOSAIC VALVE USAGE IN CHILDREN

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Objective: The aim of the study is to present first experience of the Mosaic valve usage in young children with congenital heart diseases, who underwent tricuspid valve replacement (TVR).

Methods: Between March 2005 and December 2006 13 children with Ebstein's anomaly underwent TVR: from them in nine cases (69.2%) biological Mosaic valve was implanted. Patients (pts) age varied from 1.5 to 4 years, the body weight from 9–17 kg. The size of the Mosaic valve ranged from 21–27 mm. In two cases (15.4%) TVR by 'Mosaic' valve was redo because of the dysfunction previously implanted biological 'Biolab' valve and in two patients - after TV plastic surgery.
Results: Hospital mortality was 11.1% (one patient). In two patients the early postoperative period was complicated by AV block. In all cases, the function of the Mosaic valve was adequate in the early postoperative period. Mean gradient ranged from 2–5 mmHg. The follow-up ranged from 6 months to 1.5 years.
Conclusions: Our preliminary data demonstrate clinical safety and excellent performance of the Mosaic valve. Continued clinical monitoring of this patient population will show if this new bioprosthesis indeed provides acceptable results.

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PROPHYLAXIS OF ATRIAL FIBRILLATION AFTER CABG WITH COMBINATION OF SOTALOL AND MAGNESIUM. A PROSPECTIVE, DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED STUDY

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Objective: Atrial fibrillation (AF) is a common complication reported in 20–40% of patients after coronary artery operations determining potentially prolonged hospital stay. The aim of this study was to evaluate the efficacy of Sotalol and Magnesium, used in combination in a prophylactic regimen, to reduce postoperative AF.
Methods: Sixty consecutive patients referred to our hospital for elective CABG, between December 2004 and November 2005 were enrolled. The study was carried out in a double-blind, placebo-controlled fashion. Patients were excluded for preoperative ejection fraction <0.40, atrioventricular block, QT interval longer than 440 ms, preoperative use of antiarrhythmic drugs (exception of beta-blockers), history of supraventricular arrhythmias, severe chronic obstructive pulmonary disease and serum creatinine levels more than 2.0 mg/dl. All eligible patients were randomly assigned to receive either placebo or Sotalol and Magnesium, according to the following scheme: 3 g of Magnesium the day before operation, 3 g of Magnesium just after CBP, therefore, 1 h after coming in ICU, Sotalol infusion 1 mg/kg in two hours and then 0.15 mg/kg until first day after operation. Thereafter, Magnesium 3 g was given once daily for a total of four days and Sotalol 80 mg twice for a total of five days. The primary end point of the study was considered any AF episode from entry in ICU until the fifth postoperative day.
Results: This study evaluated 60 patients undergoing coronary artery surgery, with 30 receiving placebo (group P) and 30 receiving Sotalol and Magnesium sulfate (group S). There were not postoperative deaths. Atrial fibrillation occurred in 28.48% of patients (8/28) in the group P, 22.22% (6/27) in group S (*P*=N.S.). No differences were noted among the groups for total duration of AF or for time of onset of AF. Patients in group S had more episodes of AF than group P (*P*=0.05) for a total duration of AF of 10.19±7.21 h and 9±13.91 h, respectively (*P*=N.S.).
The group P had no longer postoperative length of stay compared with the group S (*P*=0.81). The two groups differed significantly in their serum magnesium levels at postoperative days one and two, showing a marked increase for patients in group S (*P*<0.05).
Conclusions: Prophylaxis with Sotalol and Magnesium used in combination does not decrease incidence of postoperative atrial fibrillation and length of hospital stay.

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CORONARY ARTERY BYPASS GRAFTING IN OCTOGENARIANS – OUTCOME WITH AND WITHOUT EXTRACORPOREAL CIRCULATION

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Objective: Octogenarians are increasingly considered for coronary artery bypass grafting (CABG), but still represent a high-risk patient group with increased mortality and morbidity. In recent years off-pump surgery has been successfully established in CABG. The avoidance of extracorporeal circulation (ECC) seems to be of particular benefit for this patient group. We retrospectively analyzed our experience with CABG surgery with and without ECC in octogenarians to define a potential benefit of these different approaches in this high-risk group of patients.
Methods: We analyzed the outcome after isolated CABG of 344 consecutive patients (219 male, 125 female, 82±2.4 years) who were aged 80 or older. Patients were divided in two groups according to the use of ECC. The on-pump group consisted of 237 patients (151 male, 86 female, 82±2.8 years) and the off-pump group consisted of 107 patients (68 male, 39 female, 82±1.9 years). The predicted EuroSCORE and EuroSCORE mortality risk were similar for both patient groups.
Results: Overall hospital mortality rate was 5.5% (*n*=17), 14 patients (5.9%) in the on- pump group (*n*=237, 100%) and five patients (4.6%) in the off-pump group (*n*=107, 100%). The average number of grafts in the on-pump group was 2.8±0.4 and 2.4±0.6 in the off-pump group (*P*=0.05). Morbidity was comparable in both groups. Significant variables in multivariate regression were preoperative atrial fibrillation (*P*=0.03; RR=2.7), COPD (*P*=0.0001; RR=6.5) and prolonged intubation (*P*=0.005; RR=4.1).
Conclusions: Isolated CABG in octogenarians can be performed with good clinical results although a substantial mortality remains. The results of coronary surgery in this patient group with and without ECC are comparable concerning mortality and morbidity.

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THE ASSOCIATION OF LEFT ATRIAL SIZE AND OCCURRENCE OF ATRIAL FIBRILLATION AFTER CORONARY ARTERY BYPASS SURGERY

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Objective: Recently left atrial enlargement has been documented as an independent predictor of common cardiovascular outcomes, such as atrial fibrillation. Moreover, increased left atrial dimension (LAD) is a risk factor for nonrheumatic atrial fibrillation (AF) in a non-selected population, according to the Framingham Heart Study. The correlation between LAD and postoperative AF in patients undergoing coronary artery bypass grafting (CABG) has never been assessed in a wide population.
Methods: A retrospective review was undertaken in 3276 consecutive patients (2654 males, middle age 64.0±8.9 years) who had first-time CABG (2638 on-pump) from 1999–2004. LAD was measured by 2D-guided M-mode echocardiography obtained in the parasternal short-axis view at the base of the heart according to the American Society of Echocardiography recommendations.
Results: Medium atrial size was 38.8±6.0 mm (range 18–76) in our population. AF occurred in 315 patients (9.6%). Patients who experienced AF were, on average, older (68.0±7.6 vs. 63.5±8.9), had a slightly bigger left atrium (39.8±6.4 mm vs. 38.7±6.0 mm, *P*=0.003) and a slightly worse left ventricular ejection fraction (*P*=n.s.). After having performed logistic regression analysis, previous AF, left atrial size (*P*=0.014) and increasing age, but not cardiopulmonary bypass use and female sex, were identified as risk factors for developing AF after CABG.
Conclusions: Our results indicate that left atrial size assessed by preoperative transthoracic echocardiography can be considered a predictor of postoperative AF after both on-pump and off-pump CABG.

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CONCOMITANT CAROTID AND CORONARY ARTERY BYPASS GRAFTING: OFF-PUMP VS. ON-PUMP STRATEGY AND EARLY NEUROLOGICAL DYSFUNCTION

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Objective: The appropriate surgical strategy for patients with concomitant carotid and coronary artery disease remains controversial. We retrospectively evaluated early and late results of elective combined surgery: carotid endarterectomy (CEA) and coronary artery bypass grafting (CABG) using two types of surgical approaches.
Methods: The medical records of 138 patients, consecutively operated on for concomitant carotid and coronary artery disease between December 1993 and December 2005, were retrospectively reviewed. The patients were divided into two groups: patients who underwent combined off-pump CABG and CEA (Group I, *n*=49) and those who underwent one-stage on-pump CABG and CEA (Group II, *n*=89), according to surgeons' choice. Surgical morbidity and mortality were compared among the two groups.
Results: Patients in the two groups were similar for all preoperative variables, except for atheromatous ascending aorta (22 out of Group I vs. 20

out of Group II, P=0.049). Global early mortality was 5.07%, perioperative myocardial infarction and stroke rates were 1.44% (one in each group) and 4.34% (one in Group I and five in Group II), respectively. The duration of postoperative ventilatory support, blood loss from chest drains, intensive care unit stay and hospital stay were slightly increased in Group II, although it was not statistically significant. Interestingly patients in Group I were less likely to have a transient decline in cognitive function, and that favoured their early recovery.
Conclusions: Concomitant CEA and CABG appears safe and effective and we suggest to perform off-pump CABG in high-risk patient.

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CLINICAL FEATURES AND FOLLOW-UP AFTER 25 YEARS OF CARDIAC MYXOMA SURGERY

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Objective: Atrial myxomas are the most common benign cardiac neoplasms with possible fatal complications. We reviewed our institutional 25-year experience with reference to clinical presentation, tumour location, microscopic features, recurrence and survival for each patient affected by this neoplasm.
Methods: Between 1981 and 2006, 54 patients were operated on for primary cardiac neoplasms. Among these cases, 46 patients (26 females; 59.2±12.1 years, range: 28–82 years) underwent surgical resection because of cardiac myxomas. The surgical approach comprised complete wide excision, with transatrial Guiraudon technique in most cases.
Results: The interval from myxoma diagnosis to surgery was 4.3±5.5 days and the tumour was located in left atrium in 40 (96%) patients. Males were affected in a younger age than females (54.2±14.1 vs. 62.9±8.9 years, P=0.020). Embolic myxomas correlated with male gender (P=0.043) and irregular surface aspect (P<0.001), while cardiac symptoms were predominantly observed in females (P=0.004). There were no hospital deaths, and 17 patients suffered from postoperative atrial fibrillation. During the follow-up period (130±88 months; range: 6–305) there were eight non-cardiac deaths and no tumour recurrence was registered. At 25 years the actuarial survival for the entire population is 83% and the event-free rate is 76%.
Conclusions: A surgical and complete resection of myxomas is the gold standard treatment with excellent long-term results. Embolic myxoma involves more frequently males, which are younger than females and more frequently asymptomatic.

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HYBRID TREATMENT OF PATIENTS WITH WIDESPREAD VENOUS THROMBOSIS

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Objective: To assess the results of complex therapeutic and surgical treatment of patients with widespread venous thrombosis.
Methods: The study includes 20 patients (pts) with confirmed diagnosis of venous thrombosis. Four patients received conservative therapy, 16 patients provided surgical treatment. All the patients were carried out a standard hospital checkup during their admission to the hospital and the basic characteristics of coagulant blood system were analyzed. Genetic factors which can lead to the development of thrombosis were examined. Patients underwent the following investigations before surgical treatment: complex echocardiogram, Doppler ultrasound exam and duplex scanning of vena cava inferior and vessels of lower extremities, perfusion scan of lungs, CT-scan of thoracic and abdominal cavities, computed tomogram-angiography of pulmonary artery and heart, phlebography of vena cava inferior and veins of legs.
Results: All the patients had increased levels of fibrinogen, soluble fibrin monomers, D-dimer during their admission to the hospital. Several patients had the decreased level of antithrombin III. Six patients had thrombophilia caused by genetic mutations.
Four patients with pulmonary embolism received successful conservative treatment.
Sixteen patients provided surgical treatment, ten of them under cardiopulmonary bypass.
In three patients with pulmonary embolism performed surgery included the combination of thrombectomy from the right ventricle and tricuspid valve reconstruction using Carpantier ring in two cases; thrombectomy from the vena cava inferior, both iliac veins with simultaneous removing of thrombosed cava-filter in one case.
Thrombectomy from the vena cava inferior was done in 11 cases, in combination with thrombectomy from both iliac-femoral-popliteal segments and removing of thrombosed cava-filters in three cases; thrombectomy from the right atrium (RA) in two cases; plastic of RA and tricuspid valve (TV) in two cases; with nephrectomy in two cases; thrombectomy from RA, both iliac-femoral-popliteal segments and prosthesis of TV in one case.
The tactics of conservative therapy of patients in the postoperative period was based on the exact diagnostics of hemostasis imbalance and effective everyday laboratory monitoring of coagulant system characteristics.
Conclusions: It is necessary to use hybrid technic for treating the widespread venous thrombosis which include complex medical therapy, high surgical technologies and laboratory hemostasis monitoring. This will provide a long-term success.

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END-STAGE ACQUIRED RIGHT VENTRICULAR FAILURE: FROM TRANSPLANTATION TO ONE AND A HALF VENTRICULAR REPAIR

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Objective: Isolated end-stage right ventricular failure due to arrhythmogenic dysplasia is a rare indication to cardiac transplantation. A patient with this condition and awaiting a suitable donor underwent rescue bi-directional cavopulmonary shunt.
Methods: A 50-year-old woman with right ventricular dysplasia and malignant ventricular arrhythmia, severe tricuspid regurgitation and recalcitrant bilateral pleural effusions, mitral regurgitation with LVEF 50%, received a transvenous ICD and was rejected for tricuspid valve replacement elsewhere. She was admitted and listed for transplantation, but she gradually deteriorated and became dependent on furosemide and dopamine infusions. The lack of a donor prompted a one and a half ventricular repair.
Results: Patient underwent mitral and tricuspid ring annuloplasty, right reduction atrioplasty, cavopulmonary anastomosis and epicardial defibrillator implantation. She was extubated on day #2. She had prolonged bilateral pleural effusion for two weeks, and upper body peripheral edema for four weeks. On postoperative day #33 she was discharged home and is doing well at 9-month follow-up, free of malignant ventricular arrhytmia.
Conclusions: End-stage right ventricular failure is a traditional indication to cardiac transplantation even if left ventricular function is preserved. End-stage valve repair may be associated to bi-directional cavopulmonary shunt as an alternative to transplantation or as a bridge-to-transplant. One and a half ventricular repair may be considered part of the end-stage surgical armamentarium.

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END-STAGE RIGHT HEART FAILURE FOLLOWING MITRAL VALVE REPLACEMENT: GLENN-CLOVER REPAIR

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Objective: A compromised right ventricle following mitral surgery increases the risk of subsequent tricuspid valve repair or replacement. Adding a bi-directional cavopulmonary shunt (one and a half ventricular repair) to tricuspid surgery has the potential of reducing mortality and morbidity in high-risk patients.
Methods: A 73-year-old man, had undergone mitral valve replacement five months earlier and presented with severe tricuspid regurgitation, intractable ascites, recalcitrant pleural and pericardial effusions, increasing peripheral edema, and low cardiac output despite epinephrine infusion. He did not qualify for cardiac transplantation listing because of age. He had undergone left thoracotomy to create a pleuropericardial window 11 days earlier.
Results: He underwent urgent bi-directional Glenn shunt associated to tricuspid clover valvuloplasty. An early bifurcation of the right pulmonary artery prevented a direct anastomosis to the superior vena cava and required a 4.5 cm pericardial conduit interposition. IABP. He was extubated on day #10. Right sided effusions disappeared rapidly, while upper body

peripheral edema persisted for 4 weeks. He was discharged on postoperative day #39.
Conclusions: A bi-directional cavopulmonary shunt adds distinct advantages to tricuspid valve repair in end-stage right heart failure. Reduction of preload reduces right ventricular workload and allows a more restrictive tricuspid valvuloplasty. The fall of inferior caval and portal pressures favors recovery from hepatorenal dysfunction and enteropathy.

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FACTS AND DEBATES – 4 YEARS EXPERIENCES WITH BEATING HEART CORONARY ARTERY BYPASS GRAFTING

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Objective: In the last few years, off-pump coronary artery bypass grafting (OPCAB) has gained widespread diffusion and being increasingly reported to show better outcomes compared with conventional on-pump coronary artery bypass surgery, despite the lack of sufficient evidence from randomized trials. We detail our early experience with this technique mainly in high-risk, elderly and multivessel coronary artery disease patients.
Methods: Between 2002.01.01 and 2006.06.30, 3290 consecutive patients underwent isolated coronary artery bypass surgery at our institutions. Two thousand and ninety seven (63.7%) of these procedures were operated by authors with off-pump technique. In the last two years, 91.9% of total coronary artery disease patients were performed without extracorporeal circulation. The target arterial occlusion time was about 9 min (ranging 5–25 min). The male:female ratio was 2.8:1. The mean age was 63.02±0.5 years, ranging from 19–86 years. 27.75% of the patients were aged 70 years and older. The average EuroSCORE of the patients were 3.8 (0–38) and the Parsonett Score were 10.3 (0–74). Twenty seven percent of the procedures were performed as acute or urgent cases. There were no exclusion criteria (like LMS stenosis, intramyocardial coronary artery or emergency procedure ect.).
Results: On average, 2.51±0.4 grafts per patient were completed in our OPCAB patients (ranging 1–6 distal anastomoses). The usage of IABP in the perioperative period was about 6.9% (145). In the postoperative course, the occurrence of bleeding was 6.7% (140 patients), the need of blood transfusions were 14.8% (311 patients), neurological deficits turned out in 2% (42), renal problems developed in 2.2% (47 patients). Perioperative mortality rates were 1.1% (24 patients) and the perioperative myocardial infarction ratio was 2.9% (61). Intraopertaive conversion was necessary in 12 cases (0.57%) because of hemodynamic instability or inadequate visualization.
Conclusions: OPCAB surgery is safe and effective in patients with multivessel coronary artery disease. This type of coronary artery bypass surgery is associated with a slightly reduced postoperative length of ICU and hospital stay and there is a significant reduction in morbidity and mortality.

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OPEN HEART SURGERY AMONG OCTOGENERIANS – FICTION OR REALITY

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Objective: Along with aging of our generation, important demographic changes occur in cardiac surgical practice. Controversy exists as to whether treating of the elderly populations is meaningful in maintaining their appropriate life expectancy and quality of life.
Methods: In our work, we retrospectively analyzed 105 consecutive octogenarian patients underwent cardiac surgical procedures in our institutions, between 2000.01.01 and 2006.06.30. The mean age was 81.5 years, ranging from 80–87 years. The male:female ratio was 1.69:1 (66 vs. 39). Regarding surgical indications, 67% (70 patients) had coronary sclerosis (STEMI:4.7%, NSTEMI:31.4%, Unstable angina: 26.7%, Stable angina: 18.6%). Thirty one percent of the patients (34) had significant, symptomatic aortic valve stenosis (AVD). There were 16 patients isolated AVD and 17 patients combined with coronary sclerosis. Mitral valve insufficiency (MVD) and combined AVD and MVD were at one and one patients. The average EuroSCORE of the patients were 7.9 (4–38) and the Parsonett Score were 27.9 (12–76). Acute procedures were done in 9.5% of cases, while 41.9% and 48.6% were performed as urgent or chronic surgeries, respectively.
Results: The average operating time was 149.1±22.3 min, the aortic cross clamp 23.3±17.1 min. OPCAB procedures were done in the 84.3% of coronary cases. On average, 1.43±0.6 grafts per patient were completed. The usage of IABP in the perioperative period was about 7% (8). In the postoperative course, the occurrence of renal problems was 2.9% (3), the need of blood transfusions were 37.4% (40), neurological deficits turned out in 2.9% (3). The perioperative myocardial infarction ratio was 5.6% (6). The perioperative mortality rates (<30 days) were 3.7% (4), while the late mortality was 12% (13) and the half of them were not resulted from cardiac illness. Concerning follow-up, 80% of surviving patients are active, self-supporting without cardiac complains, 15% of them have minimal need for help and only 5% are unable of taking care of themselves.
Conclusions: Among octogenarians, cardiac surgeries can be done in acceptable mortality. Cardiac complains are treated in the waste majority of patients and their quality of life can reach the expectancies of the healthy age group.

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THE COMPARISON OF LEFT VENTRICULAR MASS REGRESSION FOR DIFFERENT VALVE TYPES AND SIZES AFTER MECHANICAL VALVE REPLACEMENT IN THE PATIENTS WITH STENOSIS OF THE AORTA

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Objective: The aim is the compare left ventricular hypertrophy and increased left ventricular mass and regression after mechanical aortic valve replacement which develop because of the pressure gradient that take place as a result of the narrowness of aortic valve in terms of different aortic valve number and tape.
Methods: In Izmir Atatürk Education and Research Hospital Heart Vascular Surgery Clinic, between March 2001 and February 2006, 46 patients having aortic valve narrowness who have had mechanical AVR (aortic valve replacement) according to different aortic valve type and number were taken into study. All of these patients were invited to examination between June 2006 and August 2006 and these patients were reevaluated with ECO, ECG and Telecardiografy.
Results: In patients having mechanical aortic valve, a statistically meaningless decrease was observed between different mechanical valve types in left ventricular mass and mass index when compared to pre-operation period.
Conclusions: The result is found as number 21 or lower valves should not be replaced in adult patients other than having narrow aortic root and could not be enlarged enough and also in patients having 1.5 m^2 or less body surface area.

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DOES AGRESSIVE SURGICAL RECONSTRUCTION MAKE AN IMPACT ON THE POSTOPERATIVE MORTALITY AND MORBIDITY IN INFECTIVE ENDOCARDITIS?

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Objective: The impact of aggressive reconstruction or root implantation after wide debridement as a surgical treatment for infective endocarditis is not well understood or explored in the literature.
Methods: Between January 1995 and Jun 2006, 79 adult infective endocarditis patients who underwent surgical treatment were enrolled. There were 63 native and 16 prosthetic valve endocarditis respectively. They include 27 cases of culture negative endocarditis. With the valve replacement or repair, 28 patients underwent more aggressive surgical option for example aortic root replacement, reconstruction or heart base reconstruction etc. Follow-up was completed and mean follow-up duration was 43+37.4 month.
Results: Mortality rate was 5.1% (4 cases). There was statistical significance (P<0.05) between in-hospital mortality and staphylococcal infection, urgent base operation, operation during active phase endocarditis. Wide debridement and aggressive reconstruction were not related both postoperative early and mid-term mortality and morbidity.
Conclusions: It must be paid attention to the medical treatment during preoperative period of the infective endocarditis so as not to change for the worse. Furthermore, if surgery is candidate for the infective endocarditis, it should be performed before the timing of downhill course of the disease so that may improve surgical outcome. Wide debridement and more aggressive reconstruction are also warranted.

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LOWEST HEMATOCRIT ON CARDIOPULMONARY BYPASS AND KIDNEY DYSFUNCTION

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Objective: The lowest hematocrit on cardiopulmonary bypass (LHCT) has been identified as a risk factor for kidney dysfunction after cardiac surgery. The objective of this study is to determine if different levels of hematocrit during cardiopulmonary bypass is related to kidney dysfunction.
Methods: A prospective study was conducted on 262 consecutive patients undergoing cardiac surgery Preoperative renal function was assessed by baseline creatinine clearance (CrClPre). Peak postoperative creatinine clearance (CrClPost) was defined as the highest daily in-hospital postoperative value. Peak fractional change in creatinine clearance (% CrCl) was defined as the difference between the CrClPre and CreClPost represented as a percentage of the perioperative value. The LHTC was defined as the lowest recorded hematocrit prior to weaning from the initial pump run. A category variable was created for hematocrit based on the distribution of values. The category variable had the following cut points: <21%, 21.1–25% and >25.1%.
Results: Lowest hematocrit (23.58+3.27%), CPB (72.91+26.62 min), CrClPre (78.7+32.8 ml/min) and highest CrPost (63.3+26.8) data varied in near-normal fashion. Statistical significance has been observed in the <21% lowest hematocrit group (CrCl1POD and CrCl5POD; P=0.008) and >25.1% lowest hematocrit level (CrClPre and CrCl2POD; P=0.042).
Conclusions: Lowest Hematocrit on CPB between 21.1 and 25% has not been associated with kidney dysfunction.

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CORRECTION OF POSTSTENOTIC ANEURYSM OF ASCENDING AORTA

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Objective: To determine possibilities of correction of poststenotic aneurysm of ascending aorta (PAAA) by means of different methods.
Methods: During 1999–2006 years, 85 patients (pts) with aortic stenoses (AS) and PAAA were operated in Institute. The average age was 53.4±7.3 (21–67) years. At all group 33 (38.8%) patients were in III NYHA class and 52 (61.2%) patients - in IV. The following operations were performed: 1) aortic valve replacement (AVR)+wrapping of AA by nylon tape (special technic) - 54 (63.5%) patients (group A), 2) AVR+resection of AA+wrapping of AA 16 (18.8%) patients (group B), 3) AVR+resection of AA+plasty of sinotubular junction (STJ) in zone of noncoronary cusp+wrapping of AA 12 (14.1%) patients (group C), 4) AVR+plasty of STJ+wrapping of AA 3 (3.5%) patients (group D). Control group E is 27 patients only with AVR. All operations were performed with CPB, moderate hypothermia (28–32 C), retrograde St. Thomas crystalloid cardioplegia.
Results: No hospital deaths among all group in hospital period and during remote period (average 3.4±0.7 years). Echo examination of diameter of AA for group A: preoperative 5.2±0.7 cm, postoperative (6–7 day) 4.4±0.4 cm, remore period 4.3±0.3 cm; for group B: preoperative 5.4±0.6 cm, postoperative (6–7 day) 4.0±0.3 cm, remore period 4.0±0.3 cm; for group C: preoperative 5.5±0.5 cm, postoperative (6–7 day) 3.9±0.4 cm, remore period 4.0±0.3 cm; for group D: preoperative 5.3±0.4 cm, postoperative (6–7 day) 4.1±0.3 cm, remore period 4.1±0.2 cm; for group E: preoperative 5.7±0.4 cm, postoperative (6–7 day) 5.6±0.4 cm, remore period 6.0±0.2 cm (P<0.05).
Conclusions: On the basis of clinical experience we recommend the expedient method of complex reconstruction of PAAA during AVR without prostheses of AA. Dilatation of AA were marked in group E during the next three postoperative year because reconstruction of AA in patients with PAAA should be better performed in cases with diameter of AA more than 4.5 cm.

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UNPROTECTED BEATING HEART SURGERY FOR COMPLETE MYOCARDIAL REVASCULARISATION

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Objective: To perform safely beating heart surgery for complete myocardial revascularisation, Left internal mammary artery (LIMA) to left anterior descendents (LAD) anastomosis is recommended by most of the authors to be performed as the first step. This may results in less freedom for heart positioning during opcab surgery and consequently leads to uncomplete revascularisation.
By performing the LAD anastomosis at the end of the procedure, it may allow the surgeon full ability to perform distal anastomosis.
Methods: We retrospectively study 185 consecutive patients between February 2002 and September 2006, we perform 185 complete unprotected myocardial revascularisation on patient with three vessels diseases. Fifty-eight patients (31%) have a significant left main disease. All other patients with one and two vessel diseases were excluded. No intra coronary shunt were used.
Results: Mean age was 70 years (range 41–88); 134 patients were male. Mean distal anastomis was 3.38 (range 2–6). In 71 patients (38%), left and right internal mammary artery were used.
Our complication rate was acceptable: reconversion rate to on-pump procedure was 2.7% (five patients); in hospital mortality rate was 1% (two patients); peroperative myocardial infarction rate was 0.5% (one patient). four patients (2%) need an peroperative intraaortic balloon-pump for haemodynamic instability.
The mean hospital and the icu stay was respectively 10 days (range 4–32) and 2.96 (range 1–28). Renal complication rate was 7% (13 patients), revision rate for bleeding 1.6% (three patients), atrial fibrillation 37% (70 patients) and neurological complication 1.6% (three patients).
Conclusions: Beating heart myocardial revascularisation is a safe procedure. Our unprotected procedure allows us to perform complete revascularisation with low mortality, morbidity and reconversion rate.

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SUTURELESS PATCH AND GLUE TECHNIQUE FOR REPAIR OF CORONARY SINUS INJURIES

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Objective: Coronary sinus (CS) injury is a rare complication of coronary sinus catheter insertion. Its management can represents a technical challenge leading to potential mortality. We reported seven cases in which CS injury was repaired by a sutureless patch-and-glue technique.
Methods: From January 1999 to November 2006, seven cases of CS catheter-related injuries occurred (0.09% of cardiac operations on cardiopulmonary bypass in our experience). The patients were one man and six women (mean age 69±12 years) who underwent valve replacement and/or coronary artery bypass grafting on cardiopulmonary bypass. One patient had reoperation.
All CS injures were intraoperatively detected at the time of blood cardioplegia delivery as an unexpected bleeding was observed. The delivery was stopped and the heart was arrested with the anterograde delivery of cardioplegia. The direct inspection revealed a middle injury in all cases. The CS injury was repaired before performing cardiac surgery. An autologous pericardium patch was sized to be about four times greater than CS. It was fixed to the surrounding epicardium closed to the CS injury with two 4-0 Prolene stitches. A biologic bovine serum albumin and glutaraldehyde glue (Bioglue, CryoLife International, Inc., Kennesaw, GA) was applied around CS injury. The CS repair was tested with the delivery of anterograde cardioplegia and when an optimal repair was observed the planned cardiac operation was performed.
Results: In our experience, this simple surgical approach led to CS injury repair and a complete haemostasis. No perioperative complications occurred. The postoperative course was uneventful. The mean postoperative in-hospital stay was 7.2±2.1 days. At follow-up no death or cardiac complications occurred.
Conclusions: This limited experience with the sutureless pericardial patch and glue technique for repair of CS injuries indicates that it is safe and feasible for repair of central coronary sinus injuries.

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RECYCLING OF THORACIC ARTERIES FOR REDO CORONARY ARTERY BYPASS GRAFTING: LONG-TERM FOLLOW-UP

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Objective: Early and mid-term results after recycling of the ITA grafts in coronary reoperation were demonstrated to be satisfactory. We report clinical and angiographic long-term follow-up of this procedure.

Methods: From January 1990 to December 2005, nine patients (seven men and two women) underwent redo-CABG recycling the previously implanted ITA.
Patients were evaluated with regards to clinical, echocardiographic and angiographic findings. They were prospectively followed-up by means of direct visit, echocardiography and stress test. Between June 2006 and December 2006, a coronary angiographic follow-up was performed in all survivals (eight patients).
Results: The mean interval between operations was 27.7±42.3 months (range 1–132). Five patients underwent early reoperation (<6 months), for stenosis of the anastomotic site. The remaining four patients had late reoperation, due to progression of native coronary disease.
There were no operative or perioperative deaths (30-days). The postoperative course was uneventful. No patient required reoperation for bleeding and no patient had evidence of perioperative myocardial infarction.
Cumulative follow-up time was 1016.0 patients-months and was 100% complete. Complete follow-up ranged from 48–192 months (mean 112.8 ± 17.6 months, median 113 months).
At follow-up, one patient died of non-cardiac causes 78 months after reoperation. The Kaplan-Meier overall survival estimate at 15 years was 83.3 ± 15.2%. The actuarial freedom from cardiac-related mortality was 100%. Only one patient underwent percutaneous coronary angioplasty (PTCA) and stenting of the anastomosis that was constructed to elongate the left ITA with an interposed SVG, At long-term follow-up, the coronary angiography showed the patency of the recycled ITAs in all cases. The actuarial freedom from restenosis of recycled ITA graft at 15 years was 75.0 ± 21.7%.
Conclusions: The recycling of ITA grafts can be performed only in a selected redo CABG population, three when ITA is patent but stenotic in the peri-anastomotic area or there is a stenosis in the coronary artery distal to the anastomosis, and when an interventional cardiologic approach is not feasible. Preoperative selective angiogram of the used ITA is helpful to exclude proximal stenosis, to locate its relationship with sternum, and to provide anatomic details that may suggest this possible alternative approach during redo CABG surgery.
In conclusion, our limited experience confirmed that the recycling of ITA grafts in redo-CABG can guarantee satisfactory outcomes in selected patients even at long-term follow-up.

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HEART TRANSPLANTATION FOR VALVULAR CARDIOMYOPATHY EARLY AND LONG-TERM RESULTS

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Objective: The heart transplantation due to a valvular cardiomyopathy is rare (3% in the International Registry). Usually present some risk factors as previous valvular operations and pulmonary hypertension. In the literature, its studies are few.
We study prospectively the early and long-term results, the mortality and morbility, and the clinical and functional status, of our 22 patients operated between 1992 and 2006.
Methods: Twelve were men and ten women. The mean age was 52.6 (±10) years. Five patients had mitral regurgitation, one tricuspid insufficiency, (Ebstein disease), seven double valve disease and one triple valve disease. Nineteen (87%) had been operated on previously. Ejection fraction was 26 (±7.3)% and the mean NYHA functional class was 3.6. Fifty-three percent had significative pulmonary hypertension. Two were operated on emergency '0'
Results: Four patients were reoperated due to bleeding. The hospital mortality was 9% (two cases). The follow-up has been completed in all survival patients, with a mean of 72 (±53) months. Two more patients (9%) died due to a cardiac allograft vasculopathy. The clinical status and the functional class are good.
Conclusions: The heart transplantation for valvular cardiomyopathy has good immediate and long-term results with a mean survival of 82% at six years, in spite of the frequency of previous valvular operations and pulmonary hypertension. In our experience, these results are better than ischemic cardiomyopathy.
Heart transplantation can be a good solution for patients with valvular cardiomyopathy and/or reiterative valvular reoperations without solution.

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NEW TREND IN CORONARY REVASCULARIZATION IN THE ELDERLY PATIENTS

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Objective: The progress of civilization, mainly improvement of welfare and life conditions, leads to ageing of population in developed countries. Recent Eurostat projections concerning population of the European Union show that the number of those aged over 65 will increase from 15% in 1995 to almost 20% in 2020. Prevalence of cardiovascular diseases in older ages causes increase in number of patients over 70-year-old requiring coronary artery bypass grafting procedures (CABG). There are two main groups of grafts used for CABG, namely arterial and venous ones. Many studies proved superiority of arterial grafts in terms of patency, especially after a longer period of time. CABG procedures utilizing only arterial grafts are called total arterial myocardial revascularization (TAMR). There are about 2500 patients operated annually in the Cardiovascular Surgery and Transplantology Department in Cracow. CABG procedures are performed in about 1600 patients. Over the last ten years there is an increasing number of patients older than 70 year who undergo CABG at our institution – a rise from 7% in 1995 to 30% in 2005.
Objective: The purpose of this study is to evaluate early outcomes of total arterial myocardial revascularization (TAMR) in patients over 70-year-old.
Methods: Comparative analysis of two patient groups who had CABG. Group I – 50 patients who underwent TAMR and group II- 50 patients who underwent conventional technique (LITA+SVG). The patients were placed on cardiopulmonary bypass in normothermia and myocardial protection was achieved with blood cardioplegia.
Results: There were no significant differences between the two analyzed groups in the early postoperative period. In TAMR group all the patients survived and three of them had postoperative low cardiac output syndrome demanding the use of both inotropic agents and intraaortic balloon pump. None of the patients suffered from any other major organ complication e.g. stroke, dialysis or prolonged respiratorotherapy.
Conclusions: Early results (mortality and severity of complications) in TAMR group show that TAMR procedure is a safe method although the great surgical experience is needed.

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HEPARIN-INDUCED THROMBOCYTOPENIA FOLLOWING OPEN HEART SURGERY

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Objective: The purpose of this work is the presentation of our clinical experience with two patients submitted to open-heart surgery procedures, who developed heparin- induced thrombocytopenia (HIT).
Methods: Two female patients aged 64 and 68 years, underwent coronary artery surgery and aortic valve replacement respectively. Both had normal preoperative platelet count and routine coagulation indexes. The first case presented with severe thrombocytopenia associated with multiple episodes of arterial embolism, starting on 8th postoperative day. The diagnosis of HIT was suspected on the basis of multiple thrombi within the left and right heart chambers and a thrombus occluding the left femoral artery. Treatment with lepirudin was promptly initiated. Despite pharmacological treatment and repeated embolectomies, the persistent ischemia of the left lower limb lead to the amputation of the left foot on third postoperative week.
The second case started as early postoperative isolated thrombocytopenia (1st postoperative day), and on the 9th postoperative day the diagnosis of HIT was achieved on the basis of a slight elevation of the serum level of anti-heparin/PF4 antibodies. Lepirudin treatment was started. During the following two days the HIT changed into disseminated intravascular coagulation. The patient died on the 11th postoperative day.
Results: Conclusions: As evidenced both by literature and our small experience, the clinical presentation of HIT can be misleading, due to extreme variability. In addition postoperative thrombocytopenia following open heart surgery is a very common finding, while HIT is a very rare complication. For all these reasons the diagnosis of HIT following open heart surgery is difficult, and a high level of suspicion is always necessary in order to avoid underestimation and mis-diagnosis, especially if severe postoperative thrombocytopenia with a platelet count of <30.000 is present.

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HEART AUTOTRANSPLANTATION AS A TREATMENT FOR GIANT LEFT ATRIUM

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Objective: Giant left atrium is a result of a mitral valve defect existing for a long time. This pathology increases thromboembolism, severe arrhythmias, resulting in worse prognosis. Surgical techniques reducing giant left atrium is hardly effective in patients with left atrium volume of 1000 ml. We present a clinical case with heart autotransplantation and reduction of left atrium with volume 2200 ml.
Methods: A female, 49 y.o., with chronic rheumatic heart disease, prolonged stenosis and mitral valve insufficiency, giant left atriomegalia, left ventricle dilatation, right atriomegalia, tricuspid valve insufficiency, stable atrial fibrillation, high pulmonary hypertension, chronic heart insufficiency FC IV, stage II B. Echo-CG data are left atrium volume is 2200 ml, end-diastolic dimension of left ventricle is 75 mm, EF – 55%, high pulmonary hypertension – 65 mmHg, right atrium – 39x100 mm. ECG – atrial fibrillation with ventricle contraction 80 per min.
Mitral valve grafting has been performed with MedIng graft - 2–31. The patient has been operated on for non-implantation plasty of tricuspid valve, left atrium reduction, and right atrium reduction by autotransplantation. Myocardial ischemia was 186 min, CPB – 262 min.
Results: Immediate postoperative period was severe. Echo-CG data: left atrium volume to 220 ml, left ventricle EDD 67 mm, EF 55%, mean gradient on the mitral valve graft 7 mmHg, regurgitation I grade, pulmonary artery pressure 30 mmHg, regurgitation II grade, right atrium 43x56 mm, mean gradient on the tricuspid valve 5 mmHg. ECG: atrial fibrillation with ventricle contractions frequency 62 per min. Examined in three months. Left atrium volume was 210 ml. ECG: atrial fibrillation with ventricle contractions frequency 64 per min.
Conclusions: This surgical technique is advisable in patients with left atrium volume more than 1000 ml and if other atrioreduced surgery is impossible.

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IS A SECOND INFRACARDIAC PERICARDIAL DRAIN ESSENTIAL TO PREVENT THE PERICARDIAL EFFUSION AND ATRIAL FIBRILLATION AFTER CABG?

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Objective: Accumulation of excessive fluid in the pericardial sac after CABG promotes atrial fibrillation and cardiac disturbance. To prevent this complication many efforts have been delivered. For this purpose utilizing a second infracardiac drain in the mediastinal space was investigated.
Methods: Eighty patients who underwent CABG were prospectively randomized into two groups. The main patient inclusion criteria was to obtain pleural integrity during operation. At the end of the operation, single 36 F drain was placed anteriorly overlying in the heart in group 1 (n=40), and anterior 36 F drain and additional second 32 F right angle infracardiac drain were placed in group 2 (n=40). The amount of pericardial effusion was assessed by transthoracic echocardiography after the drains were removed. Close follow-up for atrial fibrillation was done throughout to postoperative period.
Results: There was no significant difference between group 1 and the group 2 considering the patients preoperative parameters. Postoperative mediastinal drainage and duration of hospital stay were similar in two groups. The mean amount of pericardial effusion in group 1 was higher than group 2 according to echocardiography evaluation (4.6+1.7 vs. 3.9+1.4 mm), but this difference was not statistically significant (P=0.055). The incidence of postoperative atrial fibrillation was not significantly different between the group 1 and group 2 (20% vs. 17.5%; P=0.78).
Conclusions: Although second additional infracardiac drain reduces the accumulation of pericardial fluid in the pericardial sac, this result was not supported by statistically and occurrence of atrial fibrillation was not different between two groups. As a answer of the title of the this study, a second infracardiac pericardial drain is not essential to prevent pericardial effusion and atrial fibrillation after CABG.

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EARLY AND MID-TERM RESULTS OF AORTIC VALVE REMODELING WITH DR URBANSKI SEPARATE PATCHES TECHNIQUE

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Objective: In 2005 Dr Urbanski from Bad Neustadt, Germany described a new kind of sparing aortic valve remodeling technique in 20 patients (Paul P. Urbanski 'Valve-sparing aortic root repair with patch technique' Ann Thorac Surg 2005; 80: 839-44). Since July 2006 we introduce it in our institution.
Methods: Till now six patients with complicated aortic root pathology suitable for this kind of operation were operated on, aged 27 to 64. In four patients we achieved excellent early and mid-term results (three with asymmetric sinuses of 'Valsalva aneurysms with IA grade IV or III, one, aged 27, without IA, but with 29 mm aortic annulus and lost almost all coaptation area). In two of them we exchanged non-coronary sinus with a drop tear shaped patch cat from appropriate size vascular prosthesis, and performed wedge plasty of remaining ones, narrowing neo-sino prosthesis junction to appropriate diameter of chosen prostesis size. In next two we have to exchanged non-coronary and right coronary sinuses with patches, with intact left-coronary one. In all these patients aortic cusps were relatively unchanged, except mild symmetric enlargement. In two last patients, with mild to moderate focal fibrosis of slightly asymmetric cusps we exchanged non-coronary and right coronary sinuses with intact left coronary. In patients with exchanged right coronary sinus a button technique was used to reimplant right coronary.
Results: In the first for patients we achieved excellent early and mid-term results, only one have trivial insufficiency. In the last two, despite adequate static probe with saline, the result on TEE was inadequate, and considering we do not see any obvious easy to repair and assuring good late result pathology we exchanged the valve with mechanical in the first, and biological in the second, aged 64 patient (patient' preference).
Conclusions: In suitable patients Urbanski' method is very good one of aortic valve sparing operation, particularly, when there is no need for all three sinuses exchange, and cusps are relatively symmetrical and unchanged. In cases of moderate pathology of all three cusps the good result is less certain. In case of inadequate repair the aortic valve replacement is easy to perform.

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EXTERNAL RESPIRATORY FUNCTION IN OPERATED ACQUIRED MITRAL AND AORTIC VALVE DISEASES WITHOUT LEFT VENTRICULAR FAILURE. PART THREE: LATE POSTOPERATIVE PERIOD

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Objective: Prospective randomized clinical studies evaluating effect of the operations on normothermic cardio-pulmonary bypass with cold crystalloid cardioplegia on the functions of organs which are the most prone to damage during the procedure: mainly heart and lungs. (Numbers of research registry of our University: 502-11-818 and 502-11-432). This part evaluates the effect of the operation of advanced valve diseases on lung function in the late postoperative period.
Methods: Investigated group consists of 27 non-smokers, 21–78 year old, nine female, 18 male, 16 with aortic, 11 with mitral valve diseases, 22 in NYHA III, 5 in NYHA class IV, with LVEF 55.6±6.5% (42–66%) randomly chosen before operation pursuing excluding criteria (smokers, pulmonary diseases; left ventricle, kidney, or liver insufficiency; stroke; inability to co-operate; obesity, to be operated on moderate hypothermia; emergency operations and re-operations).
Bodypletysmography, spirometry, and diffusing capacity for CO data collected in the late postoperative period (on 3–25 postoperative months, 8 on av.) were compared to the preoperative and early postoperative values, and with American Thoracic Society (ATS) norms.
Results: Following patients' data values improved significantly in comparison to early postoperative period: haemodynamics, percent actual/predicted of: thoracic gas volume (ITGV P<0.01), expiratory reserve volume (ERV P<0.05), residual volume (RV P<0.05), vital capacity (VC P<0.001), total lung capacity (TLC P<0.001) (restriction), and FEV1 (P<0.001), peak expiratory flow (PEF P<0.001), forced expiratory flow 25 (FEF 25 P<0.01), and FEF 75 (P<0.01) (obturation); moreover, alveollar volume (VA, P<0.001), and single breath Lung Diffusing Capacity for Carbon monoxide measurements: percent-normal (TLCO P<0.001), Hemoglobin standardized (TLCOc; P<0.01), body surface area standardized (both TLCO/BSA P<0.001, and TLCOc/BSA P<0.01), and alveollar volume standardized TLCO (TLCO/VA P<0.05) - whereas, TLCOc/VA insignificantly. None of respiratory parameters was better than before operation, and ERV (P<0.05) and FEF 75 (P<0.01) worsened. After changing the position from sitting to supine direction of most changes were

similar to preoperative, and early postoperative. None of improper values excided 30% of given norm.
Conclusions: In acquired valve diseases without ventricular failure operated on normothermic CBP and cold crystalloid cardioplegia in the late postoperative period most of ventilatory disturbances erased in the early one disappear, except for ERV and FEF 75. These, and significant impairment of membrane related TLCO, TLCOc and VA present before operation are permanent. Respiratory adaptation to supine position is almost unaffected. The changes remain in the mild range.

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'PHYSIOLOGICAL' MYOCARDIAL REVASCULARIZATION

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Objective: 'Physiological' myocardial revascularization (PMR) is a re-origination of the antegrade coronary blood flow.
Methods: PMR is carried out by following operations performance:

1. Coronary arteries surgical angioplasty
2. Coronaro-coronary bypass (CCB);
3. Coronaro-coronary bypass with simultaneous surgical shunt-plasty of the donor artery.

Surgical angioplasty (SA) of 64 arteries was performed in 57 patients. As a patch we used LIMA fragment with length 27+15 (10–45) mm.
We performed plasty of LAD–47 (70.3%), diagonal–2 (3.1%), RCA–8 (12.5%), PDA–11 (17.2%).
Indications to SA:

1. Moderate stenosis only (40–60%).
2. Anatomically accessible coronary artery CA fragment for plasty.

Features of SA performance:

1. LIMA fragment is used as a patch.
2. No endarterectomy.

LIMA is always shunted to LAD, but in cases with multiple stenoses, at the level of distal stenoses we performed SA.
SA, as an independent procedure was performed for moderate stenosis in the area of circumflex artery and RCA.
Coronaro-coronary bypass was used in 18 patients.
Indications to CCB:

1. Absence of donor artery disease from the aorta to the place of the proximal anastomosis.
2. Anatomically accessible area to perform anastomosis.

Features:

1. We aimed at usage LIMA fragment as a shunt.
2. Shunted artery should be in the donor artery area.

We performed shunts to PDA–8 (45.5%), LAD–4 (22.2%), posterior-lateral branch–2 (11.1%) and others.
Donor arteries were RCA, LAD, obtuse marginal artery and etc. As a bypass in 14 cases a LIMA portion was used with length 5.5+1.7 (4.5–8) cm, in 4 (22.2%) cases – an autovein.
Eight patients underwent CCB with simultaneous surgical shunt-plasty of the donor-artery. This technique is a synthesis of the two previous ones.
Indications:

1. Presence of the moderate stenosis in the donor-artery.
2. Absence of the donor-artery disease prior to the moderate stenosis.
3. Presence of disease (stenosis >70%) in the adjacent CA.

Technique features:

1. LIMA fragment is used as a shunt.
2. Shunt-plasty on the donor-artery without endarterectomy.

At this we restored antegrade blood flow both the shunted artery and donor–artery (with stenosis 40–60%) due to shunt-plasty. A portion of LIMA with length 4.9+1.3 (4.0–6.0) cm was used as a shunt, the shunt-plasty length was 2.2+0.7 (1.5–2.5) cm.
Results: In the immediate postoperative period complications were not observed (mortality, MI, re-sternotomy). Myocardial ischemia time was 62+12 (47–147) min. CPB time was 84+28 (67–191) min.
Conclusions: PMR is a new approach to solve the myocardial revascularization tasks – CA moderate stenosis, auto-arterial revascularization. Maximal similarity of the re-originated blood flow to the natural one with LIMA application gives us a hope to show excellent long-term results.

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MANAGEMENT OF ASCENDING AORTIC ANEURYSM AND VALVULAR INCOMPETENCE WITH EXTERNAL REMODELING

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Objective: Ascending aortic aneurysms more often then not involve the sinotubular junction (STJ).
Due to radial displacement of the commissures, the aortic valve may become incompetent, even if the cusps themselves remain structurally normal. We present a case of aortic regurgitation, due to a 50 mm diameter ascending aortic aneurysm, which was corrected by sinotubular remodeling and wall-reinforcement without the usage of cardio-pulmonary bypass.
Methods: The authors provide a description on a calculation-based and a transesophageal echo controlled technique of external reconstruction of the aorta and correction of the aortic regurgitation (Sinotubular remodeling).
Results: At 6-month follow-up, the MR angiogram and transesophageal echocardiography demonstrated normal root dimensions and competent aortic valve.
Conclusions: We report a novel external approach to repair both ascending aortic aneursym and aortic valvular incompetence. The technique presented may be applicable in carefully selected cases where the aortic regurgitation is caused by the increase in the commissural distances.

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LATE OUTCOMES IN PATIENTS WITH UNCORRECTED MODERATE MITRAL REGURGITATION AT THE TIME OF ISOLATED CORONARY ARTERY BYPASS GRAFTING

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Objective: Mitral valve intervention combined with coronary artery bypass surgery is inevitable in the case of severe mitral regurgitation in patients with coronary artery disease but the best treatment protocol for patients with a moderate degree of mitral regurgitation is under debate. We evaluated the progress of mitral regurgitation after isolated coronary artery bypass surgery in cases of ischemic mitral regurgitation.
Methods: The study was conducted between June 1998 and October 2004. Fourteen patients (85% men, with a mean age of 56 years, a mean ejection fraction of 39.3%, and a mean New York Heart Association class of 2.53) with preoperative diagnoses of moderate degree ischemic mitral regurgitation (Grade 2 mitral regurgitation on a scale of 0 to 4) and coronary artery disease underwent isolated coronary artery bypass surgery. Patients were followed-up at a mean of 48 months and an echocardiographic evaluation was done to determine the progress of the mitral disease.
Results: In the postoperative period, the mean ejection fraction was 44.6% and the mean functional capacity of the patients was 1.31. Mitral regurgitation regressed to a mild degree in 57.1% of the patients. Grade of MR is unchanged after CABG in five (35.7%) patients with grade 2 ischemic MR. Post CABG–MR progression was present in one (7.2%) patients. No patient required subsequent mitral valve operation or other procedures in long-term follow-up. The 30-day operative mortality rate was 0%.
Conclusions: We conclude that, in patients with moderate MR, isolated CABG (without mitral valve replacement or repair) suffices, producing dramatic improvement in ejection fraction, and in degree of MR, with good long-term survival.

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A MITRAL VALVE RECONSTRUCTION CASE AFTER 16 YEARS OF CLOSED MITRAL COMMISSUROTOMY

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Objective: Mitral stenosis is the most frequently encountered valvular pathology and may require surgical intervention when the lesion is severe

in rheumatic etiology. It is now clearly established that restoration of a normal mitral valve function with reconstructive surgery is preferable to replacement with a device, whether bioprosthetic or mechanical. Closed mitral comissurotomy (CMC) was the first effective intervention in valvular heart disease.
Methods: In this study we are presenting a new valve reconstruction technique used successfully in reoperation of a case who had CMC operation 16 years ago and symptomless up to last four months and the first patient repaired successfully after CMC.
Results: Mitral valve repair in rheumatic disease is technically difficult.
Conclusions: From a purely surgical point of view, a safe myocardial protection, excellent valve exposure, and a direct visual testing method for competence are also essential. However, excellent long-term results support flexibility in mitral valve repair.

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CONTINUOUS BLOOD FLOW LEFT VENTRICLE ASSIST DEVICES AND HEART TRANSPLANT
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Objective: The number of patients with cardiovascular diseases and end-stage heart failure (HF) is dramatically increasing world wide. Prevention of HF does not give expected results. The World Heart Federation says that cardiac diseases in the 21st century will increase: up to 137% with male patients and 120% with female patients starting from today to 2020 worldwide. Development of pharmacotherapy, mechanical circulatory support systems (MCSS) and heart transplant (HTx) can help HF patients. Unfortunately nor pharmacotherapy neither MCSS today are efficient help to HF patients. Only HTx can be an effective method to patients with end stage heart diseases. However its application is extremely limited due to the storage of donor hearts. Axial blood flow left ventricle assist device (LVAD) treatment in our Heart Surgery Center was started in 2003.
Methods: Eleven patients - nine males and two females - were connected to LVAD with continuous blood flow, as a bridge to HTx. The age of patients was from 37–63 years. All patients were with low cardio output index. It was <1.8 l/min./m^2. Small left ventricle ejection fraction from 10–22% and large left ventricle diastolic diameter from 6.3–7.9 mm. All patients were on maximal doses of inotropic drugs, diuretics and intraaortic balloon pump support. The diagnoses of patients were: dilatation cardiomyopathy - 7, ischemic cardiomyopathy - 3, toxic cardiomyopathy post antimalignancy treatment - 1. Operative technique: axial blood pump inflow cannula was implanted in the apex of native heart left ventricle, using single Prolene 2/0 sutures with Bard® PTFE felt. The power and controller cable was connected with systems out of the body. Outflow cannula was connected with ascending aorta using continuous Prolene 4/0 suture. Inflow and outflow cannulae were connected with axial blood pump. After air embolization prophylaxis pump was turned on.
Results: Duration on continuous blood flow LVAD was from 12–764, average 202 days. Three recipients were successfully transplanted (27%) after 764, 349 and 39 days on LVAD. Four recipients (36%) died because of septicemia - 1, hemorrhagic insult - 1, thromboembolisation in the cerebrum - 1 and one patient died because of multiorganic damage. Four patients (36%) are on the waiting list. Two of them are at home and have normal social live.
Conclusions: The extracorporeal axial blood flow LVAD is important for patients whom other medical measures cannot help.

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FIBROELASTOMA OF THE MITRAL VALVE
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Objective: A papillary fibroelastoma is a rare and benign primary tumor of the heart diagnosed usually accidentally during echocardiography or following a thromboembolic phenomenon. A valvular involvement, mostly aortic and mitral, is usually observed. Usually anterior mitral leaflet is involved; posterior leaflet involvement is even rarer. Most of the scarce data have been reported from patients older than 50-year-old, it may be found at any age, from the neonate to the nonagenarian. We present rare cases of papillary fibroelastoma in two patients.
Methods: Two asymptomatic patients at ages of 38 and 52 years were operated for fibroelastoma of the mitral valve. Diagnosis was incidental with complaints of palpitations and dyspnea. Tumor of the latter patient was located on posterior leaflet involving both leaflet and the subvalvular tissue. Both tumors were located on the posterior leaflet with extension to subvalvular apparatus.
Results: The younger patient underwent a staightforward valve replacement after excision of the 12x15x8 mm tumor. The other patient was intended to have a repair rather than replacement, following the excision of the 10x8x6 mm solitary verruceous tumor, but development of SAM and LVOT obstruction with elevated mitral gradients led the surgeons to replace the valve. A modified posterior augmentation technique was adapted for the patient.
Conclusions: Cardiac papillary fibroelastoma is a rare benign tumor that involves most commonly heart valves and may cause thromboembolism or mechanical interference with the valvular function. Irrespective of the presence of symptoms, prompt excision with preservation of the valvular anatomy and function whenever possible is the primary goal of the surgery; valve replacement is, however, results in safe and effective cure with good results.

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AORTIC VALVE REPLACEMENT IN A PATIENT WITH PORCELAIN AORTA USING DEEP HYPOTHERMIC CIRCULATORY ARREST
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Objective: Aortic valve replacement is a rather safe procedure but it can become high – risk in patients with heavily calcified 'porcelain' aorta, due to inability of aortic manipulations. We describe a case with severe aortic stenosis combined with heavily calcified aorta.
Methods: The patient was a 71–year-old man who had successfully received coronary artery bypass graft in the past (off-pump) and was presented with severe aortic stenosis. Cardiopulmonary bypass was established with the arterial cannula placed in the distal aortic arch. Deep hypothermic circulatory arrest and retrograde cerebral perfusion were initiated and excision of the ascending aorta was performed. A tubular graft was sewn at the proximal aortic, circulation was reestablished and the patient was rewarmed. The aortic valve was replaced with a bioprosthesis and proximal anastomosis to the sinotubular junction was preformed.
Results: Operation was accomplished in approximately 70 min. The patient had an eventful postoperative course and was discharged from hospital 11 days later without any cerebral or systemic embolic complication.
Conclusions: We successfully performed aortic valve replacement and ascending aorta and arch replacement in a patient with porcelain aorta, using deep hypothermic circulatory arrest, retrograde cerebral perfusion and atrium – distal aortic arch cardiopulmonary bypass. This is a safe and alternative approach in dealing with porcelain aorta, especially if the distal arch is not heavily diseased.

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BLUNT CHEST TRAUMA RESULTING IN PSEUDOANEURYSM OF THE LEFT VENTRICLE
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Objective: We report here an extremely rare the case of 20-day-old patient presenting with left ventricular pseudoaneurysm.
Methods: Trauma resulting from blunt chest trauma is associated with multiple injuries such as myocardial contusion, free atrial or ventricular wall rupture, ventricular septal rupture, cardiac valve rupture and vessel injury related to bone fractures. Myocardial contusion is the most frequent injury resulting from blunt chest trauma. The course of myocardial contusion is similar to that of acute myocardial infarction.
Results: A 20-day-old boy referred to the department of the Cardiology at the our Hospital for the assessment of an effort dyspnea. The boy who had a blunt chest trauma three years ago had been examined by physician, but one had not suspected for cardiac trauma or pseudoaneurysm. On the chest radiogram, there was sequel of the rib fracture. Although cardio-thoracic ratio was normal, in the lateral chest radiogram, there was calcification

belonging to pseudoaneurysm sac around the margin of the cardiac silhouette. Two-dimensional echocardiographic evaluation of the patient revealed that ejection fraction was 55%, and that there was aneurysm formation of the anterolateral wall of the left ventricle interpreted firstly as a ventricular rupture restricted by pericardial sac, and that there was no pericardial effusion. The coronary angiography showed normal coronary arteries. Left ventriculography validated the presence of a pseudoaneurysm. The aneurysm located near the left anterior descending artery was incised firstly, dividing pseudoaneurysm from the left ventricle. The defect was closed the with a circular dacron patch at the base of the pseudoaneurysm. Then the pericardial walls were oversewn.
Conclusions: The diagnosis of the cardiac contusion frequently difficult. Thereby, cardiac evaluation such as echocardiographic assessment should be done as a routine procedure in all case suffering blunt chest trauma. And in patient with left ventricular pseudoaneurysm adjacent to the left anterior descending artery, surgical repair should be performed by endoaneurysmal patch closure technique.

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PENETRATING CARDIAC INJURIES AND URGENT APPROACH

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Objective: The aim of this clinical study is to asses the characteristics of penetrating heart injuries and its urgent surgical approach.
Methods: Thirteen cases suffering from penetrating heart wounds were evaluated retrospectively in department of cardiovascular surgery between 1999–2004. All of the patients were male. Age ranged from 19–33 years (mean age was 23.1 years).
Results: Five median sternotomy, seven left anterior thoracotomy and one right anterior thoracotomy were performed to control the bleeding or to reach heart for internal cardiac massage (Table 1). Although left atrial penetration was not seen at all, right ventricle penetration was seen in eight patients, left ventricle penetration was seen in two patients and right atrial penetration was seen in three patients. Mortality rate was 23% (three cases).
Conclusions: Although the most important factor effecting mortality rate in penetrating heart injuries is rapid transport, an urgent approach applied by a well trained specialist team decreases the mortality and morbidity rate.

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REPEATED PARACENTESIS FOR TREATMENT OF RENAL FAILURE AFTER HEART TRANSPLANTATION IN A PATIENT WITH ASCITES

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Objective: We report a case of orthotopic heart transplantation in a 42-year-old man who had cardiomyopathy with severe biventricular heart failure, ascites, and large umbilical hernia.
Methods: The patient was a 42-year-old man weighing 93 kg. He had been previously diagnosed with heart failure four years earlier. After heart transplantation, renal failure was noted. Ascites and renal failure were successfully managed with repeated paracentesis. His cardiac and abdominal symptoms subsided gradually following transplantation. His umbilical hernia was repaired 55 days after the heart transplantation because of strangulation.
Results: Echocardiography showed biventricular dilatation. Left ventricular ejection fraction was 15–18%. Cardiac catheterization was performed. The coronary arteries were found to be normal. Pulmonary vascular resistance was 2.8 Woods/Unit. The donor heart ischemic time was 207 min. No complications were encountered during the surgery. We did not perform an abdominal puncture to drain the ascites. We gave him classic triple immunosupressive therapy. In the postoperative three days, urine output gradually decreased and eventually anuria occurred. During in five days; we ordered some diuretics, dopamine 4 μg/kg/min, but anuria remained. Cyclosporine was stopped. Antithymocyte globulin was started. His abdominal girth increased from 104–109 cm just last in two days. CVP increased from 8–25 mmHg. We added dobutamine and adrenaline due to arterial blood pressure gradually decreased. While preparations were made for hemodialysis, we decided to remove some fluid his abdomen because he had ascites and a dilated abdominal wall. We only removed 3 l of ascites material from his abdomen within two hours every day. Peritoneal dialysis fluid was not administrated. We replaced his electrolytes, albumin and corrected metabolic defects. Urine output began to increase five (postoperative 10th day) days later and returned to normal levels after eleven (postoperative 16th day) days. He did not require hemodialysis. Creatinine levels decreased to approximately 1–2 mg/dl.
Conclusions: We propose that if the patient suffers from ascites, the ascites can be drained with paracentesis and that it is not necessary to administer any peritoneal dialysis solution. But we have to replace the metabolic and electrolyte deficits. This procedure appears to be safe, simple, and effective.

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COMPLETE ARTERIAL REVASCULARISATION IN PATIENTS OLDER THAN 60 YEARS

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Objective: The aim of this study was to evaluate the early and mid-term results of total arterial myocardial revascularization in patients older than 60 years.
Methods: Sixty-five patients aged 60 years and older (mean 64.8+5.4, range 60–78 years) who underwent total arterial myocardial revascularization between January 2002 and June 2004 were evaluated prospectively. Forty-one patients (63.1%) had three-vessel coronary artery disease, 18 (27.7%) had two-vessel disease and six (9.2%) with left main lesion. Twenty-two patients had an old myocardial infarction (MI) and 11 unstabile angina pectoris. Mean EF was 55%. All patients underwent TAMR. In total 167 distal anastomoses were constructed (2.6 per patient) Pedicled LITA and RITA, free RITA and Radial arter were used as single or composite T- or Y-graft.
Results: Patinent were followed-up in a mean period of 17.6+7.3 months (range 1–28 month). One patient died in this period (1.5%) one underwent PTCA (1.5%) two suffered angina pectoris (3.1%), there was no reoperation in this period. There was no occluded grafts in the early postoperative period (<90 days) patency 100%. Late (mean 16+2 month) LITA patency was 98.1% (one graft occluded), RITA patency was 93.4% (one graft occluded) and RA patency was 93.2% (three grafts occluded).
Conclusions: This study showed that using only arterial conduits in coronary bypass surgery in elderly (patient aged over 60 years) were clearly evident with respect to higher patency rate, surgical reintervention and freedom from cardiac events.

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POSTTRAUMATIC TRICUSPID LEAFLET PERFORATION AND SUCCESSFUL SURGICAL APPROACH BY TOTAL VALVE AND SUBVALVULAR TISSUES PREVENTION TECHNIQUE

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Objective: Isolated posttraumatic tricuspid valve insufficiency is a rare complication and mostly occurs following a blunt chest trauma. We know that severe blunt chest traumas may cause a range of cardiac injuries varying from simple myocardial contusion to severe damage of cardiac valves and related structures. Clinical presentation of post-traumatic tricuspid valve insufficiency is variable. Clinically significant incompetence of cardiac valves are not common and have been shown in only 5% of the necropsy subjects who died after close traumas to the chest. Structural abnormalities of tricuspid valve and its chordae tendineae and papillary muscles are not rare and these abnormalities of valvachordal anatomy are thought to be related with traumatic lesions and sudden deaths of cardiac origin. We report a case of post traumatic severe tricuspid insufficiency together with an abnormality of subvalvular papillary muscle structure and successful surgical outcome. The patient had multiple anterior tricuspid leaflet perforations after a blunt chest trauma, in combination with abnormal location of papillary muscle of the anterior leaflet of tricuspid valve.
Methods: Implantation of the bioprosthesis was done without making any valve tissue or papillary muscle and chordal resections, in the beating, perfused heart. For this, all the leaflets were left in situ. Interrupted horizantal mattress sutures buttressed with felt pledgets were placed circumferentially and all leaflets were folded by these sutures. Then, a 33 mm Carpentier-

Edwards bioprosthesis was inserted while all the leaflets and chordal attachments were preserved.
Results: Two-dimensional echocardiogram and doppler echocardiography revealed normal biopresthetic valve functions and lack of any tricuspid regurgitation or stenosis sign.
Conclusions: We believe that, whatever the reason is, when a patient is tansferred to the emergency service after a blunt trauma to the chest or abdomen with or without cardiac symptoms, should be assessed echocardiographically to lower the risk of early or late unexpected cardiac deaths. In addition, total valvar and subvalvar prevention of tricuspid valve, which need to be replaced due to severe valve insufficiency and morphological damages, seems to be an important desicion and is an effective surgical technique without any disadvantages.

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THE MANAGEMENT OF CORONARY ARTERY TO PULMONARY ARTERY FISTULAE IN PATIENTS WITH PULMONARY ATRESIA AND VENTRICULAR SEPTAL DEFECT
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Objective: Pulmonary atresia and ventricular septal defect is a complex anomaly with a highly variable anatomic substrate. Pulmonary blood flow is usually from a patent ductus arteriosus or from collaterals from the aorta. Rarely coronary artery to pulmonary artery fistula may occur and contribute to pulmonary blood flow. We report our experience in managing such fistula using internal closure of the fistula from the pulmonary artery as part of the total intracardiac repair for these patients.
Methods: Since 1996, we have treated four patients with coronary artery to pulmonary artery fistula associated with pulmonary atresia and ventricular septal defect. We retrospectively reviewed the patients' records and operative data to define the exact anatomy of the fistula and the operative technique used.
Results: The prevalence of the fistula among our patients with pulmonary atresia and ventricular septal defect is 8%. The fistula provided significant pulmonary blood flow in all. Two fistulae originated from the left coronary, one from the right coronary and one from a right-sided solitary coronary system. All terminated in the main pulmonary artery, which was confluent and adequate in all cases. Co-existent aortopulmonary collaterals were coiled preoperatively. The fistula itself was managed by direct internal closure. Total intracardiac repair was then accomplished at the same sitting, in all patients. There was one mortality.
Conclusions: Coronary artery to pulmonary artery fistula in patients with ventricular septal defect and pulmonary atresia can be managed by direct internal closure with good results, in this cohort of patients with favourable anatomy.

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A CONCEALED PENETRATING CARDIAC INJURY
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Objective: The aim of this case report is to demonstrate the role of accurate preoperative diagnosis and urgent surgical approach in good outcome of this rare case.
Methods: We present a case, 29-year-old man who had been wounded with a stab. Cardiac wound was localized through left ventricle apex and posterior side of the left ventricle. When he was brought to the emergency department, he had no significant symptoms related to cardiac wound regardless of ECG changes.
Results: The vital signs were normal and there were no signs of cardiac tamponade. Arterial blood pressure was 100/70 (80) mmHg, heart rate was 105 beat/min. The breath sounds and heart tones were normal. There was no subcutaneous emphysema. 3 cm skin wound occurred by a stab was seen at the junction of the left midsternal line and 5th intercostal space. Although the patient suffered from some pain from his chest, we tried to find the wound depth with palpation under local anesthesia; we could not pass the intercostal space. Transthoracic echocardiography was taken from his bedside. It was within normal range and was not observed pericardial effusion. The patient was immediately transferred to the operating room and intubated. An anterolateral thoracotomy was performed in left 5th intercostal space. A pericardial wound was seen. Almost 1000 cc fresh desaturated blood and a little fresh thrombus was evacuated from left thorax. Pericardial incision was expanded through base of the heart and a stab wound that at the apical segment of the left ventricle was seen and controlled by finger. The heart rhythm was sinus but heart was empty. The cardiac wound was repaired with pledgeted mattress sutures after then the patient's position was adjusted to trendelenburg position and some volume was given for filling the heart.
Conclusions: In every penetrating trauma to the chest with non-specific laboratory tests and even a normal echocardiography, also normal chest X-ray, the suspicion for a possible cardiac injury should always be kept in our mind because there are always 'false-negatives'. One more time we saw that the important thing on the patient evaluation; every patient should be carefully evaluated together with clinical signs and laboratory results.

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CONCURRENT CESAREAN SECTION AND REDO MVR FOR MECHANICAL STUCK VALVE
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Objective: Prosthetic heart valve thrombosis in pregnancy is a life-threatening complication for the mother and the baby. Thrombolysis, thrombectomy or redo prosthetic valve replacement are the options for the treatment of this complication.
Methods: We report the case of a 36th week pregnant patient who was a 29-year-old female.
She underwent mitral valve replacement (MVR) with a 25 mm St Jude valve in 1997. Because of a planned pregnancy, warfarin had been replaced by low molecular weight heparin. During the 36th week of pregnancy, she was admitted to our emergency clinic because of aggravating dyspnea, tachypnea and cyanosis. Echocardiography revealed stuck mechanical valve in mitral position and she was diagnosed with acute left ventricular heart failure due to mechanical valve thrombosis.
Results: She was treated by emergency cesarean section and redo mitral valve replacement for the mechanical stuck valve. She and her baby were discharged 11 days after surgery without any complications.
Conclusions: Difficulties concerning prolonged anticoagulation during pregnancy and puerperium in patients with prosthetic valves are discussed. The purpose of this paper is to review the available clinical data and provide recommendations for the management of patients with mechanical mitral valve thrombosis during gestation.

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OFF-PUMP CABG FOR LEFT MAIN STENOSIS 10 YEARS AFTER HEART TRANSPLANTATION
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Objective: Accelerated coronary artery disease (ACAD) is the main cause of late death in patients after heart transplantation. In the past, retransplantation was the only choice for managing ACAD, despite poor results and long waiting lists. In the past 10 years, various coronary revascularization techniques have been shown effective in ACAD. This is case presentation for successful management of ACAD after 10 years of heart lung transplantation.
Methods: We describe a patient with asymptomatic left main stem coronary artery stenosis 10 years after heart transplantation who was treated successfully with off-pump coronary artery bypass grafting. Managing ACAD primarily involves prevention and controlling the risk factors.
Results: The disease in allografts varies from proximal lesions (type A) to diffuse and distal lesions (type C), and techniques of coronary revascularization depend on the type. Angioplasty remains a good choice if there are no limitations imposed by type or multiplicity of the lesions, and results similar to those with use in atherosclerotic disease have been reported. Conventional coronary artery bypass surgery can be performed successfully in patients with type A lesions. However, type B and type C diffuse lesions limit the possibilities of bypass surgery and transmyocardial laser revascularization (TMLR) isolated or combined with coronary artery bypass grafting may be useful. A hybrid procedure that combines minimally invasive direct coronary artery bypass (MIDCAB) and angioplasty may be beneficial.

Conclusions: Follow-up symptomatic and non symptomatic heart transplant patient regularly for signs of accelerated coronary atherosclerosis is mandatory in preventing major myocardial ischemic events. Many techniques according to the type of the disease proved to be successful. We prescribed this case presentation as an example of successful management.

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POSTOPERATIVE RHYTHM DISORDERS AFTER CORONARY ARTERY BYPASS SURGERY: PREDICTION BY NONINVASIVE METHODS OF INVESTIGATION

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Objective: Postoperative arrhythmias still frequently occur despite the improvements in the surgical techniques of coronary artery bypass surgery (CABG).
Aim: The purpose of this study was to evaluate the incidence of new-onset postoperative arrhythmias and to identify the risk factors for their development.
Methods: In our study 41 patients underwent off-pump CABG and 30 patients - on-pump CABG. Incidence and predictive perioperative factors of early postoperative atrial fibrillation (AF) and ventricular arrhythmias (VA) were assessed in these two groups of patients by using contemporary noninvasive methods of investigation.
Results: There were no significant differences between two groups in respect to patients' preoperative characteristics. The incidence of postoperative AF turned out to be 15% after off-pump and 23% after on-pump myocardial revascularization ($P>0.05$). The incidence of postoperative ventricular arrhythmias was 27% after off-pump and 37% after on-pump CABG ($P<0.05$). By multivariate analysis age, left atrial size, P-wave duration and dispersion by standard ECG, electrolyte imbalance, cardiopulmonary bypass time were independently associated with the development of postoperative AF. Independent predictive factors of VA were left ventricular (LV) ejection fraction <40%, history of myocardial infarction, multivessel coronary artery disease and large LV volumes.
Conclusions: Performance of CABG by avoiding cardiopulmonary bypass did not decrease the incidence of early postoperative AF. However, off-pump surgery was associated with a lower incidence of postoperative ventricular arrhythmias.

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POSTOPERATIVE ARRHYTHMIAS IN CHILDREN AT EARLY AGE IN SHORT-TERM PERIOD AFTER SURGICAL CORRECTION OF TETRALOGY OF FALLOT

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Objective: To reveal most frequently occurred rhythm disorders and their predictors in short-term period after surgical correction of tetralogy of Fallot in children at early age.
Methods: Sixty patients with tetralogy of Fallot were enrolled in our study. They were divided into two groups according to the age: in group A mean age was 21.3±2.4 months, in group B - 12.6±1.3 months. All patients underwent radical surgical repair of main pathology. Inclusion criteria were: arrhythmias and conduction disorders in early postoperative period after surgical correction of tetralogy of Fallot. Exclusion criteria were: children at the age of over three years and arrhythmias before surgery. We analysed two groups: group 1–24 (40%) patients with arrhythmias after surgery and group 2–36 (60%) patients without arrhythmias after surgery. Along with noninvasive methods of histological investigation of right ventricle was performed.
Results: Ventricular arrhythmias (VA) occurred in 83.3% of patients early after radical surgical correction of tetralogy of Fallot, supraventricular arrhythmias (mainly single ectopic beats in 66.7% of patients) and atrioventricular (AV) nodal tachycardia – in 62.5%. Ventricular arrhythmias occurred significantly more often than supraventricular arrhythmias. These rhythm and some conduction disorders (i.e. AV block 2 degree) were mostly transient. Preoperative predictors of these arrhythmias were age 18 months and the history of palliative surgery. Intraoperative predictors included cardiopulmonary bypass time >90 min and aortic cross clamping time >50 min. Predictors of VA were as follows: QRS duration 100 ms, QT dispersion >50 ms, calculated pressure in right ventricle (RV) >65 mmHg. and the RV end diastolic volume >50 ml. Predictors of supraventricular arrhythmias turned out to be P-wave duration >95 ms and P-wave dispersion 20 ms.
Conclusions: In children at early age postoperative arrhythmias after surgical correction of tetralogy of Fallot occur due to initial hemodynamic changes, leading to hypoxemia, myocardial electrical disorders, dilatation of heart chambers and ventricular hypertrophy additionally to intraoperative risk factors (surgical trauma).

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LONG-TERM RESULTS OF THE 'PALLIATIVE' ATRIAL SWITCH FOR TRANSPOSITION AND SEVERE PULMONARY HYPERTENSION

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Objective: Palliative atrial switch (PAS) procedures that reroute pulmonary and systemic venous drainage and leave a ventricular septal defect (VSD) open have been used in the treatment of deeply cyanotic patients who have severe pulmonary vascular obstructive disease (PVOD). Palliative atrial switch is beneficial for patients with transposition of the great arteries (TGA) or Taussig-Bing anomaly who show higher arterial oxygen saturation in the pulmonary artery than in the aorta. We reviewed the late results of PAS (Mustard, $n=27$; Senning, $n=9$) at our institution.
Methods: Between 1984 and 2003, PAS was performed in 36 cyanotic patients (19 male, 17 female). Median age was four years (range, 1–14). Mean preoperative pulmonary arterial pressure was 95 mmHg (range 84–115 mmHg). Mean systemic arterial oxygen saturation was 60% (range, 40–76%). Mean pulmonary vascular resistance was 15 units (range 10–36 units). The majority of patients (97%) were in New York Heart Association (NYHA) functional class III or IV preoperatively.
Results: Overall early mortality was 26%; for patients after 1994 ($n=17$), the early mortality was 11.5%. Mean follow-up was 6.5 years (maximum 21). Mean postoperative systemic arterial oxygen saturation was increased to 88% ($P<0.0001$). Late survival for early survivors at 5, 10, and 15 years respectively was 87% (63%, 97%), 75% (58%, 89%), and 68% (27%, 72%). The NYHA functional class was significantly improved; 75% of late survivors ($n=15$) were in functional class I or II ($P<0.05$).
Conclusions: The PAS operation significantly improves systemic arterial oxygen saturation and quality of life in selected patients with transposition hemodynamics, VSD, and severe PVOD.

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SHORT-TERM RESULTS OF DIRECT MYOCARDIAL REVASCULARIZATION ON THE BEATING HEART IN 300 CONSECUTIVE PATIENTS WITH ISCHEMIC HEART DISEASE

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Objective: Aim of this study was to evaluate the immediate results of minimally invasive myocardial revascularization in patients with ischemic heart disease.
Methods: From September 2003 to September 2006 at the Surgical Treatment Department and Minimally Invasive Coronary Surgery Department of Bakoulev Center for Cardiovascular Surgery 300 patients underwent direct myocardial revascularization performed with minimally invasive technique. Mean age was 56.5±8.7 years with male predominance (90%). Angina pectoris I-II functional class was noted in 5.3% cases, III-IV FC – in 82.7% cases, acute coronary syndrome – in 9.7% cases. History of myocardial infarction was present in 42% cases. Impaired left ventricular ejection fraction <40% was noted in 4.7%. Sixty eight percent patients had multivascular coronary artery disease. Left coronary truncus stenosis was noted in 13.3%.
Concomitant pathology: history of initial nervous system pathology – in 1% of cases; chronic obstructive lung diseases – in 2.7%; gastrointestinal tract pathology – in 22% cases.
Results: We performed 300 operations of direct myocardial revascularization on the beating heart. In majority of cases (98.7%) we applied median sternotomy (OPCABG technique) due to predominant multivascular coronary blood flow lesion. In 5% cases cardiopulmonary bypass was required during operation.
Combined surgery was performed in 13% of cases. In 51.3% cases CABG was combined with peripheral artery interventions, in 38.5% - with transmyocardial laser revascularization, in 10.3% - with transmyocardial laser revascularization and angiogenic factor infusion in critical lesion of distal coronary blood flow. We revascularizated 1–6 coronary arteries. In most cases we shunted three or four coronary arteries (64.7%). Index for revascularization was 3.5. Left internal mammary artery was used in 96% cases,

radial artery – in 87%. 22.6% patients underwent total autoarterial myocardial revascularization.
In postoperative period acute myocardial infarction and focal neurologic symptomatology were not recorded. Mean time of ICU-stay was 18±6.2 h. Recurrent angina pectoris I-II FC in preadmission diagnosis was noted in two patients (1%) with marked initial lesion of distal blood flow (nonshuntable artery areas). Hospital mortality rate was 1.3%.
Conclusions: Direct myocardial revascularization performed with minimally invasive technique is effective and safe for multiple CA lesion and severe concomitant pathology treatment. Its efficacy is equal to CABG by using CPB.

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LEFT VENTRICULAR REMODELING AFTER HEART VALVE SURGERY IN PATIENTS WITH DILATED LEFT VENTRICLE

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Objective: The objective of this study was to investigate the influence of heart valve surgery on the development of left ventricular (LV) remodeling.
Methods: From 2000 to 2005, 104 patients with heart valve disease and end-diastolic volume index (EDVI) >80 ml/m² (without coronary artery disease) were followed. All patients were in New York Heart Association (NYHA) class III-IV. The average LV ejection fraction (EF) was 49%, end-systolic volume index (ESVI) - 77 ml/m², end-diastolic volume index - 138 ml/m², LV mass index (LVMI) - 196 g/m². LV wall thickness index (LVWI) was 0.31.
Results: Patients were divided into three groups according to the long-term follow-up results. The first group includes 60 patients (57%) with favorable results: heart valve surgery in these cases resulted in normalization of LV sizes, volumes and systolic function. EFLV was 62.2±2%, ESVI -32 ml/m², EDVI – 72 ml/m². LVMI decreased to 129 g/m², LVWI increased to 0.45. LV has elliptical geometry; sphericity index was 0.4 in systole and 0.6 in diastole. Patients were in NYHA class I-II. It points to symptomatic reversible preoperative enlargement LV cavity that was resulted from volume overload. The second group consists of patients with irreversible alteration of LV structure and geometry. There was no substantial reduction in LV size and improvement in systolic function after surgery. EFLV was 31±2%, ESVI - 118 ml/m², EDVI –181 ml/m². Significant decrease in LVWI (0.26), large LV mass and assumption of a more spherical shape indicate to adverse LV remodeling. Patients were in NYHA class III-IV. In the third group with intermediate results patients demonstrated a decrease in LV size and improved contractility. However, there were sings of eccentric LV hypertrophy: increased LVMI was 144 g/m² and decreased LVWI – 0.37. EDVI was increased mildly -110 ml/m². LVEF was 52±6%. Overall functional status of patients improved significantly, but less than in the first group.
Conclusions: The development of LV remodeling results from initial functional status of myocardium. There is a normalization of LV geometry and function in the most of patients with heart valve disease and dilated LV in the long-term follow-up. However, part of patients have signs of pathological LV remodeling influenced on their functional status.

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IMPLANTATION OF CRYOPRESERVED MITRAL VALVE ALLOGRAFT IN TRICUSPID AND MITRAL POSITIONS

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Objective: In certain localizations of heart valve destruction and in active infective endocarditis the implant choice is contradictory. The cryopreserved mitral valve allograft is the possible variant for complete or partial replacement of atrioventricular valves.
Methods: From January 1998 to December 2005 in the department of heart valve diseases cryopreserved mitral valve allograft was implanted in 13 patients. There were four females and seven males. The mean age was 26.7±3.4 years. New York Heart Association (NYHA) class III was in six (46.9%), IV – in five (53.1%) patients. The etiology was: active infective endocarditis in 11, VSD with tricuspid valve chords rupture in 1, tricuspid valve anterior leaflet benign tumor in one cases.
In tricuspid position were implanted eight complete and four partial mitral allografts. In mitral position was implanted one mitral allograft. For complete replacement the valve exceeded the 2-D echo recipient fibrous ring dimension was taken. The donor anterior mitral leaflet was oriented on the base of the recipient septal leaflet. The allograft papillary muscles were sutured to the RVOT part of IVS and in accordance with anatomy to the muscles or myocardium of RV. In all four cases the defect of medial part of tricuspid valve leaflet was met. For the closure the slightly bigger part of allograft anterior leaflet with two groups of papillary muscles was cut. The muscles fixation was the same.
In mitral position complete implantation was added with nonflexible supporting ring placement. Allograft papillary muscles were placed between LV wall and native muscles.
Results: There were no hospital deaths, reinfection or reoperation in the long-term follow-up. The postoperative period was ranged from 6–96 months (mean 51±7.6). For mitral position the follow-up was 46 months. All patients in the study were in NYHA class I. Valve regurgitation was absent in 4, minimal in 5 and moderate in four cases. Transthoracic echocardiografy revealed sclerosis of the recipient and native papillary muscles and mildly retraction of the allograft leaflets.
Conclusions: The postoperative period near five years showed good results of mitral allograft function. This implant can be used for complete and partial replacement of atrioventricular valves.

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PREDICTORS FOR CORONARY ARTERY REVASCULARIZATION IN PATIENTS WITH END-STAGE RENAL FAILURE

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Objective: Patients with end-stage renal failure (ESRF) show accelerated arteriosclerosis with resultant coronary heart disease. Therefore, some cases are needed the coronary revascularisation, PTCA and/or CABG, in the clinical follow-up. We conducted a study to investigate the possible predictors of coronary artery revascularization in patients with ESRF.
Methods: A total of 61 patients with a mean age of 51±12 (range, 25–77 and median 51 years) having ESRF who underwent hemodialysis (range of dialysis seances, 104–2030) without any proven coronary artery disease were analyzed for coronary artery revascularization (CABG and/or PTCA and stenting) during four years follow-up. Coronary artery calcification (CAC) scoring was assessed with a 16-channels multidetector computed tomography and traditional coronary angiography. Data were analysed with logistic and linear regression analysis as appropriate.
Results: A total of 17 (27.9%) patients underwent coronary revascularization. In these cases, the mean of CAC scoring was 295±486 (range, 0–2111). Age (P<0.0001), subgroup of age (age >51 years) (P=0.0016) and CAC scoring (P<0.0001) showed a significant correlation with coronary revascularization. Blood cholesterol (P=0.054), creatinine (P=0.060) and triglyceride (P=0.090) levels showed a trend towards significancy. However, gender (P=0.1628), dialysis period (P=0.665), blood urea nitrogen (P=0.863), calcium (P=0.214), parathyroid hormone (P=0.189) and phophorus (P=0.801) levels did not correlate with coronary revascularization.
Conclusions: Blood calcium-phosphorus product, parathormone levels is reported the predictive risk factors of coronary artery disease in ESRF patients. However, our study findings demonstrate that these risk factors are not correlate coronary artery revascularisation. On the other side, age (patients older than 51-year-old) and high levels of CAC scoring are highly predictive for coronary revascularization in patients with ESRF.

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SURGICAL STRATEGY IN COEXISTING SIGNIFICANT CAROTID AND CORONARY ARTERY DISEASE

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Objective: International recommendation is not coherent in the case of coexisting significant carotid and coronary artery disease. It is often hard to decide the operative indication and timing.
Methods: Our aim was to create a clear strategy regarding our results and the literature. The last 10 years literature can be divided into two subgroups, whether they recommend therapy for coexisting significant carotid stenosis or not. Meanwhile all articles call for the need of a randomized study. Later data emphasize the importance of carotid stents. We have analyzed our 15 year long surgical experience gained with simultaneous

carotid and coronary procedures. All the carotid eversion endarterectomies were performed by well trained vascular surgeons while the concomitant coronary procedures by cardiac surgeons.
Results: In our department 253 simultaneous carotid and coronary surgery was performed. We lost 13 patients. Our mortality was 5.13%. This result is absolutely comparable with those have been published in the literature. However, more and more coexisting carotid stenosis will be stented prior to the coronary procedures nowadays.
Conclusions: Regarding our and the international results, we recommend the surgical therapy of the carotid disease. Timing of the operation should be decided by the neurological and cardiac risk. The suggested time-window between carotid stenting and coronary surgery should be not shorter than 40 days to prevent instant thrombosis. We have to emphasize, that the cardiac surgeon is the person who should make always the decision, which of the strategies (simultaneous vs. two stages) might by the less risky for the given patient in case of concomitant carotid and coronary disease.

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AORTIC VALVE REPLACEMENT WITH A LARGER MECHANICAL VALVE

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Objective: Trans-valvular pressure gradient is still one of the main concerns in aortic valve surgery. The aortic leaflets that attach to the aorta might display differences in longitudinal axis. The sinus of Valsalva changes its radius of curvature from systole to diastole with a decline of 16%, approximately. Intra-aortic pressure is zero during aortic valve replacement (AVR). In this study, our aim was to perform aortic valve replacement by using the dispensability property of the aorta with a larger mechanical valve.
Methods: Ten male and six female patients with a median age of 46.5 (Range, 22–74) underwent AVR. In addition to AVR; 10, 1, 1, 3 and 2 patients underwent mitral valve replacement, aorta-right coronary artery saphenious vein bypass, left atrial tromboectomy, radio frequency ablation and tricuspid valve repair; respectively. After measurement of the valve size, one grade larger mechanical valve is used in the replacement procedure.
Results: There was no early postoperative complications and mortality. In the early postoperative period, we did not detect any clinically significant trans-valvular pressure gradient in echocardiography of the study population. Out of 16 patients with mean body surface area of 1.65 m^2 (Range; 1.32–1.9) we could achieve our AVR procedure in only eight (50%) patients.
Conclusions: We think that trans-valvular pressure gradient problem in aortic valve surgery with stent could be managed ideally with this procedure.

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SURGERY FOR LEFT VENTRICLE ANEURYSMS

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Objective: To assess immediate post-surgical results of post-infarction left ventricle aneurisms treatment.
Methods: More than 2300 operations for IHD have been performed since 2003 to 2006. Post-infarction aneurism of left ventricle requiring surgery, was found in 156 patients (6.7%). There were 143 males (92%). Mean age was 56.4±10.4 years. Eighty-five percent had FV III-IV (NYHA). Post-infarction aneurism location was: anterior-lateral – 89, anterior-lateral-apical – 49, apical – 17, posterior – 1. LV EDD varied from 48–72 mm (mean 58±19 mm). Maximal LV EDV was 290 ml (mean 180±48 ml). Mean LV EF was 42±6.8% (35–49%). One patient had evident hemodynamic MR.
All operations were performed with CPB and pharmacologic hypothermic cardioplegia (Custodiol 20 ml/kg). CPB was performed according to the scheme 'aorta-right atrium'. Mean time of CPB was 85±18.4 min (51–141 min), mean time of myocardial ischemia was 54±12 min (33–105 min). Four patients required intra-aortic balloon-pump, in one case – preoperatively. Dor's procedure was performed in 51 cases (33%). It was performed if LV EDV was >200 ml and evident interventricular septum involvement. In 100 patients we performed resection of LV aneurism with D.A. Cooley's linear plasty (with LV EDV <200 ml and minimal or lack of interventricular septum involvement). In five cases W.S. Stoney's septoventruculoplasty was performed. In 64 cases (41%) we performed thromboectomy from LV. In 152 patients besides LV cavity reduction, coronary artery grafting was required. Seventy-seven patients had isolated mammary-coronary grafting of the anterior descending artery; 1–2 arteries grafting – in 75 patients. Mean number of grafts for a patient was 1.7. The patient with mitral dysfunction had a MV plasty with access via LV.
Results: Hospital mortality rate was 1.9% (three cases: one polyorganic insufficiency, two syndromes of small ejection). Complications were syndrome of small ejection in 37 cases (24%), cerebral blood circulation acute disorder in two (1.5%). At the discharge moment 82% patients were referred to FC I (NYHA). Mean LV EDD was 51±2.1 mm (40–58 mm), mean LV EDV 134±12 mm. In patients with coronary artery grafting, there were no cases of angina recurrence.
Conclusions: Surgery for post-infarction LV aneurisms is accompanied with a low hospital mortality rate. Surgical technique is chosen regarding the patients status.

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RENAL FUNCTION AFTER CORONARY ARTERY BYPASS GRAFTING IN PATIENTS WITH AT LEAST MODERATELY DECREASED GLOMERULAR FILTRATION RATE

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Objective: The purpose of this study was to estimate the early postoperative outcomes of isolated CABG (with particular consideration of renal function) in patients with non-dialysis dependent renal dysfunction.
Methods: The glomerular filtration rate (GFR) was estimated using the Cockroft-Gault formula preoperatively and up to 6th postoperative day in 486 consecutive patients undergoing isolated CABG. Patients with dialysis-dependent renal failure and patients operated in cardiogenic shock were excluded from this study. One hundred and thirteen patients with calculated creatinine clearance lower than 60 ml/min composed the study group. The control group constituted 373 patients with GFR equal or >60 ml/min. Patients with decreased creatinine clearance compared to the control group were significantly older (71.8±6.5 vs. 60.0±8.2 years; $P<0.05$), more likely women (48.7% vs. 19.6%; $P<0.05$), presented higher perioperative risk estimated by EuroSCORE (6.3±2.55 vs. 3.4±2.45 scores, $P<0.05$) and underwent more frequently prior myocardial infarction (68.9% vs. 55.5%; $P<0.05$). Mean left ventricular ejection fraction and prevalence of hypertension, diabetes, unstable angina were comparable in both groups. The rate of OPCAB did not differ between groups (12.4% vs. 12.3%, study vs. control group, respectively, $P>0.05$). Mean number of grafted coronary vessels was comparable in the study group (2.5±0.66) and in the control group (2.63±0.7) /$P>0.05$/.
Results: Patients with impaired GFR needed significantly more often an inotropic support (30.1%) than the control group (11.3%); $P<0.05$. The rate of cardiac arrhythmias, cerebrovascular accidents, need of IABP application and myocardial infarction was not different in both groups ($P>0.05$). A significant decrease of GFR was observed both in the study group (45.3±14.2 ml/min vs. 48.8±9.5 ml/min, postoperative vs. preoperative value, respectively, $P<0.05$) and in the control group (84.9 25.1 ml/min vs. 87.3±19.1 ml/min, postoperative vs. preoperative value, respectively, $P<0.05$). One patient (0.88%) in the study group required hemofiltration, the patient survived (vs. no hemofiltration in the control group; $P>0.05$). Two patients (1.77%) in the study group died, there was not death in the control group ($P>0.05$).
Conclusions: Postoperative increased rate of hemofiltration need or increased intra-hospital mortality was not observed in the study group. With respect to clinical importance of GFR decrease in patients with preoperatively impaired renal status, the postoperative deterioration in renal function was more expressed in the study group, however a statistically significant impairment of renal function was noted in both groups.

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MYOCARDIAL PROTECTION WITH THE SOLUTION CELSIOR IN NORMAL CARDIAC SURGERY

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Objective: The solution for cardiac protection Celsior was designed to prevent the celular edema with its content in mannitol and lactobionate, the damage of the free radicals acids of 02 with the glutation, histidina and mannitol and to avoid the myocardial contracture with the glutamate and the magnesium. Its use in heart transplantation is very frequent, with good

results, but its use in other types of cardiac surgery is unusual. We study its application in non transplant cardiac surgery and its benefits.
Methods: We study prospectively the results to administer 1 l of cold Celsior solution through the ascending aorta and/or the coronary venous sinus, after the crossclamping of the aorta, in 111 consecutive patients operated by one team.
Mean age of the patients was 63 (16/84) years and one third were more than 70 years. Fifty-nine (53%) were males. The operation was valvular in 55, coronary in 36, valvular and coronary in 13 and others in 7.
Results: We gave one single dose of Celsior in 32 (29%), with a mean cross-clamp time of 45 min. In 79 (71%) we administered later one (500 cc) or more doses of cold blood. The total mean cross-clamp time was 64 min (maximum 116) and the extracorporeal circulation 98 min (40–190). At the end of bypass, the mean systolic pressure was 104 (80–130) mmHg and the left atrial pressure was 13 (3–28) mmHg. We came back to bypass in five cases due to surgical problems in three and to ischemia in two.
Conclusions: The hospital mortality was 2.7%: One AMI at the 4rt P.O. day, one mediastinitis and one cardiorespiratory insufficiency.
The myocardial protection obtained with the solution Celsior has been good, sure, effective and reproducible, with very few haemodynamics problems.

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SURGICAL REPAIR OF DEGENERATIVE MITRAL INSUFFICIENCY WITH COMPLEX ANATOMY
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Objective: Advantages of repair over prosthetic replacement for degenerative mitral insufficiency are well established. These advantages include lower early and late mortality, superior preservation of left ventricular function, higher freedom from thromboembolism, anticoagulant-related complications and endocarditis. The relatively low frequency of conservative treatment of mitral valve insufficiency may be determined by unwillingness of many surgeons to attempt valvular repair when the anterior leaflet is involved, a condition which occurs in approximately 30% of the cases and in which results have historically been less favourable when compared to the durable and reproducible results obtained in repair of posterior leaflet prolapse. In this retrospective study, the feasibility and the reliability of mitral valve reconstruction in patients with degenerative mitral insufficiency secondary to involvement of the anterior, or of both mitral leaflets, has been evaluated.
Methods: From January 1, 1996 to January 15, 2007, three-hundred and thirty one consecutive patients with isolated mitral insufficiency secondary to degenerative disease with prolapse of both leaflets (240 cases), or of the anterior leaflet alone (91 cases), underwent surgical correction. In 318 patients (96.1%) repair was accomplished by reconstruction of the chordae tendineae with polytetrafluorene (PTFE) sutures together with implantation of a flexible annuloplasty ring. When the posterior leaflet was involved, quadrangular resection and sliding plasty were also performed. In nine patients (2.7%) the repair was accomplished utilizing the ‘edge to edge’ technique. In four patients (1.2%) a prosthetic valve replacement was performed. All patients who underwent repair had either no regurgitation or trivial to mild incompetence at the end of the procedure.
Results: Hospital mortality was 0.9%. Follow-up ranged between three months and nine years (average of 5.2 years) and was performed in 97% of the cases. No cardiac related late mortality was recorded; six patients (1.8%) presented a late failure of the repair which required a second procedure. In four patients (1.2%) repeat echocardiograms showed a stable moderate recurrent mitral insufficiency that, at present, does not require a correction. In the remaining patients echocardiogram demonstrates a trivial to mild mitral incompetence.
Conclusions: In the great majority of patients with mitral insufficiency with involvement of the anterior or of both mitral leaflets, physiological single-orifice repair is feasible with low mortality and low medium-term recurrence rate. Repair utililizing ‘edge to edge’ technique may find occasional indication in a minority of patients. Prosthetic valve replacement is only seldom necessary.

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EARLY OUTCOMES OF CORONARY ARTERY BYPASS GRAFTING IN PATIENTS WITH CAROTID DISEASE
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Objective: The aim of this study was to evaluate the impact of carotid disease on early outcomes of coronary surgery.
Methods: The study group constituted 913 patients undergoing isolated CABG in whom a duplex ultrasound examination of the carotid arteries was performed preoperatively. An internal or common carotid artery stenosis equal or >50% was detected in 144 (15.8%) patients. The remaining 769 patients with a stated carotid blood flow in normal ranges composed the control group.
The patients with carotid disease were significantly older (mean age 66±7.85 vs. 62.6±9 years, $P<0.05$) and presented higher perioperative risk estimated by EuroSCORE (6.07±2.67 vs. 3.69±2.6, $P<0.05$). Compared to the control group they underwent more frequently prior cerebrovascular accidents ($n=27$; 18.75% vs. $n=59$; 7.7%), suffered from lower extremity peripheral arterial disease ($n=25$; 17.4% vs. $n=60$; 7.8%), left main disease ($n=44$; 30.6% vs. $n=174$; 22.6%), aorta calcification (showed in the preoperative chest X-ray picture; $n=53$; 36.8% vs. $n=211$; 27.4%) and chronic kidney disease ($n=13$; 9% vs. $n=37$; 4.8%) /$P<0.05$/. The prevalence of hypertension, diabetes mellitus, prior myocardial infarction, unstable angina, impaired LVEF (<50%), chronic obstructive pulmonary disease was comparable in both groups ($P>0.05$). Operative data: OPCAB rate, mean aorta cross-clamp and extracorporal circulation time did not revealed any differences in both groups ($P>0.05$).
Results: The rate of postoperative cardiac arrhythmias was comparable in both groups ($P>0.05$). Patients with carotid stenosis needed more frequently an inotropic support ($n=25$; 17.4% vs. $n=88$; 11.4%; $P<0.05$) or IABP application ($n=8$; 5.5% vs. $n=13$; 1.7%; $P<0.05$) than the control group. The neuropsychologic deficits occurred more often in the patients with carotid disease ($n=48$; 33.3% vs. $n=110$; 14.3%; $P<0.05$). The prevalence of perioperative myocardial infarction was statistically not different in patients with carotid disease ($n=7$; 4.86%) and in the control group ($n=21$; 2.7%). Three patients (2.1%) with carotid disease and nine patients (1.2%) in the control group sustained postoperative stroke ($P>0.05$). The in-hospital mortality showed no statistically significant difference: 4 (2.8%) vs. 15 (1.95%) death, patients with carotid disease vs. control group, respectively ($P>0.05$).
Conclusions: The patients with carotid disease are the group with more unfavourable comorbid conditions. The presence of carotid artery stenosis did not result in increased mortality or postoperative stroke rate. However, the carotid disease may be a risk factor for the deterioration in neuropsychological function.

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TWO YEARS EXPERIENCE WITH SORIN FREEDOM SOLO: CLINICAL RESULTS AND FOLLOW-UP
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Objective: The Sorin Freedom Solo pericardial aortic valve, has the potential to provide superior hemodynamic function and durability with shorter time of implantation compared to the others stentless valve. The aim of the study was to analyze the mid-term results with this new stentless valve.
Methods: From December 2004 to December 2006, 118 patients (62 females and 56 males, mean age 76.7±6.9) underwent aortic valve replacement with Pericarbon Freedom Solo. Valve performance was investigated in all patients in all patients with echocardiographic controls at 3, 6, 12 and 24 months.
Results: Hospital mortality was 4.2%. N° patients died after hospital discharged (0.88%). All deaths were not related to valve dysfunction. Sixty-two patients underwent isolated aortic valve replacement while 56 underwent combined procedures that included coronary artery bypass grafting, mitral valve surgery, septal myectomy and AF ablation. The mean valve size implanted was 22.40±1.8 mm. The cross-clamp time in isolated valve implantation was 40±6.7 min. No structural anomalies, paravalvular leakage and endocarditis were observed. Follow-up at 3, 6, 12 and 24 months (mean follow-up 16.5 months) was complete in all patients. During follow-up the mean and peak transvalvular gradient decreased from 9±2 and 15±1.7 mmHg prior to discharge to respectively 5±1.6 and 11±1.3 mmHg at 12 months.
Conclusions: The Freedom Solo pericardial bioprosthesis, compared to other stentless valves, is easier to implant and so require a shorter learning curve. The supra annular position allows to face the small aortic root problem even in the elderly patients. Technique of implantation consent to reduce CPB and cross-clamp time compared to other stentless valve. In conclusion this valve provide excellent hemodynamic performance that seems to further improve at early follow-up. Longer follow-up is warranted to confirm these preliminary results.

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BLOOD VS. CRYSTALLOID: ROLE OF CARDIOPLEGIA ON HEMODILUTION DURING CARDIOPULMONARY BYPASS. IMPLICATIONS ON OPERATIVE OUTCOME

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Objective: Low on-pump hematocrit and consequent oxygen delivery (DO_2) have been associated to several complications in the postoperative period including renal failure, stroke, greater operative death and resources utilization. Cardiopulmonary bypass (CPB) hemodilution to hematocrit <24% and DO_2 <272 ml min^{-1} m^{-2} seem to be the best predictor of poor outcome in the postoperative period. Until now no previous study analyzed the impact of type of cardioplegia on hemodilution during standard CPB. The aim of this study was to investigate how the type of cardioplegia (blood vs. crystalloid) modifies the grade of hemodilution during CPB and, therefore, its consequences on postoperative outcome in term of renal failure, stroke, blood transfusions and death.
Methods: We studied retrospectively 411 consecutive patients undergoing coronary artery bypass graft (CABG) operation in cardioplegic arrest from January 2003 to October 2006. First, the impact of hemodilution on postoperative outcome has been analyzed, confirming the cutoff value of 24% of hematocrit during CPB as best predictor for acute renal failure, peak postoperative serum creatinine levels, stroke and mortality. Then, we divided our population in two groups: Group A, CABG performed with crystalloid cardioplegia (147 patients); Group B, CABG performed with tepid blood cardioplegia (264 patients). There were no statistically significant differences between the two groups in term of risk factors, EuroSCORE, sex distribution, body surface area (BSA), cross-clamp and CPB time, and type of revascularization. The choice of cardioplegic solution was based on surgeon preferences. On cardiopulmonary bypass, we recorded a curve of several variables including: Hemoglobin and Hematocrit levels; SvO_2; oxygen delivery (DO_2) and consumption (VO_2). These variables were explored in a multivariate model as possible risk factors for renal failure, stroke, blood transfusions rate, ICU stay, and poor outcome in the postoperative period. The role of cardioplegia and transfusions was subsequently included in the model.
Results: Hematocrit value lower than 24% resulted, in the postoperative period, in higher serum Creatinine levels; higher incidence of neurological complications and death (P=0.001). Hematocrit and Hemoglobin curves during CPB did not show significative differences between the two Groups and, therefore, on postoperative outcome.
Conclusions: As demonstrated in previous studies, a hematocrit cutoff value of 24% is a good predictor of the postoperative outcome of the patient. The type of cardioplegia (blood vs. crystalloid) seems to not have any role on hemodilution and DO_2 during CPB: the management should focus more on other variables as on-pump diuresis, priming, pump flow and ultrafiltration.

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LEFT VENTRICLE REMODELING ASSESSMENT IN PATIENTS WITH AORTIC VALVE DISEASES AFTER AORTIC VALVE REPLACEMENT

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Objective: Echocardiography assessment of the left ventricle remodeling after aortic valve replacement.
Methods: Forty patients (33 men) mean age 39.93±7.07 years were evaluate using echocardiography 10–14 days after the operation. Patients were divided in three groups: group one-patients with aortic stenosis (n=8), group two-patients with aortic insufficiency (n=12), group three-patients with aortic stenosis and insufficiency (n=20). Based on left ventricular myocardial mass index, left ventricular size, left ventricular thickness index patients were divided in four groups: group 1 – normal geometry, group 2 – concentric hypertrophy, group 3 – eccentric hypertrophy, group 4 – concentric remodeling (Florja VR, 1997).
Results: We noted the decreasing of left ventricular cavity dimensions: end-systolic size and end-diastolic size from 5.25±0.41/7.65±0.72 cm to 5.07±0.48/6.28±0.31 cm (P<0.05) respectively, 10–14 days after the operation in patients with aortic insufficiency and eccentric hypertrophy. In patients with aortic stenosis and concentric hypertrophy left ventricular end-systolic and end-diastolic size in early follow-up period changed insignificant: from 3.22±0.95/5.26±0.92 to 3.19±0.87/4.84±0.20 respectively. Left ventricle thickness, left ventricular myocardial mass index does not change. Markedly increased the ratio of the left ventricular myocardial mass index to end-diastolic volume index in patients with aortic insufficiency and eccentric hypertrophy from 46.3±0.2 g/ml to 56.25±0.40 g/ml (P<0.05). Sistolic myocardial stress decreased in patients with aortic insufficiency excentric hypertrophy from 101.90±22.58 din/cm^2 to 93.18±20.84 din/cm^2 (P<0.05). The left ventricular ejection fraction increased early in group 3: from 47.75±10.03 to 53.96±12.56 (P<0.05). In group 1 there were no changes in the left ventricular ejection fraction but it is decreased significantly in group 2 from 57.27±5.19 to 46.47±4.89 (P<0.05) in the early follow-up period. Patients of groups 2 and 3 showed markedly decrease of left ventricular diastolic sphericity index which represent the ratio of left ventricular end systolic size to longitudinal diastolic size: from 0.79±0.15 (group 2), 0.68±0.18 (group 3) before operation to 0.65±0.08, 0.54±0.15 (P<0.05) 14 days after the operation respectively.
Conclusions: Group three-patients with aortic stenosis and insufficiency showed the best postoperative performance in early follow-up period after the aortic valve replacement. Left ventricular cavity dimensions, spherific left ventricular diastolic index, left ventricular ejection fraction and systolic remodeling index were improved in few days (10–14) after the operation.

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LIMA CAN CAUSE FATAL COMPLICATIONS

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Objective: Beginning of using left internal thoracica arteria (LIMA) for coronary revascularization was a great step in cardiac surgery, and results in autoarterial grafting. In our days LIMA grafting is preferred revascularisation method for patients undergoing bypass surgery. Is it so advanced, or not?
Methods: In retrospective analysis of mechanisms and reasons patient's hospital mortality we found that hospital mortality for patients, underwent only aortovenous grafting was 1.5%, but for patients underwent CABG with LIMA was 2.9%. Excluding parametres for LIMA using was its bad flow conditions.
Results: Using LIMA in situ during CABG we are performing 'physiological' revascularisation. But, from the other side, LIMA as a 'true' peripheral artery could perform spastic events as a reaction to the operation procedure.
Conclusions: This results in noneffective reanimation and increased mortality.

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IMPACT OF MODIFICATION OF TRANSFUSION ALTERNATIVES PROTOCOL ON EARLY POSTOPERATIVE RESULTS IN JEHOVAH'S WITNESSES PATIENTS AFTER CARDIAC SURGERY

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Objective: Non blood cardiac surgery in Jehovah's Witnesses became a standard procedure in some centres, with results comparable to the rest of the population. In our institution, during the last ten years, based on growing experience, the perioperative protocol was evaluated and results changed. The purpose of this study is the comparison of early postoperative results in this group of patients, depending on the type of perioperative transfusion alternatives protocol.
Methods: The prospective, nonrandomized, single centre observation was conducted on 49 consecutive adult Jehovah's Witnesses patients operated on for heart diseases from January 1997 to December 2006. Patients were divided into two groups: GROUP I – 30 patients treated using the old protocol of transfusion alternatives, including: perioperative administration of recombinant Human Erythropoietin (rhea EPO), intraoperative low volume acute normovolaemic hemodilution (ANH) and antifibrinolytic therapy – Aprotynin 1.5 million KIU, for patients operated on with cardiopulmonary bypass; GROUP II – 19 patients treated using modified protocol, including: perioperative administration of recombinant Human Erythropoietin (rHu EPO), intraoperative cell-saver and antifibrinolytic therapy – Aprotynin 3 million KIU, for patients operated on with cardiopulmonary bypass. Perioperatively the demographic data, operative risk, LV ejection fraction, co morbidities, full blood count, basic coagulation parameters, mortality and morbidity rate,

chest tube drainage, duration of ICU stay, duration of mechanical ventilation and dose of rHu EPO were compared.
Statistical analysis was performed using *t*-student and Pearson's χ^2 tests. A *P*-value <0.05 was considered significant.
Results: Preoperatively the groups were comparable. Postoperatively the rate of deep anemia (hematocrit value <25%) was higher in group I 20% vs. 0% ($P<0.05$). Lower hematocrit value in postoperative days two and three, hematocrit value and blood hemoglobin concentration in day 5–7 in group I was observed as well: 31.5±6.91% vs. 35.84±3.30% ($P<0.05$), 30.8±6.88% vs. 34.88±3.47% ($P<0.05$), 31.9±7.31% vs. 36.88±3.14% ($P<0.01$), 6.63±1.56 mmol/l vs. 7.44±0.67 mmol/l ($P<0.05$), respectively. In group II the postoperative dose of rHu EPO was significantly lower: 94.73±134.26 U/kg vs. 275±307.89 U/kg.
Conclusions: Increasing experience and changing perioperative transfusion alternatives protocol in Jehovah's Witnesses open heart surgery patients resulted in the elimination of deep postoperative anemia and increase of full blood count parameters in the early postoperative period.

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COMPOSITE CONDUITS WITH LEFT INTERNAL MAMMARY ARTERY ONLY

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Objective: LIMA is a gold standard in the coronary surgery for anterior descending artery grafting (LAD). Application of other arteries (RIMA, radial artery, gastroepiploic artery) faces with numerous complications related to their harvesting and results in prolonged operative time. However, there is a remain of the LIMA which is not applied. Composite grafting is one of the ways to use such LIMA fragments.
Methods: Since January 2004 to January 2007, 185 patients have been operated on with composite grafting with cut LIMA fragment, its length was 52±24 (15–150 mm).
We performed 156 T-grafts (84.3%), 8 Y- grafts (4.3%). 5 X-grafts (2.7%), 13 TT-grafts (7.0%), 3 K-grafts (1.7%), 2 WV –grafts (1.1%).
Additionally to LAD we established a bypass grafted 210 coronary arteries: diagonal - 110 (52.3%), intermedia-36 (17.1%), marginal- 30 (14.3%), posterior – 34 (16.2%).
To perform composite grafting with LIMA alone it is necessary to observe some conditions which are individual in every case in view of a degree and anatomy of the diseased vessels, their localization on the heart.
A place for arteries junction, a type of anastomosis (T, Y, X, TT, K, WV), and localization and form of the distal anastomosis with coronary arteries are chosen individually.
Results: Autoarterial revascularization value was 2.2±0.1 (2–3), mortality rate - 2 (1.1%), MI - 2 (1.1%), resternotomy - 2 (1.1%). Myocardial ischemia time was 63+23 (35–146), CPB time – 94+29 (53–194). ICU stay was 20.5±3.2 (15–70) h. Angina pectoris recurrences did not occur.
Conclusions: The best application of LIMA allows increasing the patient's index of autoarterial revascularization safely.

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OFF-PUMP ARTERIAL CARDIAC REVASCULARISATION – OUR EXPERIENCE

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Objective: Off-pump coronary artery bypass (OPCAB) grafting is still discussed controversially in the cardiac surgical community. Early perioperative results are encouraging. We investigated results of OPCAB surgery in arterial myocardial revascularization with composite grafts in multiple vessel coronary artery disease.
Methods: From January 2004 to December 2005, 858 patients underwent coronary surgery at our department, and from them we enrolled 283 patients receiving arterial myocardial revascularization with composite grafts in OPCAB technique.
There were 235 (83.08%) men and 48 (16.96%) women with an average age of 49.6. Emergency surgery was performed in 55 (19.44%) patients. LMS was present in 35 (12.37%), 80 (28.27%) had previous myocardial infarction, 57 (20.14%) had previous PCI and 11 (3.89%) had carotid endoarterectomy at the same time, seven (2.47%) had IABP before surgery. Thirty (10.6%) patients are diabetic. EF ranged from 18–60% and EuroSCORE from 1–12 patients. ITAs were harvested as pedicled or sceletonized conduits. A preoperative assessment of the RA (Allen test and an oximetric plethysmography curve of the thumb during RA occlusion) in the non-dominant arm was carried out in all patients scheduled for RA harvesting. There were 18 (7.2%) patients with single vessel disease, 76 (30.4%) with double vessel disease, 156 (62.4%) with multi vessel disease.
Results: Two hundred and fifty (88.3%) patients had bypass using an ITA and RA in OPCAB technique. In 158 (63.2%) patients a total arterial revascularization was achieved, 92 (36.8) had additional venous grafts implanted. For all patients distal anastomoses were performed with LITA (in nine) cases as a jump with DGB) and for 45 (18%) with the radial artery, RITA we use in 17 (6.8%) cases. The 30-day mortality was three (1, 2%) all in emergency group, six (2.4%) patients were reoperated for bleeding, in this group were three (1.2%) perioperative myocardial infarctions. There was one episode of hypoperfusion corrected by lengthening the left ITA. At follow-up (mean, 3 and 12 months) no significant complications were observed in terms of survival and any cardiac-related events.
There were 18 (7.2%) patients with single vessel disease, 76 (30.4%) with double vessel disease, 156 (62.4%) with multi vessel disease. The 30-day mortality was three (1.2%) all in emergency group, six (2.4%) patients were reoperated for bleeding, in this group were three (1.2%) perioperative myocardial infarctions. There was one episode of hypoperfusion corrected by lengthening the left ITA At follow-up (mean, 3 and 12 months) no significant complications were observed in terms of survival and any cardiac-related events.
Conclusions: OPCAB could be successfully used for arterial grafting without compromising the completeness of revascularization. Proximal anastomosis of the radial artery to the side of the internal thoracic artery permits complete arterial revascularization, with the aim of improving long-term results.

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LEFT ATRIUM DIAMETER CHANGE AFTER SURGICAL TREATMENT OF ATRIAL FIBRILLATION USING RADIOFREQUENCY ABLATION – INITIAL REPORT

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Objective: To assess early and mid-term results of surgical treatment of atrial fibrillation using radio frequency ablation with a focus on left atrium diameter.
Methods: A prospective study of 36 consecutive patients operated from February 2006 to November 2006 was performed. Eighteen mitral valve prostheses, 14 mitral rings and nine aortic valve prostheses were implanted. CABG alone or as a concomitant procedure were performed in 11 patients. Atrial fibrillation both paroxysmal and permanent was diagnosed in every case. Radio frequency ablation of left atrium using MEDTRONIC Cardioblate system was performed as a concomitant procedure. All patients had echocardiography performed pre- and postoperatively. Study performed 3–6 months after procedure included physical examination, ECG and echocardiography.
Results: Mean ejection fraction was good 52.1% (range 30–75%). Mean EuroSCORE logistic was 4.28%. Preoperatively mean LA diameter was 55.7 mm (range 40–100 mm). We noticed three deaths after the operation in 10th (stroke), 23rd (bleeding from gastrointestinal tract) and 17th (heart failure) postoperative day respectively. Mean length of stay was 6.97 days. In the day of discharging from hospital 71.43% patients were in sinus rhythm and one patient needed pacemaker. Postoperatively decreasing LA diameter (mean 44 mm, range 36–64 mm) was noticed, but mean ejection fraction remained unchanged 55.3%. In follow-up, after 3–6 months after operation number of patients in sinus rhythm increased to 78.79%. Pacemaker was needed in two cases (6.06%). Arrhythmic remained 15.15% of our patients.
Conclusions: Radio frequency ablation of left atrium is safe and effective method of treatment of atrial fibrillation. Left atrium after procedure decreases and provides better hemodynamic function.

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THE PROGNOSTIC VALUE OF PREOPERATIVE B-TYPE NATRIURETIC PEPTIDE IN PATIENT UNDERGOING CORONARY BYPASS SURGERY

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Objective: The natriuretic peptides are cardiac neurohormones secreted in response to volume expansion and pressure overload. Many studies evaluat-

ing the prognostic implications of B-type natriuretic peptide (BNP) have been limited to cardiologic patients.
Our recent study evaluated the prognostic value of preoperative BNP in 90 consecutive elective coronary artery bypass graft (CABG) patients. Our present study involves 379 consecutive elective CABG patients.
Methods: We investigated the association between preoperative BNP level and postoperative intensive care unit (ICU) days, troponin I, creatinine, atrial fibrillation (AF) and blood transfusion. We adjusted analyses for age, gender, preoperative ejection fraction (EF), preoperative serum creatinine, chronic obstructive lung disease, critical preoperative state, recent myocardial infarction (MI), preoperative systolic PA $P>60$ mg HG and extracardiac arteriopathy.
Results: Preoperatively the BNP level correlated with preoperative EF (correlation coefficient (cc) -0.473 $P<0.0001$), age (cc 0.310 $P<0.0001$), EuroSCORE (cc 0.554 $P<0.0001$), preoperative serum creatinine (cc 0.217 $P<0.001$) and with recent MI ($P<0.0001$).
A significant correlation as shown in the previous study existed between BNP and postoperative ICU day greater than one (cc 0.252 $P<0.0001$) and postoperative transfusion requirement ($P<0.0001$). Although in the previous study there was no significant correlation between levels of BNP and postoperative troponin I and postoperative creatinine this new study shows a correlation with $P<0.001$ (cc 0.182) and $P<0.0001$ (cc 0.206) respectively.
This study continues to show no significant correlation between levels of preoperative BNP and postoperative atrial fibrillation.
In multiple logistic regression analysis the B-type natriuretic peptide level did not add significant independent predictive power to ejection fraction and EuroSCORE in predicting the postoperative ICU days.
Conclusions: Used in conjunction with other clinical information, preoperative measurement of BNP may be useful in predicting the postoperative duration in the ICU, requirement for blood transfusion, troponin I level and creatinine level.
Additional investigations are needed to support our findings and to further evaluate.

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REDO CARDIAC PROCEDURES: VACUUM-ASSISTED VENOUS DRAINAGE VIA PERCUTANEOUS INTERNAL JUGULAR AND FEMORAL VEIN CANNULATION

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Objective: In redo cardiac operation our cardiopulmonary bypass (CPB) protocol includes an easily available peripheral access for venous drainage and arterial perfusion to avoid congestion of the operative field and the vacuum-assisted venous drainage (VAVD). These peripheral cannulae are longer and have smaller internal diameter than standard cannulae.
Methods: Our experience includes 37 complex valvular and ascending aortic redo operations performed from January 2004 to November 2006 (20 men and 17 women, mean age 60.8±11.4 years).
The venous cannulation was always obtained by percutaneous access of the right internal jugular and femoral veins. For jugular vein approach a 16F percutaneous femoral artery cannula (Edwards Lifesciences 16F, length 15 cm) was used. Before skin incision the anaesthesiologist performed a 1 cm incision over the space between the sternal and clavicular insertions of the right sternomastoid muscle; the internal jugular vein was punctured with a needle, a guidewire was inserted and the cannula containing a dilator was introduced into the superior vena cava close to the right atrium. A 5-0 Prolene was placed in the anterior surface of the vein and the artery as a purse string. First a needle, then a dilator and then the cannulae were inserted. A 21F femoral vein cannula (Medtronic 21F lenght 64 cm) was inserted in the common femoral vein and introduced in the inferior vena cava close to the right atrium.
The arterial cannula was inserted in the femoral artery (30 cases), in the axillary (7) artery.
The CPB was begun trough a centrifugal pump (Biomedicus, Medtronic Biomedicus Inc. MN, USA). After CPB start, the VAVD was always employed trough a second Biomedicus centrifugal pump to ensure the complete decompression of the right atrium, applying a negative pressure <-80 mmHg.
Perfusion rate range was from 3.5–5.1 l/min and the perfusion rate of 2.4 l/min of body surface were achieved in all the patients. The central venous pressure remained low in all the cases. The VAVD associated to CPB allowed small diameter cannulae, smaller CPB priming volume and lower haemodilution without any air embolism.
Results: We reported no difficulty in inserting the venous cannulae and the operative field was free from these cannulas.
Conclusions: The peripherial CPB venous cannulation associated to VAVD is a safe and effective means of achieving venous drainage and it is our choice approach in complicated redo cardiac surgery.

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MORPHOLOGICAL SUBSTANCE OF SPASTIC REACTIONS OF VESSELS DURING CABG

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Objective: Mechanisms of spastic reactions at CABG operations are studied during many years, especially at use of arterial grafts. The aim of this research is to reveal morphological substratum of this phenomenon.
Methods: Preoperational diagnostics of 119 patients included standard protocol Duplex Ultrasound of RA and functional tests: reactive hyperemia and cold pressure test. Intraoperational specimens of RA and ITA were obtained during CABG for morphological analysis. Operative mortality was noted in two patients, which were also taken subepicardial and coronary arteries. Then, the results of ultrasonic and morphological data were compared.
Results: All patients were divided into three groups.
The group I contained patients with normal type of blood flow in RA, the growth of RA diameter during reactive hyperemia more than 10%, vasoconstriction during cold pressure test was transient.
There were patients with abnormal blood flow in RA, paradoxical reaction during reactive hyperemia and long-lasting vasoconstriction during cold pressure test (>7 min) in the group II.
Patients in the group III had RA with both normal and abnormal types of blood flow, the growth of RA diameter during reactive hyperemia <10%, medium vasoconstriction during cold pressure test.
Morphological study revealed the following:
The group I contained patients with normal morphology of RA and ITA.
RA with circular intimal hyperplasia in group II, significant or very significant dystrophy of smooth muscle cells, acute spasm of RA. Smooth muscle cells of ITA were also in condition of dystrophy. To group II referred died patients, who had subepicardial arteries were in a condition of significant dystrophy and acute spasm.
RA with moderate dystrophy of smooth muscle cells without acute spasm in group III.
Morphological study revealed that changes in smooth muscle cells of ITA correlated to changes in those of RA.
Conclusions: Morphological substratum of long vasospastic reactions is dystrophy of smooth muscle cells.
It is necessary to reveal patients with high-risk of spastic reactions in preoperational period. These are patients with significant vasculopathy of RA and typical variant angina confirmed by cold pressure test.

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EXCELLENCE IN CARDIOVASCULAR SURGERY: CONSIDERATIONS ABOUT ITS APPLICATION

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Objective: Excellence in surgery must be understood not only as a tool which allows to compete with advantage in the clinical, academic and investigation fields, but also as a target on itself because of its social and economic transcendence.
Methods: We analyze the three scopes where the excellence methodology must be applied: on structures (including not only the physical resources but also the human ones), on procedures and on results.
Results: To implant an excellence system can be initially expensive. However, the social and institutional advantages are bigger: the competitive advantage can lead to an economic advantage, due to the savings in avoiding expensive or unnecessary procedures or actuations and compensation and law costs. Besides, it is a professional motivation for every implicated sector of the institution.
Conclusions: To apply the excellence concepts in the daily routine is necessary that the institution leaders are determined to do it and they have been building an excellence culture in which everybody must participate.

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OFF-PUMP SINGLE GRAFTING TO SOLVE A TOTAL OCCLUSION ON MAIN LEFT CORONARY AS ISOLATED LESION

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Objective: To see a full occlusion of the main left coronary on living patients is very infrequent. Those that survive to this event are because collateral circulation from right coronary has been established during a chronic process. Then it may be treated with a drug eluting stent. Also good results have been communicated with this technique among who are not candidates for surgical revascularization as well as in unprotected left main cases. However, surgery is usually the first choice.
Methods: Fifty-seven-year-old male, with mild chronic angina, but without any previous diagnosis, who suddenly suffered from prolonged rest chest pain. Myocardial anteroseptal infarction was confirmed. Coronariography showed full occlusion on main left coronary as isolated lesion, which is filled from right coronary. Ejection fraction was 35%. An eluting stent implant was tried but unsuccessfully. Surgical Technique: An off-pump single left internal thoracic artery (LITA) to anterior descending coronary artery bypass was performed because heart luxation was untolerated when the marginal artery approach was tried.
Results: By flowmetry on LITA a 204 ml/m peak flow was obtained. After a fast-track ICU stay, patient was hospital discharged six days later and follows fine 12 months later with active life.
Conclusions: We believe that off-pump procedures on depressed left ventricles are the good choice, if it is possible, because it causes less myocardial damage. When only an isolated full left main lesion is present, perhaps a single coronary bypass can be enough. Above all if circumflex branches revascularization is not well tolerated in off-pump procedures.

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IDIOPATHIC THROMBOCYTOPENIA PURPURA IN ELDERLY TETRALOGY OF FALLOT WITH DEGENERATIVE AORTIC REGURGITATION

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Objective: Today corrective surgery of native Tetralogy of Fallot (TOF) beyond 60 s is a very rare exception. His association with degenerative severe aortic valvular regurgitation (DSAVR) is also an exceptional finding. When severe right ventricular dysfunction (SRVD) is present, pulmonary regurgitation (PR) after TOF repair must be avoided. Idiopathic thrombocytopenia purpura (ITP) in CPB procedures can difficult its resolution. The aim is to review the best strategy according to literature to repair this combination of heart and blood anomalies not previously described.
Methods: A 64-year-old caucasian male patient presenting TOF, DSAVR (worsening it), SRVD, severe main pulmonary trunk hypoplasia and a remarkable ITP, was operated on to perform a total correction. A pulmonary homograft was inserted on the right side until pulmonary artery bifurcation. Aortic valvular replacement and septation of the ventricular septal defect (VSD) was performed by aortic way. Four packets of aphaeresis platelets were transfunded finishing CPB.
Results: The patient did well and needed a permanent pacemaker on his 10th postoperative day. He was hospital discharged in a good condition and follows fine three years later, with improvement of his right ventricular function (RVF).
Conclusions: An accurate strategy in order to avoid PR, residual pulmonary trunk stenosis and impairment of RVF as well as a blood loss due to ITP, transfusing four packets of aphaeresis platelets, has been successful in this very uncommon case.

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CABG IN OBESE PATIENTS: LATE FOLLOW-UP

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Objective: Most of the stratified risk score studies have shown no more risk of in-hospital mortality for obese patients after CABG. We have studied the late survival follow-up in these patients.
Methods: We have retrospectively studied 465 consecutive patients undergoing isolated CABG performed between January 1997 and January 2000. We made two groups: GI have 253 patients with Body Mass Index (BMI) below 30; GII has the remaining 212 patients (45.6%), who had a BMI equal or >30. The study end point was the death, the related cardiac death or a new invasive procedure (surgery or stenting), described according to Kaplan-Meier actuarial analysis. To control for differences between patient characteristics, we used Cox proportional hazards analysis to calculate adjusted Hazard Ratios (HR) and 95 confidence intervals (CI).
Results: The 30-day mortality was 2.7±0.4 in GI and 3.2±0.7 in GII (NS) and a mean follow-up of 5.8±1.7 years with 35 deaths (7.5%) in this period. The crude HR of long-term mortality for GII was 1.12 (95% CI: 0.94–1.46; NS). The adjustment for core preoperative factors (age, sex, priority, re-do surgery, ejection fraction, angor class, other site atherosclerotic disease, diabetes, blood hypertension, renal dysfunction, vein/artery grafts and respiratory disease) shows an adjusted HR of long-term mortality for GII of 1.53 (95% CI: 1.11 – 1.87; $P<0.05$).
Conclusions: We have a high prevalence for obesity in CABG. No significant differences were found between obese and non-obese patients in-hospital mortality. Obesity has a significant increase in mortality during a six year follow-up period after CABG.

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THE USAGE OF FENOTEROLUM AFTER AORTAL VALVE REPLACEMENT

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Objective: The aim of research: to study the usage of FENOTEROLUM in bradioaritmic cases, which were occurred after aortal valve replacement.
Methods: There were done 62 operations in the case of rheumatic aortic valve disease of the heart since 2002 till 2006. Men – 56, women – 6, at the age of 35.7±11.8 years old. The time of bypass was 110.8±44.3 min, occlusion of the aorta 80.9±32.9 min, the freezing temperature 30.8±2.0 °C. There were done pharmacocold cardioplegia in combination with blood cardioplegia to all patients.
Results: The 30% (19) of patients had bradioaritmic pulse (50 – 60 st. per min) at nearly post operation period. So it was needed a stimulation through ventricular electrode. Twelve patients had a problem, they had no stimulation through the miocardic electrode after the 24–48 h and it was needed to use partusisten (Fenoterolum).
Fenoterolum is a stimulator of β2-adrenoreceptors and can be used in special cases as tocolitic in obstetrics. One of the side effects of this preparation is tachycardia. Preparation was injected in the dose 0.3–0.4 mg/kg/min, it made increase the rhythm of the pulse to 90 – 100 st. per min. After the 48 h rhythm restored and it made stop injecting the preparation. To the four patients were needed to use preparation seven days and then pulse restoring was mentioned. One of the patients after aortic valve replacement regarding to combine aortic disease with aortic valve calcification transiting on to fibrotic ring and left ventricle's wall, the rhythm normalization was not mentioned even on the 9th day after switching off partusisten (50–55 st. per min). That is why it was decided to make a constant transvenous implantation of the pacemaker.
Conclusions: Side effects of some preparations which are used not in cardiosurgery let them effectively use in bradioarhythmias which occurred after replacement of aortic valve.

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CLINICAL, ELECTROPHYSIOLOGICAL AND ECHOCARDIOGRAPHIC FOLLOW-UP OF ON-PUMP BEATING-HEART VENTRICULAR ANEURYSM REPAIR

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Objective: The surgical treatment of post-ischemic left ventricular aneurysm (LVA) represents a challenge for the cardiac surgeon, as short and long-term outcomes still remains poor. Starting from 1999, we adopted an on-pump beating-heart strategy to repair LVAs that permits to minimize ischemia and assess wall function and viability to guide closure. This study evaluates mid-term echocardiographic follow-up of on-pump beating-heart LVA repair.
Methods: From January 1999 and November 2006, 81 patients were referred to our Institute with diagnosis of post-ischemic left ventricular aneurysm. The mean age was 62.8±8.1 years (range 33–77 years). 74.1% of the group

was male. 95.1% had previous anterior myocardial infarction. Mean preoperative Ejection Fraction (EF) was 34.3%±8.1%. Left ventricular diastolic volume was 184.3±54.0 ml, Left Ventricular Diastolic Index was 96.4±29.4. The coronary angiography showed three-vessel disease in 23, two-vessel disease in 33 and one-vessel disease in 25.
Surgical approach. Coronary artery bypass grafting to the left descending coronary artery is performed off-pump beating-heart. Afterward we proceed with on-pump beating-heart LVAs repair and at the end we perform others coronary bypass grafting. Aortic cross-clamping is employed to remove ventricular thrombi, for associated valvular procedures or in case of difficult hemodynamic control. In ten patients with preoperative diagnosis of sustained monomorphic ventricular tachycardia (VT) of left ventricular origin, intraoperative mapping and cryoablation was performed.
Results: Perioperative mortality was 3.7% (three patients). The cause of death was multi-organ failure in two patients and mediastinitis in 1. Postoperative EF was 41.6±8.4%. Postoperative left ventricular diastolic volume was 139.6±42.6 ml (P<0.05), left ventricular diastolic index was 76.9±21.8 (P<0.05).
At 90-month follow-up, five death were registered. The cause of death was cardiac in two patients and non-cardiac in three. Freedom from recurrence or inducibility of VT in operative survivors was 100%. The echocardiographic evaluations showed a significant increase of ejection fraction (46.3±5) with no further ventricular dilatation.
Conclusions: On-pump beating heart left ventricular aneurysm repair can be performed safely. It permits to avoid long cross-clamping time and myocardial ischemia and to clearly identify vital ventricular wall. The operation is associated with low perioperative mortality and morbidity and permit to achieve at follow-up an increase of cardiac function and quality of life.

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A SIMPLE THREE-DIMENSIONAL PROCEDURE TO REPAIR POSTINFARCTION VENTRICULAR SEPTAL PERFORATION

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Objective: Postinfarction ventricular septal perforation (VSP) is a serious and life-threatening complication, which may be effectively repaired in the acute clinical phase by the infarction exclusion technique. However, patients who survive this operation may require reoperation to repair residual or recurrent VSP caused by dehiscence around the suture line. We describe our surgical technique for repairing postinfarction of VSP, which involves no infarctectomy.
Methods: We operated on three consecutive patients within one week of myocardial infarction. Two of the patients were women, aged 58 and 82 years, respectively, and one was a man aged 72 years. All three patients were admitted in cardiac failure 1, 1, and 2 days, respectively, after the ischemic event. One patient had undergone percutaneous coronary intervention for an LAD lesion. Echocardiography confirmed an anterior rupture of the interventricular septum in all three patients. First, an intraaortic balloon-pump was inserted in the catheter room, from where the patients were transferred to the operating theater. The operation was performed via median sternotomy with cardiopulmonary bypass and moderate systemic hypothermia, using tepid blood cardioplegia. The defect was approached through a left ventriculotomy, made parallel to the anterior descending artery. The demarcation line between infarcted and healthy myocardium was identified and no infarcted tissue was excised. A patch of single equine pericardium was sutured to the viable muscle around the infarcted area using a 3-0 polypropylene suture that covered the infarcted left ventricular wall. After suturing the patch to viable muscle, the free edge of the patch was tailored and sutured in a pouch configuration, which was larger than the excluded ventricular volume. We then placed another small, round patch over the defect, using GRF glue. Finally, we closed the left ventriculotomy with large mattress sutures.
Results: All patients were stable when they left the operating room. The intraaortic balloon-pump was left in place for 1, 6, and 1 days postoperatively, respectively. The 82-year-old woman continued to suffer from chronic heart failure, the 72-year-old man died of colon cancer perforation three months after the operation, and the 58-year-old woman recovered uneventfully. Transthoracic echocardiography showed no evidence of a residual or recurrent shunt in any of the patients.
Conclusions: This technique is simple and safe to perform in the acute phase of myocardial infarction. It alleviates restriction of left ventricular expansion and prevents a residual shunt being caused by pouch configuration patch-plasty of the left ventriculum.

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THE PRESERVATION AND RECONSTRUCTION OF MITRAL APPARATUS IN SURGERY OF HEART VALVE DISEASE

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Objective: The importance in left ventricle (LV) dilatation associated with volume-overload secondary to mitral regurgitation well known. During last years there have been numerous advanced in operative techniques, including the preservation and reconstruction of subvalvular apparatus.
Methods: From January 2000 to December 2006, 335 operations in patients with heart valve disease and end-diastolic volume index (EDVI) >80 ml/m², without coronary artery disease were performed. Prior mitral valve disease was in 62%, aortic-mitral valve disease - in 28%, aortic valve disease with secondary mitral regurgitation – in 10%. Patients were classified in New York Heart Association (NYHA) class III-IV. The mean end-diastolic dimension (EDD) was 70±6.8 mm, end-diastolic volume (EDV) – 255±41 ml, end- systolic dimension (ESD) – 48±5.8 mm, end-systolic volume (ESV) – 108 ml. The average LV ejection fraction was 58±12%.
Two hundred and seven patients underwent mitral valve replacement, 94 - double aortic-mitral valve replacement, 21 - aortic valve replacement with mitral valve repair. Additionally, tricuspid valve repair were performed in 210 patients. During mitral valve replacement subvalvular apparatus was preservated or reconstructed in all cases. Full preservation of posterior mitral leaflet was performed in 71%, partial preservation of anterior mitral leaflet – in 18%, mitral valve replacement with reconstruction of sub-valvular structures with artificial chords ePTFE 4-0 – in 11%.
Since February 2005, decreasing distance between bases of papillary muscles heads by using ePTFE loop were performed in 24 patients with the distance between papillary muscles over 35 mm.
Results: The hospital morality was 5.3%. All the patients were found to have diminished volumetric and linear indices of the LV in the early follow-up. The mean value of EDD was 59±6.3 mm, EDV – 177±47.1 ml, ESD – 40±4.3 mm, ESV - 80±29.4 ml. The mean value of sphericity index was 0.77 in systole and 0.83 in diastole. The LVEF was 55±6.2%. The PM distance decreased to 17±3 mm.
Conclusions: Surgical treatment of heart valve disease in patients with dilated LV should include the methods of preservation and reconstruction of distorted architecture of the mitral apparatus.

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RESULTS OF DECREASING DISTANCE BETWEEN PAPILLARY MUSCLES IN PATIENTS WITH HEART VALVE DISEASE AND DILATATION OF LEFT VENTRICLE

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Objective: Patients with heart valve disease and severe left ventricular (LV) dysfunction incur excess operative mortality rates, postoperative mortality rates, and congestive heart failure after operation. We proposed a new approach for surgical remodeling of LV cavity in patients with heart valve disease and dilated LV.
Methods: In department of reconstructive surgery of acquired heart valve disease at Bakoulev center for Cardiovascular Surgery between March 2005 and December 2006, 24 operations of decreasing distance between papillary muscles of LV were performed by using PTFE loop in patients with markedly reduced LV function.
11 patients were classified in New York Heart Association (NYHA) class IV. The mean end-diastolic dimention (EDD) was 81.9±6.8 mm end-diastolic volume index (EDVI) was 185.2±41.3 ml/m², end-systolic volume index (ESVI) - 108±23.2 ml/m². The mean systolic sphericity index was 0.77, diastolic sphericity index - 0.91. The LV ejection fraction (EF) was – 40±11%. The dimensional distance between PM in LV was 40±6.8 mm.
Twenty-four patients underwent the operation of PM sling of LV by PTFE loop. The surgical procedure performed was valve repair and valve replacement. Eighteen patients underwent isolated aortic valve replacement. Double mitral-aortic valve replacement with tricuspid valve placement of an annular ring was performed in two cases. Mitral and tricuspid valve placement of an annular ring - in four patients with dilated cardiomyopathy.
Results: The LV volumes end sizes had reduced in all patients. The mean value of EDD was 72±6.3 mm, EDVI – 139±15.6 ml/m², EDV – 267±40.5 ml, ESVI – 85.1±16.9 ml/m², ESV - 163±29.7 ml. The mean value of spheric-

ity index in systole was 0.77 and 0.83 in diastole. The LVEF improved to 39±7.5%. The PM distance decreased to 17±3 mm.
Conclusions: The method of PM distance reduction by using PTFE loop is technically simple. The effects that occur after using PTFE confirm more physiological conditions for myocardial contractility. The method of shortening of papillary muscle distance may be conceded as one of the ways of accessorial procedures in the case of LV dilatation in acquired heart valve diseases.

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HEPARIN-INDUCED THROMBOCYTOPENIA FOLLOWING OPEN HEART SURGERY
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Objective: The purpose of this work is the presentation of our clinical experience with two patients submitted to open-heart surgery procedures, who developed heparin-induced thrombocytopenia (HIT).
Methods: Two female patients aged 64 and 68 years, underwent coronary artery surgery and aortic valve replacement respectively. Both had normal preoperative platelet count and routine coagulation indexes. The first case presented with severe thrombocytopenia associated with multiple episodes of arterial embolism, starting on 8th postoperative day. The diagnosis of HIT was suspected on the basis of multiple thrombi within the left and right heart chambers and a thrombus occluding the left femoral artery. Treatment with lepirudin was promptly initiated. Despite pharmacological treatment and repetead embolectomies, the persistent ischemia of the left lower limb lead to the amputation of the left foot on third postoperative week.
The second case started as early postoperative isolated thrombocytopenia (1st postoperative day), and on the 9th postoperative day the diagnosis of HIT was achieved on the basis of a slight elevation of the serum level of anti-heparin/PF4 antibodies. Lepirudin treatment was started. During the following two days the HIT changed into disseminated intravascular coagulation. The patient died on the 11th postoperative day.
Conclusions: As evidenced both by literature and our small experience, the clinical presentation of HIT can be misleading, due to extreme variability. In addition postoperative thrombocytopenia following open-heart surgery is a very common finding, while HIT is a very rare complication. For all these reasons the diagnosis of HIT following open heart surgery is difficult, and a high level of suspicion is always necessary in order to avoid underestimation and mis-diagnosis, especially if severe postoperative thrombocytopenia with a platelet count of <30.000 is present.

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CAN RECIPIENT BE A DONOR? TWO HOMOGRAFT TRANSPLANTATION IN TO AORTIC AND PULMONIC POSITION IN TWO PEDIATRIC CASES
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Objective: Aortic homograft has become an important option in the treatment of aortic valve and root pathology. We want to share our unique experience of homograft implantation of two bicuspit aortic valve replacement. In this study three cases were presented. First patient is a dilated cardiomyopathy (DCM) who underwent cardiac transplantation. Second and third patients were severe aortic stenosis cases waiting for a homograft transplantation who receive the recipient's aortic and pulmonic valves.
Methods: Eighteen-year-old patient underwent cardiac transplantation because of DCM. The aortic and pulmonic valves extracted from the recipient heart and prepared freshly for homograft transplantation. The aortic fresh homograft transplanted to a 9-year-old boy with a bicuspid aortic stenosis and pulmonic fresh homograft transplanted to an 11-year-old girl who had bicuspid aortic valve and ascendan aortic aneurism. All three patients whom received heart transplantation and homograft replacement were discharged in good health without any complaint.
Results: Three months follow-up revealed good condition and the function of the valves in echocardiography.
Conclusions: Aortic valve replacement can be done by using prosthetic valve, porcine bioprothesis, aortic valve allograft or a pulmonary valve autograft (Ross procedure). Antibiotic sterilized homografts are the choice of device in replacement although they are technically more difficult to replace than prosthetic valves. Determination of size and finding a matching homograft is not easy to find, therefore when an appropriate size is available it must be used. Thromboembolism, chronic hemolysis, and anticoagulant-induced hemorrhage may occur with prosthetic valve. Porcine valves tend to develop early calcification in children. As homograft valves do not necessitate anticoagulation, it is accepted as a good option in surgical treatment of both aortic and pulmonic position in children and adults.

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CARDIAC AUTOLYSIS: A VERY UNCOMMON SUICIDE ATTEMPT
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Objective: Cardiac direct damage due to a suicide attempt is very rare. We report two cases in which the patients tried to reach the heart by different methods in order to die. The surgical procedures are also described.
Methods: A 44-year-old imprisoned man tried to commit suicide introducing sewing needles into his chest and sternum. One of them reached the right atrium and produced a cardiac tamponade 15 days later. He had to be brought to the operating room (OR) in very bad condition. Six needles were retrieved from both of his lungs, sternal bone and right atrium. This last one was bleeding and produced the tamponade.
Another 42-year-old man tried to suicide inserting a knife directly into his heart. He also arrived to our center with a cardiac tamponade and severe cardiac failure. Once in OR, the knife was retrieved and a 4 cm wound sutured in the left ventricle. The knife itself avoided the cardiac wound to be lethal.
Results: Postoperatory periods were both uneventful. The patients were discharged home on their 8th and 10th days after surgery, respectively.
Conclusions: Self-inflicted cardiac direct damage in order to commit suicide is very rare and not many cases are reported in the literature. Aortic rupture (or its major branches) from precipitation is much more frequent. Some of these attempts result in surgical challenges that cardiac surgeons must be ready to solve.

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PULMONARY ENDARTERECTOMY FOR PATIENTS WITH CHRONIC TROMBOEMBOLIC PULMONARY HYPERTENSION ACCOMPANIED BY TROMBOPHILIA
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Objective: Chronic thromboembolic pulmonary hypertension (CTEPH) can be successfully cured by endarterectomy of pulmonary arteries (PEA) in indicated cases. There have been only a few reports of surgically treated patients with CTEPH suffering from a trombophilia, and in USA study the trombophilia was found in 10% of patients, in Japan study in 32%, and in our study in 48%. The aim of the present study was to compare the group of patients with trombophilia with the group of patients without it following PEA.
Methods: Thirty-nine patients with CTEPH (19 with trombophilia-12 males and seven females), with the average age of 52, underwent PEA using cardiopulmonary bypass (CPB) and deep hypothermic circulatory arrest. Their mean pulmonary artery pressure was 55±8.5 mmHg preoperatively. Four patient had the Antiphospolipid syndrome, four had the Leiden mutation of the factor V, three had the mutation of the factor II-protrombin, two had the deficit of the protein C, two suffered from hyperhomocystinemia, and 11 patients had the Methylenetetrahydrofolate Reductase (MTHFR) gene mutation (three of them were homozygots and eight were heterozygots). In total, our 19 trombophilic patients suffered from 27 coagulopathies of different types. For statistical evaluation we used the software package ANCOVA a for Windows, SPSS inc., USA. Statistical analysis was performed using Student's *t*-test when comparing both groups of patients. Any value $P<0.05$ was consider statistically significant.
Results: After the surgery, there was a considerable improvement of haemodynamic parameters (mPA, CI, PVR) in both groups without statistic difference.
Concerning the parameters monitored in the trombophilic and nontrombophilic groups, the average circulatory arrest time was 36±11.2 min and 42±12.5 min respectively, the average total pumping time was 330±36.5 min and 320±42.2

min respectively, the average total surgery time was 448±54.3 min and 429±39.5 min respectively, and the average duration of mechanical ventilation was 58.5 h and 54.6 h respectively. Within one month there was a considerable improvement or almost normalisation of haemodynamic parameters and an increase in the average walking distance on the six-minute walking test. NYHA functional class improved to I in 14 (17) and II in two (2) patients.
Conclusions: PEA is a curative method for patients with CTEPH with a surgically accessible obstruction of the pulmonary artery. Early results of the patients, suffering from trombophilia, are comparable with the results of the patients without trombophilia in terms of clinical and hemodynamic improvement following PEA Supported with grant IGA NR 9224-3.

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CARDIAC TRANSPLANT IN PRESENCE OF LEFT SUPERIOR VENA CAVA

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Objective: Persistent left superior vena cava is a common anomaly that may complicate a heart transplant. We report one of these cases, with intact innominate vein and absence of right superior vena cava. The technique used is described here.
Methods: A 59-year-old male, with history of dilated myocardiopathy, was brought to the operating room for a classic biatrial cardiac transplant. No data of congenital anomaly was reported in the preoperative evaluation.
Once the chest was opened, a left superior vena cava, present innominate vein and absence of the right superior vena cava were found.
The technical modifications made for the procedure were: selective cannulation of the left vena cava and conservation of the coronary sinus and its ostium in the cuff of the right atrium. With this purpose, the atrioventricular groove of the recipient heart was isolated with an incision between left pulmonary veins and coronary sinus.
Once the transplant completed, two coronary sinuses drain into the right atrium.
Cardiopulmonary bypass time was 135 min.
Results: The postoperative course was completely uneventful. The postoperative angio, prior to discharge, demonstrated a correct flow through the left superior vena cava and coronary sinus.
Conclusions: Persistence of the left superior vena cava, in absence of the right superior one and present innominate vein, may result in a surgical challenge if undiagnosed during the preoperative period.
Some surgical methods have been described to solve this problem but, if possible, it is better to avoid prosthetic materials because the risk of infection in an immunosupressed patient is significant. Other alternative techniques require prior knowledge of the anomaly in order to preserve a large portion of the superior vena cava and combine different possibilities of caval anastomosis.
We think that our solution was simple, can be done without prior knowledge of the anomaly and permits a classic biatrial or a bicaval transplant just being careful in the anastomosis of the right atrium.

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PLACE FOR MULTISLICE SPIRAL COMPUTED TOMOGRAPHY IN LATE RESULTS ASSESSMENT OF SURGICAL TREATMENT OF SINGLE VESSEL CORONARY ARTERY DISEASE

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Objective: To select the most accurate and sensitive non-invasive exam assessing early and late results of surgical treatment of single vessel coronary disease (Left Anterior Descendent Artery) by Minimally Invasive Direct Coronary Artery Bypass (MIDCAB) and Endoscopic Atraumatic Coronary Artery Bypass (EACAB).
Methods: A prospective study of 100 patients (50 in each group) operated from May 2002 to September 2005 was performed. Patients in both groups were similar in demographic data. All patients had angiography, Dobutamine stress echocardiography and SPECT done preoperatively. Some of them also had mammariography performed preoperatively. Study performed postoperatively and after 12 months included physical examination, angiography (treated as a point of reference to non-invasive tests), Dobutamine stress echocardiography, angiography with mammariography, SPECT and MSCT.
Results: In MIDCAB group mammariography showed full patency of the anastomose in all patients, in EACAB group in 94% (P=0.119). Stress echo showed improvement of contractility in 80% of MIDCAB patients and 76% in EACAB patients (P=0.475). SPECT showed improvement of anterior wall perfusion of 100% patients of MIDCAB group and of 94% of EACAB (P=0.241). After 12 months mammariography showed full patency of the anastomose in 94% in both groups. Stress echo showed improvement of contractility in 88% of MIDCAB patients and (86%) of EACAB patients (P=0.766). SPECT showed improvement of anterior wall perfusion in 80% patients of both groups. MSCT showed full patency of the anastomose in 94% in EACAB group and in 92% in MIDCAB group (P=0.674).
Conclusions: Among non-invasive examinations MSCT appears to be the most accurate and sensitive examination to assess effectiveness of myocardial revascularisation by LIMA.

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AORTIC ROOT REPLACEMENT WITH HOMOGRAFT FOR ENDOCARDITIS AFTER BENTHALL PROCEDURE

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Objective: Today, the most frequently used valves are mechanical and bioprosthetic valves. But the results of homografts are better than the prosthetic material for infective endocarditis.
Methods: A 36-year-old patient had the complaints of dyspnea and fatigue who underwent Benthall procedure five years ago for aortic insufficiency and ascending aorta aneurysm. He was admitted to the hospital where he was first operated and a diagnosis of infective endocarditis was made. Staphylococcus aureus was identified in blood cultures. He was referred to our clinic for homograft aortic root replacement.
Results: In his physical examination, he had a blood pressure of 100/70 mmHg and the heart rate was 88/min. He was in a moderate condition with subfebrile temperature. In his cardiac examination, systolic and diastolic murmurs of 2/6 were heard. Abnormal laboratory findings were; white blood cell 14.300/ml, eritrocyte sedimentation rate 70 mm/h and C-reactive protein 165 mg/ml. In his repeat blood culture S. aureus was developed. Echocardiography revealed normal ventricular functions with an ejection fraction of 68%. Aortic valve showed a moderate insufficiency (2/4). There was a moderate mitral insufficiency (2/4) due to flow passing from aorta to left atrium and an abscess formation about 1.4x0.7 cm at the junction of atrial septum and aorta. After obtaining an appropriate sized homograft, patient was scheduled for operation. After median sternotomy, cardiopulmonary bypass was established via femoro-biatrial cannulation. After cross-clamping of the aorta and cardioplegic arrest, aortotomy was made on the graft. A second pseudoaneurysm pouch beside the graft, the infectious material and the fistula opening to left atrium from aorta were seen.
The fistula was closed. Both coronary arteries were excised from the graft. Homograft was implanted to the aortic root with separate sutures. First the left coronary artery, then the right coronary arteries were anastomosed to the homograft. The distal end of the homograft was anastomosed to the native aorta. He was kept on antibiotic treatment and had an uneventful recovery period. The cultures from operation materials developed no microorganisms. The postoperative echocardiography was normal.
Conclusions: The results of aortic root replacement with homografts are better, when used for aortic valve endocarditis complicated with annular abscess.

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NORMOTHERMIC VARDIOSURGERY. THE COMPARATIVE ANALYSIS OF HEMODYNAMIC IN CASE OF NORMOTHERMAL OR HYPOTHERMAL AORTO-CORONARY BYPASS SURGERY

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Objective: In recent years an actual theme is carrying out hemodynamic parameters in case of normothermal or hypothermal cardio surgery. Aim of study: carrying out changes in hemodynamic parameters in case of using different types of cardioplegia and artificial blood circulation in normothermal or hypothermal cardio surgery.
Methods: In 2000–2006 in a study where we used mathematical model and monitor-computerized system 'Aibolit' were enrolled 210 patients with ischemic heart disease, whom were operated in Baculev Institute. First group included 150 patients, whom were performed pharmacohypothermat cardioplegia with crystalloid solution #3 and hypothermal artificial blood circulation. Second group included 30 patients, whom were performed pharmacohypothermat cardioplegia with solution 'Custodiol' and hypothermal artificial blood circulation. Third group included 30 patients, whom were performed normothermat artificial blood circulation and normothermad cardioplegia with normothermal solution for cardioplegia.
Results: Cardiac index after cardiopulmonary bypass: first group 2.5±0.1 l/m^2, second group 2.4±0.4 l/m^2, third goup 3.1±0.4 l/m^2 (P<0.05).
Increase of LVSWI after cardiopulmonary bypass: first group 0.1±0.002 din*cm/m^2, second group 0.8±0.003 din*cm/m^2, third group 1.2±0.002 din*cm/m^2 (P<0.05).
Time of cardiopulmonary bypass: first group 146.4±9.3 min, second group 119.5±10.1 min, third group 101.8±9 min (P<0.05).
Conclusions: Normothermal cardio surgery with help of normothermat artificial blood circulation and normothermad cardioplegia causes less pathological changes in hemodynamic, comparison to hypothermic group. So, this method can improve prediction and can be recommended for complicated patients.

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AORTIC VALVE SURGERY IN PATIENTS WITH SEVERE AORTIC REGURGITATION AND POOR LEFT VENTRICULAR FUNCTION

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Objective: Left ventricular dysfunction is an indication for aortic valve replacement (AVR) in patients with severe aortic regurgitation (AR). However, the postoperative outcome of patients with severe AR and a markedly low ejection fraction (EF) is not known.
Methods: The study group consisted of a total of 87 patients who had AVR for isolated AR between 2000 and 2006. Patients with markedly reduced left ventricular function (EF <35%, LoEF, n=10) were compared with those with moderate reduction in left ventricular function (EF 35% to 50%, MedEF, n=25) and those with normal left ventricular function (EF>or=50%, Nl EF, n=52).
Results: There was no early postoperative complications and mortality. Congestive heart failure occurred in two patients, Postoperative EF improved by 4.9 in the LoEF group and by 11.9% in the MedEF group compared with -2.3% in the Nl EF group.
Conclusions: Patients with severe AR and markedly low EF incur excess operative mortality rates, postoperative mortality rates, and congestive heart failure after AVR. However, postoperative EF improves markedly, and most patients enjoy a long postoperative survival without recurrence of heart failure after AVR; thus they should not be denied the benefits of AVR.

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IMPORTANCE OF VENTING THE LEFT VENTRICLE IN AORTIC VALVE SURGERY

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Objective: Routine use of left ventricular vent is controversial in patients undergoing open heart surgery. However, surgeons use it during valvular surgery to maintain a dry field to make the operation easier. In addition it helps to prevent left ventricular distention during the critical period of rewarming and reperfusion, if ventricular function does not return immediately following the release of aortic cross clamp.
Methods: This paper deals with retrospective analysis of the five patients required insertion of left ventricular vent through the apex and reviews the beneficial effects of an apical left ventricular vent under refractory circumstances.
Results: In our country, patients present for valvular surgery at a very late stage and they often have severe left ventricular hypertrophy. This may affect the return of cardiac rhythm after the release of aortic cross clamp with progressive left ventricular distention. In the authors' experience, insertion of left ventricular vent through the apex is occasionally necessary to decompress the left ventricle as the left atrial vent usually fails to do so.
Conclusions: It is recommended that insertion of left ventricular vent through apex should be strongly considered in patients having severe aortic valve disease with hypertrophied hearts, if cardiac rhythm in not restored with conventional management with left atrial vent and shocks following the release of aortic cross clamp.

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AN UNUSUAL CASE OF CYSTIC THYMOMA RESULTING IN CARDIAC COMPRESSION

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Objective: Cystic changes in the anterior mediastinum are relatively uncommon. Cystic thymoma develops from tissue extensive cystic degeneration with clear material within thymoma. Huge cystic timoma is very rare and generally asymptomatic within the mediastinum.
Methods: We present the case of a previously healthy 29-year-old man who developed acute dyspnea, and angina pectoris following chest trauma because of falling from a high place. A 13x10.5 cm cystic tumor is found intraoperatively in mediastinum.
Results: Diagnosis of cystic thymoma is made. The patient remained asymptomatic on the postoperative follow-up period.
Conclusions: Reports in the literature indicate that 30–50% of thymomas are asymptomatic. On the other hand Vaideeswar and co-workers reported 50 patients with thymoma 22% of whom presented with local pressure symptoms, while remaining had para-neoplastic syndromes. In the present case, the huge cystic thymoma was present in the anterior mediastinum for many years without any symptoms. Microscopic hemorrhage which was thought to be due to the trauma was seen in lumen of some of the cysts. The present case was firstly misdiagnosed as pericardial tamponade because of a history of injury. A giant cyst formation that pressurized the heart became obvious after examinations. Although a definitive diagnosis can be obtained by the histopathological examination of the operative material, cystic thymoma should be considered in patients with anterior mediastinal cystic mass.

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SYSTEMIC RELEASE OF MMP-9 DURING CABG, BUT NOT OPCABG SURGERY

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Objective: Extracorporeal circulation (ECC) in CABG is associated with the systemic inflammatory response syndrome. Gelatinases (MMP-2 and MMP-9) are important mediators of inflammation. The objective of this study was to measure plasma and myocardial MMP-2 and MMP-9 levels in patients undergoing OPCABG and CABG.
Methods: Sixteen patients with CAD operated with CPB (CABG), and 16 without CPB (OPCABG) were included in this study. In CABG blood was collected at the beginning (A), before ECC initiation (B), at the cross clamp release (C), after ECC (D), 30 min (E), 6 h (F) and 12 h (G) after ECC. In OPCAB group blood was collected at the beginning (A), after grafts harvesting (B), after distal anastomoses (C), after proximal anastomoses (D), 30 min (E), 6 h (F) and 12 h (G) after grafting. The myocardial biopsies were collected before and after ECC in CABG and after harvesting and completion of proximal anastomoses in OPCAB.
MMPs in plasma and myocardium were measured by zymography. Myeloperoxidase, TIMP-1 and -2 were measured using ELISA.
Results: There were no significant differences in age, gender, LVEF, risk score between groups. CABG, but not OPCABG, led to a giant increase (700–900 folds) of plasma MMP-9 levels. A small, but significant, increase in MMP-2 levels was detected in both procedures. Levels of MMP-9 in biopsies significantly increased at point D of CABG and OPCABG. In contrast, myocardial levels of MMP-2 were not significantly changed during both procedures. Increase of MMP-9 activity at the end of ECC (point D) was accompanied by augmentation of endogenous MMP inhibitors TIMP-1 and TIMP-2 in plasma but its magnitude (5 folds) was unable to balance the plasma MMP-9 content.

The MMP-9 content in plasma at point D correlated with MPO plasma concentration (r^2=0.8212, *P*<0.05).
Conclusions: 1. Systemic MMP-9 levels greatly (700–900 folds) increased during and directly after CABG, but not OPCABG. 2. Levels of MMP-9 in biopsies were significantly higher at the end of both CABG and OPCABG in compare to beginning of these procedures with no differences between them. 3. The correlation of plasma MMP-9 with MPO suggests that MMP-9 was released by activated granulocytes during CPB. 4. Thus, CPB mediated increase in plasma MMP-9 may contribute to pathogenesis of SIRS.

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USE OF RECOMBINANT ACTIVATED FACTOR VII FOR SERIOUS BLEEDING AFTER CARDIAC SURGERY WITH CARDIOPULMONARY BYPASS
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Objective: Bleeding after cardiac surgery is a frequent complication. It can be managed with protamine to neutralise heparin and derivatives of blood. When however the patient continues bleeding and the ACT remains elevated, finding a new solution is necessary. The use of recombinant activated factor VII (rFVIIa) as a treatment for serious bleeding after cardiac surgery with CPB becomes continuously more frequent.
Methods: We report our experience in the successful use of rFVIIa for the management of serious bleeding after cardiac surgery in four patients. The giving dosage of rFVIIa had been decided in association with the haematology department of our hospital. For the three patients the giving dose was 90 μg/kg whereas for the 4th patient the dose was smaller, 30 μg/kg/h for three doses.
Results: For the three first patients the achievement of controlling the bleeding was astonishingly fast with parallel hemodynamic stabilisation of the patients. As regarding the 4th patient a reduction of bleeding was achieved but not enough to stabilise the patient. We control the bleeding when the patient received the same quantity as the others (90 μg/kg bolus) the following day. No one of the patients faced any thromboembolic complication.
Conclusions: For the patients that face a life threatening bleeding after cardiac surgery with CPB, if they have already receive derivatives of blood, haemostatic factors and the possibility of surgical bleeding does not exist, the use of rFVIIa can be very useful. In spite of our encouraging results and the recent publications where they support its use, there is not a well documented study with enough patients. Therefore safety, effectiveness but also dosage cannot be clarified in present stage. Furthermore, the reported complications (thrombosis) and the high cost must also be considered.

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NEUROLOGICAL OUTCOMES IN PATIENTS WITH HISTORY OF CEREBROVASCULAR ACCIDENTS WHO UNDERGO ISOLATED CORONARY ARTERY BYPASS GRAFTING
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Objective: The history of cerebrovascular accidents is thought to be a risk factor for postoperative neurological complication after cardiac surgery.
The aim of this study was to assess the neurological outcomes after isolated CABG in patients who previously sustained stroke or transient ischemic attack (TIA).
Methods: The study group constituted 86 patients with history of cerebrovascular accidents (38 TIA, 53 stroke, five patients sustained both TIA and stroke). The control group composed 500 consecutive patients with no evidence of prior cerebrovascular accidents. The study group compared to the control group was significantly older (65.5±7.2 vs. 63.2±7.4 years, *P*<0.05), presented higher perioperative risk estimated by EuroSCORE (5.74±2.8 vs. 3.79±2.65 scores, *P*<0.05), suffered more frequently (*P*<0.05) from hypertension (84.9% vs. 72.2%), lower extremity peripheral arterial disease (13.9% vs. 6.8%). LVEF was significantly lower in patients with history of cerebrovascular accidents (51.2±13 vs. 55.2±12.3%, *P*<0.05). Carotid artery disease was confirmed more often in the study group (32.6% vs. 14%). The prevalence of unstable angina, prior myocardial infarction, diabetes and chronic obstructive pulmonary disease was comparable in both groups (NS). The rate of OPCAB was similar in patients with history of cerebrovascular accidents (13.95%) and in the control group (13%, NS). The patient from the study group needed more frequently an inotropic support (*n*=16; 18.6% vs. *n*=49; 9.8%; *P*<0.05) or IABP application (*n*=6; 7% vs. *n*=11; 2.2%; *P*<0.05) than the control group. The rate of cardiac arrhythmias (study group: *n*=37; 43% vs. control group: 190; 38%, NS) and perioperative myocardial infarction (*n*=3; 3.5% vs. *n*=14; 2.8%, respectively, NS) did not differ between both groups.
Results: The transient neuropsychologic deficits occurred more frequently in the patients with history of cerebrovascular accidents (*n*=25; 29.1% vs. *n*=92; 18.4%; *P*<0.05). The prevalence of perioperative cerebrovascular accidents was comparable (NS) in both groups: two (2.33%) cerebrovascular accidents (both TIA) were noted in the study group compared to eight cerebrovascular accidents (1.6%) observed in the control group /3 TIA and five strokes/. The intra-hospital mortality was similar in both groups (NS): one patient (1.16%) died in the study group (the death was not related to the neurological complication) and 13 (2.6%) patients died in the control group (including two patients who sustained postoperative stroke).
Conclusions: Despite of less favorable comorbid conditions in the patients with history of stroke or TIA the rate of cerebrovasclular accidents after CABG as well as the mortality were comparable to those observed in the control group.

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REDO CABG
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Objective: To compare the results intraoperative myocardial protection in patients undergoing redo CABG.
Methods: From 1996 to 2005, 30 patients underwent CABG reoperation due to the recurrence of angina after previously made coronary bypass. Mean age of patients was 57.1±5.8 years (46–73 years), 93.4% (28) of men, 6.6% (2) of women. Initially 13% (4) patient had angina of II functional class, 87% (26) patients had severe angina of III-IV functional class. Average time of angina return after CABG was 4.7±0.9 years (6 months to 6 years), reoperation was performed in 7.8±1.3 years (from 4 months to 19 years) after the first CABG. Average revascularization index was 2.1±0.8. In 18 (60%) patients (group1) we used warm blood cardioplegia, in eight (26%) - group 2- crystalloid cardioplegia, one operation (3%) was performed under electric fibrillation, five (11%) under parallel blood circulation.
Average time of bypass in group 1 was 122±24′, group 2 - 132±29′. Average time aorta clamping in group 1 was 70±10′, group 2 – 68±14′. Temperature conditions in group 1 was 35.4±5 ºC, group 2 – 29.3±3 ºC. Spontaneous functional recovery of heart beat to observe in group 1 in 14 (77%) patients, group 2 in 2 (25%) patients.
Results: Hospital mortality in group 1 was 5.5% (two patients), in group 2 – 12.5% (one patients). Low cardiac output in group 1 had 33% (6) patients, in group 2 – 75% (6) patients. Non-Q myocardial infarction developed in group 1 in 11% (2) patients, group 2 in 25% (2) patients.
Conclusions: Results of CABG reoperations with warm blood cardioplegia show preference above crystalloid cardioplegia with respect to mortality, low cardiac output and perioperetive myocardial infarction. We considered, to use warm blood cardioplegia in all patients undergoing redo CABG is reasonable.

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C-REACTIVE PROTEIN IN PATIENTS WITH ACUTE AORTIC DISSECTION
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Objective: The aim of our study was to determine the diagnostic value of C-reactive protein in patients with acute aortic dissection.
Methods: We studied 25 adult symptomatic patients, 31–81 years old, with acute aortic dissection who admitted in our clinic from February 2006 to December 2006. We decided to compare this group with an other of 25 adult patients, with similar characteristics, who admitted for heart attack. They were all complaining, at the emergency department, for a severe chest pain. CRP value was requested for all of them as soon as they were admitted.
Results: The values of CRP were elevated in all the patients but in the group of aortic dissection they were impressively high. They ranged between 4.04–188 mg/l (mean value 78) while the values of the other group ranged between 2.1- 4.6 mg/l (mean 4).
Conclusions: C- reactive protein is a sensitive marker of inflammation and it can be elevated in the first hour after the aortic dissection. Although the number of the studied patients is low we think that CRP could be useful for the doctor at the emergency department for the diagnosis of acute aortic dissection.

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EFFECT OF VACUUM ASSISTED VENOUS RETURN AND OF PROCESSING OF PERICARDIAL BLOOD WITH A CELL SAVER DEVICE ON COMPLEMENT PATHWAYS DURING CORONARY ARTERY BYPASS GRAFT SURGERY: A PROSPECTIVE RANDOMIZED STUDY

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Objective: The objective of the present study was to determine whether VAVR and CS entailed reduction of postoperative inflammatory response.
Methods: One hundred patients, who underwent on-pump coronary artery bypass graft surgery, were included in a prospective randomized study. Patients were randomised into four groups of 25 patients each in a 2X2 factorial design: Group A had no VAVR and no CS, Group B had VAVR alone, Group C had CS alone and Group D had VAVR and CS. The complement factors C4a, C3a, C5a, the terminal complex sC5b9, MBL, C3bBb, CRP and fibrinogen levels were measured in EDTA plasma preoperatively and 30 and 240 min after the end of cardiopulmonary bypass (CPB).
Results: Mean age, cardiopulmonary bypass and clamping times were similar in all groups. At 30 and 240 min after CPB, C3a, sC5b9, C3bBb, fibrinogen levels were increased and C5a and MBL levels were decreased compared with preoperative levels in all groups. C3bBb levels at 240 min were higher when CS was not used (P=0.0002). When CS was used, fibrinogen levels were lower when VAVR was associated (P=0.0016).
Conclusions: The present study shows that modern CPB remains associated with a striking activation of all complement pathways and of the terminal component. The use of CS decreases the activation of the complement alternative pathway. The combination CS/VAVR reduces the increase of fibrinogen observed when CS or VAVR alone are used.

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PREOPERATIVE INTRAAORTIC BALLOON-PUMP SUPPORT FOR HIGH-RISK OFF-PUMP CORONARY ARTERY BYPASS OPERATIONS

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Objective: Displacement of the heart to expose the target vessels during off-pump coronary artery bypass grafting (OPCABG), often causes hemodynamic deterioration, epecially in high-risk patients (significant left main coronary artery disease, unstable angina, left ventricular dysfunction, recent acute myocardial infarction). Usefulness of preoperative intraaortic balloon-pump (IABP) therapy in this high-risk group was the objective of our study.
Methods: Two hundred and seventy three consecutive patients who underwent OPCABG through median sternotomy between July 2004 and December 2006 were studied. Patients were divided into group I (47 high-risk patients – preoperative use of IABP) and group II (226 patients – no preoperative IABP). Of the 47 patients satisfying the insertion criteria, ten had critical left main stem disease, 23 had unstable angina, six had acute myocardial infarction and eight had left ventricular dysfunction (ejection fraction <35%). Number of distal anastomoses, conversion rate, need for inotropic support, average operating time, mortality, ventilator support time, low cardiac output syndrome, cerebrovascular accident, acute renal failure, length of stay in intensive care unit (ICU) and hospital stay were studied and compared in both groups.
Results: The average number of distal anastomoses in group I and II were 3+0.7 and 3.2+0.8 respectively (P>0.05). There were no significant differences in the number of posterior vessels anastomoses per patient. There was no conversion to on-pump surgery in group I compared to five patients (2.2%) in group II. IABP appeared to facilitate intraoperative management by improved hemodynamic stability and elimination of the need for inotropic support. There were no differences in ventilator support time, length of stay in the ICU, hospital stay and morbidity in both groups. There was one death in group I and two deaths in group II. There was only one IABP-related complication (leg ischemia).
Conclusions: Preoperative use of IABP is valuable in conduct of off-pump coronary artery procedures in high-risk patients, providing results similar to patients at low operative risk.

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EVALUATION OF VARIOUS RISK FACTORS IMPACT ON OPERATIVE MORTALITY AFTER CABG

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Objective: Aim of our study was to investigate the relationship of various risk factors to postoperative mortality rate in patients who underwent CABG.
Methods: Our study population consisted of 420 male patients (aged: 66.1±0.95 years old) who undewent CABG with cardiopulmonary bypass. Mortality and major post surgery complications were examined by age together with interactions with pre-existing patient characteristics, like comorbid conditions and preoperative medication (statins, ACE, b-blockers, insulin, diuretics).
We evaluated various risk factors and we observed levels of creatine, bilrubin, amylase for 10 days postoperatively.
Results: Operative mortality rate (within the first ten days) was 4.2% in our study group. Mortality was positively collerated with age (rho=0.291, P=0.001), increased creatinine levels (rho=0.433, P=0.0001), early postoperative increased bilirubin levels (rho=0.368, P=0.0001) and postoperative temperature >38 ºC (rho=0.433, P=0.00001). Death rate in patients who underwent CABG also collerated with increased cross-clamp time (rho=0.177, P=0.049), obstructive pulmonary disease (rho=0.306, P=0.023) and increased amylase levels (rho=0.218, P=0.030).
Conclusions: In our study age, increased creatinine levels, early postoperative increased bilirubin levels and postoperative temperature >38 ºC were strongly collerated with mortality rate in patients after CABG.

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LONG-TERM CLINICAL AND ECHOCARDIOGRAPHIC FOLLOW-UP OF A PORCINE STENTLESS AORTIC PROSTHESIS

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Objective: This report was undertaken to evaluate the long-term clinical and echocardiographic follow-up of patients who underwent aortic valve replacement with the BRAVO 400 Xenograft, an entire porcine aortic root.
Methods: Between February 1992 and January 1994, 67 underwent aortic valve replacement with Bravo Model 400 stentless porcine bioprosthesis at one single institute.
Data were obtained annually by means of direct visits and telephone interviews. Transthoracic echocardiography was performed preoperatively, at discharge, at three months, at one year and annually thereafter. Left ventricular mass (LVM) was assessed using the formula proposed by the Penn Convention and indexed to body surface area (Left ventricular mass index, LVMI).
Survival and time-related event analysis was performed with the Kaplan-Meier method. Significant differences in echocardiographic parameters were evaluated with repeated-measures ANalysis Of VAriance (ANOVA). If statistically significant, Student's paired t-test was then performed, with Bonferroni's method used to correct for multiple comparisons. A P<0.05 was considered statistically significant.
Results: There were 26 late deaths at follow-up, seven were valve-related deaths. The actuarial freedom from valve-related death 14 years was 87.0±4.6%. The actuarial freedom from cardiac-related death at 14 years was 84.1±4.9%. The actuarial freedom from non-cardiac death at 14 years was 69.2±6.6%, respectively.
Fourteen-year Kaplan-Meier survival of patients younger than 65 years at surgery was 81.8±8.2% vs. 45.7±8.2% for older patients (P=0.012, Log Rank Test). Freedom from valve-related death and from cardiac related death was not significantly different between patients younger and older than 65 years at surgery (Log Rank Test). Freedom from non-cardiac deaths was significantly better in patients younger than 65 years at surgery (P=0.004, Log Rank Test).
Prosthesis replacement was necessary in seven patients for degeneration of the prosthesis. The actuarial freedom from reoperation at 14 years was 85.4±5.2% respectively.
At echocardiographic follow-up, the most significant decrease of mean transvalvular gradient was a reduction to 37.4% of the preoperative value at three month. LVMI was significantly reduced by 20.7% at three month and continued to decrease down to 72.4% of the preoperative value at 14-

year follow-up. These changes reflected mainly the reduction in septal and posterior wall thickness.
Conclusions: The Bravo 400 aortic prosthesis has provided good clinical and echocardiographic outcomes up until 14 years of follow-up.

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VOLATILE ANESTHESIA DURING CARDIOPULMONARY BYPASS

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Objective: The aim this study was to assess efficiency the Sevorane anesthesia during cardiopulmonary bypass and to compare with fentanyl technique.
Methods: Beginning from December 2005 to December 2006 was operated 1578 patients, underwent CABG and Valvular diseases in Normothermic CPB; since October 2006 we have used Sevorane anesthesia during cardiopulmonary bypass.
We compared two groups of normothermic patients. Mean age was 55.8±10.5 years, BSA 1.92±0.24 m^2, t ºC during CPB – 36.2±1.5 ºC, time of ischemia was 49.8±1.5 min, time CPB – 94±4 min.
In sevorane group (n=15) anesthesia was induced with Sevorane® 1.7–2.1 MAC, Pipecuronium 0.03 mg kg^{-1}; maintenance of anesthesia was 1.5–2.1 MAC Sevorane®; maintenance of anesthesia during CPB (2.5 l/min/m^2 Terumo® Advanced Perfusion System 1) was 1.0–1.3 MAC Sevorane®. Volatile anesthetic was delivered into oxygenator in composition of gas mixture.
In control group (n=20) anesthesia during CPB maintained by a continuous infusion of Fentanyl 5 μg kg^{-1} h^{-1} and Midazolam 0.2 mg kg^{-1} h^{-1}.
We use antegrade cardioplegia Custodiol ® 20 ml/kg (ante-retrograde road used in aortic valve disorders, multivalve corrections, and conditions couple with aortic valve abnormalities).
We assessed the time respiratory support, length of stay in the ICU, necessity and duration inotrope therapy, determined the intraoperative BIS, hemodynamic profile, oxygen delivery and consumption, biochemical tests such as intra- and postoperative levels of glucose, lactate, pain scores as means (S.D.). Postoperative analgesia was achieved by IM Pethidine 20 mg.
Results: Time of respiratory support in sevorane group was 18±6 min vs. 212±44 min (P<0.05); patients sevorane group were extubated in operating room. First PaO_2 and $PaCO_2$ (FiO_2=50%) after extubation were 145±39 mmHg and 47±5 mmHg, respectively. There were no any complications. Pain scores postoperatively were low within 1.8, 1.6 immediately and 6 h after surgery respectively.
Conclusions: Our results indicate that use of Sevorane technique during cardiopulmonary bypass permits to reduce of time of respiratory support, length of stay in ICU, to decrease the cost of treatment in cardiac surgery. Sevorane® is more appropriate for fast track protocol during open heart surgery.

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DETERMINATION OF RISK FACTORS FOR CAROTID DISEASE IN PATIENTS SCHEDULED FOR CORONARY ARTERY BYPASS GRAFTING

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Objective: Carotid disease is thought to be a risk factor for postoperative neurological complication after cardiac surgery. Routine ultrasonography screening is still not performed in every patient scheduled for CABG. Consequently, the aim of this study was to determine the risk factor which may facilitate the selection for elective neck arteries ultrasound examination in patients undergoing CABG.
Methods: Six hundred and eighty-two patients (mean age 63.2±8.7 years, range: 37–85) scheduled for CABG underwent a preoperative duplex ultrasound examination of the carotid arteries. The following factors were collected and analysed: age, sex, left ventricular ejection fraction, history of cerebrovascular accidents (stroke and/or TIA), myocardial infarction, prevalence of hypertension, diabetes, unstable angina, chronic obstructive pulmonary disease, chronic kidney disease, left main stenosis equal or >50%, lower extremity peripheral arterial disease, obesity (body mass index >30). The logistic regression analysis was used to determine the risk factors for incidence of carotid disease.
Results: An internal or common carotid artery stenosis equal or >50% was detected in 123 (18%) patients. Bilateral stenosis occurred in 35 (5.1%) patients out of whom 29 (4.5%) presented at least monolateral vessel diameter reduction >70%. History of cerebrovascular accidents, prevalence of lower extremity peripheral arterial disease and unstable angina were the independent risk factors for at least monolateral vessel diameter reduction equal or >50%. Although, an older age was also an independent predictor (Exp (B)=1.035, P<0.05), the ROC curve analysis did not reveal an age threshold above which the probability of carotid disease detection increase significantly with satisfying sensitivity and specificity. The predictors for bilateral stenosis (at least one of them equal or greater 70%) were history of stroke, prevalence of left main disease or lower extremity peripheral arterial disease.
Conclusions: Carotid disease is common among patients scheduled for coronary artery surgery. Preoperative neck arteries ultrasound examination should be necessarily performed in all patients with more advanced, symptomatic atherosclerosis (history of cerebrovascular accidents, prevalence of lower extremity peripheral arterial disease, left main disease, unstable angina), independently of patient age.

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A PIECE OF CHAINLINK FENCE IN THE HEART

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Objective: We describe a case of cardiac penetration with a fragment of chainlink fence.
Methods: A 63-year-old man with no previous cardiac history was admitted for chest pain that arose after an accident that occurred while using a lawnmower. He was cutting the grass close to a chainlink fence when he felt a violent shot in the middle of the chest. A few hours later a sudden precordial pain arose. On arrival to the emergency department a small bleeding lesion located near the right edge of the sternum (3rd intercostal space) was observed. There was no evidence of dispnea and auscultation revealed normal heart and breath sounds. The electrocardiogram showed sinus rhythm and no signs of ongoing ischemia. On the chest radiography a metallic fragment was evident over the cardiac silhouette. Transthoracic echocardiography revealed a hyperechoic, fixed, mass between the interventricular septum and the posterioinferior left ventricle wall. Contrast enhanced CT scan localized the fragment near the apex in close contiguity with the posterior papillary muscle and at the volume rendered 3-dimentional reconstruction it appeared almost completely embedded within the myocardial wall. Although the proximity, mitral valve apparatus neither appeared damaged nor functionally altered and there was no evidence of kinetic anomalies.
Because of the clinical stability the patient did not undergo an urgent operation. Blood cultures were obtained and therapy with broad spectrum antibiotic was started.
Results: At the six month follow-up the patient is symptom free and the fragment has not moved from its position.
Conclusions: This is a rare accidental event and a particular aspect seems to be the chest entry point, apparently not consistent with the final localization.
The penetration of foreign bodies and their retention in a cardiac chamber, great vessel, myocardium or pericardial space can be due to a direct penetrating chest trauma or secondary to venous embolization from peripheral injuries. The rarity of such events do not allow standardized diagnostic protocols or treatment guidelines. Some authors advocated surgical removal of symptomatic foreign bodies irrespective of their nature, dimensions, path of travel and localization, whereas, in asymptomatic patients the mentioned factors and the time of diagnosys could drive the decision toward a conservative management. The patient's clinical course determined our decision toward observation. A close follow-up will be required in our but all patients conservatively managed because also the apparently 'low risk' foreign bodies cannot exclude long-term sequelae.

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INSIGHT INTO SURGICAL AND SPATIAL ANATOMY OF THE AORTIC ROOT

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Objective: The precise knowledge of regional anatomy details is of utmost importance.
Methods: From November 2005 to December 2006, 26 fixed normal heart specimens were filled with silicon and regional anatomy of the aortic root

was studies using cross-sectional models of natural aortic roots. All specimens created by the polymeric embalming method, which keeps their natural form and consistence. The aortic root includes interdependent elements functioning in a coordinated manner and establishing important relations with adjacent structures.
Results: The aortic root acts as the supporting structure of the aortic valve. It represents the origin of the respective vessels from their corresponding ventricle and include the distal ventricular out-flow tract, the sinuses with the interleaflet triangules and the sinotubular junction. The circle joining the bottom of the valve attachments, is the basal ring. The more distal circular anatomic ventriculoarterial junction is crossed by the crown-shaped incertion of the cusps, which are extend between the basal ring and the sinotubular junction and constitute the hemodinamic ventriculoarterial junction.
Conclusions: A novel approach was used by performing nontraditional dissections of the arterial root by studying plastinated cross sectional and 3-D models. The depicted details are useful to surgeons specializing in aortic root reconstructive procedures.

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OPTIMIZING AV DELAY IN DDD PATIENTS WITH ECHOCARDIOGRAPHY

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Objective: Optimizing AV delay and decreasing of right ventricle pacing percent are effective ways for improving cardiac hemodynamics in DDD patients. Echocardiography is used for selection optimal physiological pacing mode. To study echocardiography usefulness for determine hemodynamic AV 1 block meaning and define optimal AV delay for DDD patients.
Methods: Twenty-two patients (M 64%, 66±7 years) with hypertension and coronary artery disease were included in this study. Sick sinus syndrome and transient complete AV block were indications for pacemaker implantation. DDDR systems were implanted to all patients. Sinus rhythm with permanent AV 1 block was dominating. All patients had rigid mitral flow type and diastolic heart failure (mean EF=50%±6). We tried to improve LV diastolic function and optimizing AV delay with echocardiography. Echocardiographic examination was performed at baseline and after operation. Modes with AV delay from 80–200 ms were programmed step-by-step. We assessed mitral inflow Doppler velocity and measured VTI. We defined optimal AV delay as a period of time with adequate LV filling and maximal VTI. There are 3 LV filling types, which depend on duration and hemodynamic meaning AV interval. They are short, long and optimal AV delay.
Results: Patients were separated on two groups. One group included 12 patients. Optimal Echo parameters were registered with sinus rhythm. Intrinsic AV interval <250 ms. two group included 12 patients. Optimal Echo parameters were registered with RV pacing. Intrinsic AV interval >250 ms. AV 1 block did not have hemodynamic meaning in one group. Programming maximal AV delay helps to decrease RV pacing percent for these patients. AV 1 block make worse hemodynamic in two group. Best clinical and Echo results was registered with short AV delay.
Conclusions: Selection AV delay with Echo is effective method for improving cardiac hemodynamics in DDD patients. Optimizing AV interval increases VTI in patients with LV filling delay. Programming maximal AV delay and ADI mode are indicate to patients with intrinsic AV interval <250 ms. DDD mode with short AV delay are indicate to patients with intrinsic AV interval >250 ms. There are necessary to avoid RV pacing in patients, which did not need it.

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RISK FACTORS OF ATRIAL FIBRILLATION FOLLOWING OFF-PUMP CORONARY ARTERY BYPASS GRAFTING SURGERY

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Objective: Off-pump CABG has more benefits than on-pump CABG. It allows decreasing percent of complications following operation. However, incidences of postoperative atrial fibrillation following off-pump CABG are significant problem in cardiac surgery. Purpose of the study: to identify rate and risk factors of atrial fibrillation in short-term period after off-pump CABG.
Methods: Fifty-nine patients (M - 83, 59±6.5 years) with coronary artery disease were underwent off-pump CABG and were included in our study. Fifty-five patients have I-II Heart Failure NYHA class (mean EF=59%±16). Mean number of vessels grafted was 3.1±0.8. Before operation all patients were examined with ECG, Echocardiography, Coronarography. ECG monitoring was performed for patients during shot-term period after operation. Eighty percent patients were treated with b-blockers before and after operation.
Results: Patients were separated on two groups. One group included 11 patients with paroxysmal AF. Two group included 48 patients without onset of AF. Rate of AF episode during first seven day after CABG was 18.6%. AF episodes width was 30 s and more, which were registered with ECG and ECG monitoring. There was a significant increase in AF episode on days 2-3-4 postoperatively, which was when 86% episode occurred. Statistically significant risk factors for developing atrial fibrillation after off-pump CABG were old age, anamnesis of coronary artery disease, preoperative AF, left atrial size. We determine, that myocardial infarction, LVEF, number of vessels grafting and potassium concentration did not have effect on rate of AF episode.
Conclusions: Patients after off-pump CABG have high rate of AF episodes during short-term post operation period, despite on treating with b-blockers. Risk factors of developing atrial fibrillation depend on structural, morphological and electrophysiological changes of atria, which happened due to old age, coronary artery disease, recurrent AF.

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SORIN FREEDOM SOLO: STENTLESS IMPLANTATION WITHOUT LEARNING CURVE?

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Objective: The valve of choice for aortic valve replacement (AVR), especially in elderly patients with a small aortic annulus has not been unanimously defined yet. Stentless bioprosthesis have been recommended, by some authors, as prosthesis of choice for such patients, claiming better hemodynamic performance compared to stented bioprosthesis. On other hands, a more demanding surgical technique, needing a proper learning curve, has always been considered the main disadvantage of stentless valve. In this paper we investigated the extent of a learning curve for Sorin Freedom Solo, a stentless valve characterized by a single suture line, recently introduced claiming easy implantation and favourable hemodynamic performance.
Methods: Thirty-five consecutive patients (age >70 years) undergoing AVR±combined procedures, in a six-months period, were enrolled in the study. Patients undergoing surgery in emergency and patients undergoing double valve replacement were excluded from the study. To investigate the extent of a 'learning curve' for the implantation of Sorin Freedom Solo, surgical parameters as well as postoperative early hemodynamic performances and clinical outcome of 14 patients (Group A) receiving Sorin Freedom Solo (operated on by a single surgeon with no previous exposure to stentless valve implantation) were compared to 21 patients (Group B) operated on by the some surgeon and receiving a stented bioprosthesis (Mitroflow).
Results: The patients of two groups were comparable for preoperative characteristics. Mean valve size implanted were 23.3±0.7 and 20.3±1.8 mm for Freedom Solo and Mitroflow respectively. Mean cardiopulmonary bypass time and aortic cross clamp time (76±4 and 69±3, 74±8 and 65±8 for group A and B, respectively) did not differ in two groups. Intraoperative transesophageal ECHO showed no regurgitation and no residual abnormal gradient in all patients receiving a Freedom Solo. Early postoperative clinical outcome were similar in two groups and pre-discharge trans-thoracic ECHO confirmed the intraoperative findings for patients receiving a Freedom Solo valve, with favourable hemodynamic performances in terms of peak and mean transprosthesis gradient (18±7 and 8±4 mmHg, 25±10 and 12±6 mmHg for group A and B, respectively).
Conclusions: Our experience shows that Freedom Solo stentless valve allows for implantation of a stentless valve without needing a proper learning curve. Despite favourable hemodynamic performances have to be confirmed by a more extensive experiences, including a long-term follow-up, we support the use of Freedom Solo valve especially in elderly patients with a small aortic annulus.

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PAROXYSMAL ATRIAL FIBRILLATION. THE SURGICAL SOLUTION THROUGH ABLATION PROCEDURES FOR A SERIOUS CLINICAL PROBLEM OF HEART SURGERY PATIENTS

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Objective: Approximately 13% of the patients undergoing heart surgery suffer from chronic atrial fibrillation (AF). Of them about 40% have paroxysmal AF. Those patients are oft highly symptomatic. It is well known that the conversion rate of paroxysmal AF after CABG, MVR or AVR operation is very low. Therefore those patients must be postoperative anticoagulated, something that leads eventually to further problems and complications. It is obvious that paroxysmal AF represents a serious clinical problem. The aim of this study was to evaluate the efficacy, safety and feasibility of ablation procedures in patients with paroxysmal AF undergoing major heart operation.
Methods: Between May 2000 and December 2006, 168 patients underwent unipolar (*n*=130) or bipolar high frequency ablation (*n*=38) as a concomitant procedure. Thirty-five patients (20.8%) hat preoperative paroxysmal AF. By 16 patients (45.7%) two encircling isolation lesions around the left and the right pulmonary veins (PVs), a connection line between both and a connection line between the left PVs and the mitral valve ring were created endokardial (Group A). Nineteen patients (54.3%) received epicardial pulmonary vein isolation (Group B). We retrospectively studied the patients` data regarding the preoperative and postoperative course and the operation. The patients were routinely controlled three and six months after the operation.
Results: Mortality and pacemaker implantation postoperative were 0%. There were no procedure related complications. The SR-rates by discharge, 1, 3 and 6 months after the operation were 100%, 93, 8%, 100% and 100% for group A and 89, 5%, 94, 7%, 100% and 100% for group B, retrospectively. There is a high incidence (*n*=13 or 37, 1%) of perioperative AF. However, only two patients (12, 5%) suffered AF after endocardial ablation whereas 11 patients (64, 7%) hat AF after epicardial procedures. Ablation time was 5, 6 min for endocardial ablation and 2, 8 min for epicardial PV isolation.
Conclusions: Paroxysmal AF represents a serious clinical problem for a lot of heart surgery patients due to the complications, symptoms and of the anticoagulation and antiarhythmic medication needed postoperative. The use of ablation procedures represents a safe and a very effective option to cure paroxysmal AF. We highly recommend the use of ablation procedures concomitant to major heart operation by patients having paroxysmal AF for at least three months preoperatively.

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EFFECTS OF CARDIAC RESYNCHRONIZATION. RESULTS IN THE MEDIUM TERM

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Objective: To study the medium-term effects of cardiac resynchronization according to clinical and echocardiographic parameters.
Methods: Thirty-six resynchronizations with more of one year of follow-up, were performed during the period July 2000 to January 2006: 26 for dilated myocardiopathies, three for valve disorders and seven for ischemic disease. Left ventricular pacing was achieved by means of a transvenous lead through the coronary sinus in 32 patients and with an epicardial lead in the other four. All patients were in NYHA functional class III-IV. Clinical and echocardiographic parameters were evaluated prior to surgery and every six months after resynchronization.
Results: A significant increase was observed in the ejection fraction ($P<0.05$) in 83% of patients, as well as reduced mitral insufficiency in 22 (61%). Similarly, 29 patients (80%) improved their functional class by one or two levels.
Conclusions: Three-chamber pacing is shown to be an effective therapy in patients with chronic cardiac insufficiency in whom a transplant is contraindicated or prior to their inclusion on a waiting list; the technique may also complement coronary revascularization in cases of ischemic myocardiopathy. The increased ejection fraction and reduced mitral insufficiency are related to the improvement in functional class.

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ACCESS TO SUPRAHEPATIC SECTION OF THE INFERIOR VENA CAVA

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Objective: Suprahepatic section of the inferior vena cava is considered indeed to be difficult for an exposure of vascular system sections in a humen body. Nevertheless, in transplantology and oncology the access towards this very section is of great life value for a patient.
Methods: We have used supermidline laparotomy leading to median sternotomy in our work. Then this approach was added by pericard-phrenictomy. After this procedure the whole suprahepatic section of the inferior vena cava was excellently visualized that enabled to perform any plastic and lymphodissectional interventions. Restoration of anatomic structures was conducted by continuous suture of pericard together with diaphragm. Further completion of the surgery was performed according to the standard algorithm.
Results: Above mentioned access was applied by us in one case after liver transplantation for venaocclusing disease with a recurrence of the underlying disease, in one case with lymphodissection for resection of retroperitoneal tumor. Lethality – 0%. No complications. Postoperative period was without any problems.
Conclusions: The used access seems to be handy and less traumatic that allows not to intensify severity of the underlying disease, and to get optimal conditions for its sound correction.

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IS OPCAB ADVANTAGEOUS FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS?

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Objective: COPD is a chronic inflammatory disease manifested by airflow obturation. Off-pump cardiac surgery is known to be less proinflammatory than classic CABG surgery. The question arose as to whether OPCAB contributes to shorter mechanical ventilation, ICU stay and hospitalisation and reduces the pulmonary complications rate in patients with COPD.
Methods: One hundred and sixty-eight consecutive patients with diagnosis of COPD were scheduled to coronary artery surgery in 2003–2006. In 80 patients spirometry was performed. Only patients reaching the GOLD (Global Initiative for Chronic Obstructive Lung Disease) criteria for COPD (FEV1%FVC<70%) were analyzed. Pulmonary complications were defined as pleural effusions, pneumothorax, prolonged pleural drainage, pneumonia and/or pulmonary oedema. Ventilation >10 h was considered prolonged ventilation, ICU stay>24 h was classified as prolonged ICU stay and hospital stay >6 days – as prolonged hospital stay. χ^2 and Mann–Whitney statistics were used.
Results: COPD diagnosis according to the GOLD criteria was confirmed in only 30 patients (17.9%). OPCAB was performed in 18 (60%) patients with confirmed COPD. There was no difference in pulmonary complications occurrence, ventilation time, time in ICU, hospitalisation time between the classic CABG and the OPCAB group. However, further analysis showed that patients with FEV one value below the Lower Limit of Norm (LLN=mean FEV1 norm – 1.64S) who underwent OPCAB stayed in the ICU significantly shorter than patients after classic CABG (1.1 vs. 4.6 days, $P<0.01$), FEV1 below LLN contributed also to prolonged ventilation and hospitalisation time after CABG when compared to OPCAB (accordingly: 12.7 vs. 9 h and 13 vs. 7 days, but with $P>0.05$).
Conclusions: Although advantages of OPCAB in COPD patients have not been strongly shown in this study, even a one-day difference in ICU stay and hereby cost-reduction are worth consideration.
The other surprising finding is overdiagnosing of COPD – this disease has its diagnostic criteria and in each patient spirometry should have been performed and critically interpreted prior to naming respiratory problems 'COPD'.

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LEFT MAIN CORONARY ARTERY DISEASE – SURGERY OR PTCA

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Objective: To improve the quality of surgical treatment of patients with multivessel lesion of a coronary arteries, the group of patients underwent CABG operations in our institution for the period 2000–2006 has been analyzed.
Methods: For the given period in our institution has been operated 150 patients with multivessel lesion of the coronary arteries, including Left coronary artery (LCA) stenosis. The age of our patients ranges from 39–79 years, mean age of 58.5 years (+8.6). 89.6% of patients underwent on-pump CABG. Eight percent patients have undergone interventional procedures. Sixty percent of patients had the history of IM (from 1 till 4). Aortic valve disease was observed at 2.6% patients. At four patients - a diabetes type 3.5%. RCA occlusion was observed at 48.6% of patients. LAD occlusion - at 18.3% of patient. Circumflex artery occlusion - at 24.3% of patients. At the

patients with RCA occlusion the average level of LCA stenosis was 46%. At 0.8% patient the intraaortic balloon-pumping have been performed as a preoperative issue.
Results: At 89.6% patients (on-pump CABG in maximum necessary volume have been performed. All operations were carried out in conditions of warm blood cardioplegy. Average cross clamping time was 41.7 min. Average number of grafts - 2.5. On LAD (LIMA) - 48, on CA - 28 and on RCA - 32. In three cases CABG was combined with DOR procedure (1989) at the reason of LV aneurysm. Hospital mortality in the group of patients with LCA disease was 0.8%. The following correlations have been found after analyzing the patient data: Correlation between the number of IM and the number of diseased arteries (r - 0.35, $P<0.05$), between age of the patients and the level of LCA stenosis (r - 0.45, $P<0.05$), between preoperative EF and the level of LCA stenosis (r - 0.29, $P<0.05$). Long-term survival (5 years) was 98%. Freedom of ischemic events was 89%.
Conclusions: CABG in maximum necessary volume is operation of choice and causes good direct and long-term results in CAD patients with LCA stenosis together with multivessel involvement. For PTCA procedures in patients with left main stenosis we have strong indications.

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EXPERIMENTAL BILATERAL ENDOCAB WITH ULTRASOUND MOBILIZATION OF INTERNAL THORACIC ARTERIES

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Objective: The use of thoracoscopic instruments for ITA harvesting makes it suitable for minimally invasive coronary artery bypass grafting (ENDOCAB), which enables to minimize the surgical trauma. Now surgeons are tend to perform ITA harvesting with ultrasound instruments because of minimal thermal damage of surrounding tissue. The present study deals with feasibility of performing of two-vessel, off-pump, bilateral ENDOCAB operation and ultrasound harvesting of both ITAs.
Methods: From September 2005 to September 2006, 24 mongrel dogs underwent bilateral ENDOCAB. Total intravenous anesthesia: Propofol+Phentanil +Arduan was used. First stage: ITAs were harvested thoracoscopically with 'Harmonic Scalpel' (Ethicon) device; dissecting-hook, scalpel and scissors. It was done through three ports on the left chest: at first RITA, then LITA were harvested in their full length as non-skeletonized conduits. Then distal ends of arteries were skeletonized. Second stage: 3-inch incision was made on the left 4-th intercostals space, pericardium was opened, heparin was administered, and then skeletonized parts of arteries were clipped with laparoscopic instruments and transected between clips. Then the heart was positioned with «Tentacles» device and left anterior descending artery (LAD) stabilized with «Adobe Acrobat» device. Then LITA to LAD end to side anastomosis was performed under direct vision. Third stage: 3-inch incision was made on the right 4-th intercostals space and after positioning and stabilizing, RITA to proximal right coronary artery (RCA) end to side anastomosis was performed also under direct vision. Blood flow was investigated with Doppler flow meter device 'Transonic'; before, during and 60 min after the harvesting. All anastomosis were performed with a running 8.0 'Premilene' (polypropylene) sutures and temporary intraluminal shunts were used. Selective ITA angiogram was performed in eight dogs after three months.
Results: Duration of harvesting averaged 26 min. After an hour, the percents of blood flow in comparison with initial data exceed 80 percent for both conduits. There were 44 anastomosis performed in 22 dogs. There were two intraoperative mortalities because of ventricular fibrillation. There was no requirement for reoperation and any morbidity or mortality during 6-month follow-up.
Conclusions: Bilateral thoracoscopic ITA harvesting with ultrasound instruments through unilateral approach is useful and safe method which leads to excellent graft patency with good blood flow data. Bilateral off-pump ENDOCAB is feasible procedure for two-vessel revascularization with good mid-term results.

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IMPACT OF PARTIAL CLAMP VS. NO CLAMP TECHNIQUE ON NEUROLOGIC OUTCOME AFTER OFF-PUMP CABG

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Objective: Atherosclerotic disease involving the ascending aorta has been found to contribute to the release of multiple emboli during aortic manipulation and clamping in cardiac surgery. However, most studies evaluating the effect of partial aortic clamping and, reciprocally, the neurologic benefit in avoiding aortic manipulation have yielded contradictory results. The aim of this retrospective study was to evaluate the effect of avoiding aortic manipulation on major neurologic outcome after off-pump coronary artery bypass grafting (OPCAB).
Methods: A total of 408 consecutive patients undergoing multivessel OPCAB between January 1999 and June 2005 were included. Before 2002 myocardial revascularization was performed off-pump at the discretion of the operating surgeon. After this period our strategy was to plan starting CABG without cardiopulmonary bypass (CPB) in patients over 60 years. In accordance of our OPCAB policy only patients over 60 years of age were included in our study. There were 137 (33.6%) patients undergone aortic no-touch technique who were compared with 271 (66.4%) patients in whom partial aortic clamps were applied. The aorta was evaluated by manual palpation. The baseline characteristics among the two groups were comparable, with the exception of older age and higher prevalence of left main stenosis in the clampless group.
Results: The frequency of detected atherosclerotic aortic disease was higher in the no-touch group (73% vs. 36.6%, $P=0.001$). The respective graft/patient ratios were 3.6±0.9 and 3.3±0.8 in the side-clamp and no-touch groups ($P=0.001$). Mean number of used partial clamps were 1.13 (range 1–2) in the clamp group. There was no difference in stroke rate between the groups (0.7%, $n=1$ vs. 0%, $P=0.159$).
Conclusions: Composite arterial grafts in coronary surgery allow complete revascularization but are limited by the inflow of a single internal thoracic artery supplying all the grafted vessels. Avoiding partial aortic clamping during OPCAB in our study did not influence neurologic outcome. Taking into account an opportunity of graft failure we recommend not to refuse a partial clamp completely.

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INTERMEDIN (IMD/AM2) DILATES THE PIG CORONARY VASCULAR BED THROUGH RELEASE OF NITRIC OXIDE

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Objective: The present study was designed to investigate the effects of IMD/AM2 (IMD), an endogenous agonist for calcitonin-like calcitonin receptors (CLCR), on coronary and systemic hemodynamics.
Methods: Ultrasonic transit time flow probes were placed around the left anterior descending (LAD) artery in the anesthetized, open-chest pig. A catheter was placed into the LAD. Intracoronary arterial bolus injections (IAB) of IMD, hADM13–52 and CGRP were performed and coronary blood flows continuously recorded.
Results: IAB of IMD, hADM13–52 and CGRP increased coronary blood flow in a dose-dependent manner. IMD at the doses studied was more potent than CGRP and hADM13–52 and did not alter systemic arterial pressure, cardiac output and cardiac index. IAB of L-NAME significantly decreased the coronary vasodilator response (CVR) to IMD.
Conclusions: The present data suggest that IMD possesses marked vasodilator activity in the pig coronary vascular bed. The present data further suggest the CVR to IMD in the pig is mediated by release of nitric oxide from endothelial CLCR. The degree of the CVR to IMD may serve as functional marker for the integrity of endothelial cells in resistance segments of the coronary circulation.

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TENSION-COMPRESSION FREE LEFT MAMMARY ARTERY IN PATIENTS WITH SEVERE PULMONARY EMPHYSEMA SUBMITTED TO CORONARY ARTERY BYPASS SURGERY

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Objective: Although the left internal thoracic artery (LIMA) has been recognized as the conduit of choice in myocardial revascularization due to its proven long-term patency and prognostic survival benefit, there is still a dilemma concerning its use in patients with severe pulmonary emphysema. Whereas, several techniques have been described to increase the length of the LIMA pedicle and to reduce the tension imparted from the hyperinflated lungs, acute transection of the LIMA, remote from the anastomosis, follow-

ing coronary artery bypass surgery (CABS) has been reported as a devastating complication of the sudden forceful lung expansion.
The objective of this study is to describe a technique aimed to the reduction or avoidance of tension and compression in the LIMA pedicle of patients with severe pulmonary emphysema submitted to CABS.
Methods: From 1/9/2004 to 30/10/2006 a new technique has been applied in 12 patients with severe lung emphysema submitted to elective cardiac surgery. The pericardium was divided with an inversed T-shaped slit and the LIMA was harvested on its pedicle in the standard fashion with fasciotomy and application of ligation clips, preserving the mediastinal pleural integrity. A strap of glutaraldehyde-fixed bovine pericardium (4.6 cm) was sutured in the left edge of the pericardium and in the parietal pleura and the deep thoracic fascia, 1 cm outside from the LIMA bed. The apical segment of the pericardial strap was split and a small fissure was created. The LIMA pedicle traversed the pericardial strap through the fissure lying in a straight line to the left anterior descending artery without kinking and undue tension and traction of the artery. Three months after surgery, the patency of all grafts was evaluated with the 16-multi slice CT, while all patients underwent pulmonary function tests.
Results: There were no statistical significant changes (P>0.05) in the postoperative pulmonary test values (TLC, VC, FEV1), while the 16-multi slice CT demonstrated patent grafts. In particular, the LIMA conduits were presented without compression or kinking during the respiratory and cardiac cycles.
Conclusions: The induction of a pericardial patch, between the left pericardial edge and the bed of the LIMA with a concomitant fissure, averts the compression and the tension of the LIMA pedicle, in patients with severe pulmonary emphysema. The method provides a simple, fast, and effective solution to the long-standing dilemma of using LIMA in patients with severe pulmonary emphysema.

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LONG-TERM SURVIVAL OF DIALYSIS PATIENTS REQUIRING VALVE SURGERY INDEPENDENT OF TYPE OF PROSTHESIS IMPLANTED

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Objective: Valve surgery in patients suffering under end stage renal disease remains controversial with guidelines recommending replacement with mechanical prostheses due to presumed accelerated calcification and structural valve deterioration of xenografts. We performed a long-term follow-up of our patients to determine the validity of this recommendation.
Methods: Information obtained from a computer based valve replacement database with telephone interviews and patient charts were reviewed for follow-up data.
Results: Between 1999 and 2005, 56 patients underwent valve replacement. Of these patients 33 received mechanical prostheses (25 aortic, 10 mitral, 1 tricuspid) and 23 received tissue valves (18 aortic, 7 mitral and 1 pulmonary). The mean follow-up for the mechanical and tissue valve groups were 20.4±20.6 months and 18.2±19.8 months, respectively. Freedom from reoperation at four years was 97%/96%. No significant differences in freedom from thrombembolism,(mech 1/33, bio 0/23) haemorrhage (mech 1/33, bio 1/23), valve related mortality and morbidity could be discerned at four years.
Conclusions: Dialysis patients continue to represent a high-risk patient collective, valve surgery can be performed with acceptable operative results. Data analysis demonstrates the long-term survival to be poor, irrespective of the type of valve prosthesis implanted. Incidences of thrombembolism, bleeding and valve related mortality and morbidity were similar in both groups.

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HOW TO DO IT: INTRAOPERATIVE TESTING TO DETERMINE THE PROTHROMBOGENIC PROPERTIES OF TEXTILES

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Objective: Anticoagulation by heparinization is an absolute requirement for using an extracorporeal circuit. Any Clotting may endanger the patients life - mainly due to unwanted and uncontrolled thrombotic events. Three years ago we were confronted with unexplained onset of clotting while still on ecc. This was caused by changed prothrombotic properties of textiles used during the operation due to a modification of their production process. In order to control the prothrombotic properties of all the textiles used during the operation we developed a simple qualitative test.
Methods: Fully heparinized blood is gained during an operation using ecc. The blood is given into a sterile container. Afterwards textiles used during surgery are put into the container for at least 5 min. After taken out the texiles are macroscopically examined for signs of clotting. This test is done regularly in order to detect prothrombotic properties.
Results: In 2002, we detected unexpected high clotting properties in textiles used routinely during cardiac operations. After informing the distributing company it was discovered that the producing company had changed the dye which resulted in prothrombotic textiles. The production was stopped immediately. Ever since we apply this test periodically to the textiles used in our OR.
Conclusions: The suggested test is simple, cheap and contributes to the patients safety.

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COMPARISON OF ELECTROPHYSIOLOGICAL PROPERTIES OF THE HEART AFTER OFF-PUMP AND ON-PUMP MYOCARDIAL REVASCULARIZATION

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Objective: Electrical instability of the heart has been shown to hamper results of surgical revascularization, as demonstrated by increased incidence of arrhythmic events in the first postoperative days. As electrical stability largely depends on ventricular repolarization, we sought to determine the impact of coronary artery bypass grafting (CABG) with (on-pump) and without (off-pump) the use of cardiopulmonary bypass on QT dynamics.
Methods: Forty-five patients were admitted for CABG: 22 for on- and 23 for off-pump. High-quality digital electrocardiograms were recorded. From stationary 5-min segments, RR and QT intervals were determined, and QT interval variability was evaluated by a T-wave template matching algorithm. Slope (and correlation) for predicting length of QT interval from length of RR interval was computed using linear regression. Fisher exact test, nonpaired t-test and ANOVA were applied to test the results, a P<0.05 was considered significant. The two groups were comparable regarding clinical characteristics and postoperative characteristics.
Results: The frequency of arrhythmic events increased through fourth till seventh postoperative day and returned to preoperative levels four weeks after CABG. It was higher in on-pump group on the seventh postoperative day. The RR interval shortened significantly after CABG in both groups (P<0.001). Faster heart rates were observed after on-pump procedure one and four weeks after CABG. QT variability index increased from -1.2±0.6 to -0.8±0.4 after off-pump and from -1.3±0.5 to -0.5±0.6 on the fourth day after the operation (P<0.05), further deteriorating to -0.2±0.6 one week after CABG in on-pump group only (P<0.05). Four weeks after CABG QT variability index returned to -1.0±0.5 in off-pump and to -0.7±0.6 in on-pump group (P=not significant). QT-RR correlation decreased from 0.39–0.24 in off-pump vs. 0.34–0.17 in on-pump group (P<0.05) and remained significantly reduced as long as four weeks after CABG in both groups.
Conclusions: Observed faster heart rates after CABG imply excessive adrenergic activation after CABG in both groups, however, slower normalization towards preoperative levels was observed after on-pump procedure. The results indicate profound autonomic derangement and loss of rate-dependent regulation that coincides with increased rhythm disturbances. Restituted repolarisation corresponded with decreased frequency of rhythm disturbances four weeks after CABG. Loss of coupling of RR/QT interval occurred after CABG regardless of the technique applied. The observation of impaired electrical stability in both groups offers new insights into proarrhythmic mechanisms after CABG.

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LONG-TERM MORBIMORTALITY AFTER CORONARY REVASCULARIZATION IN MYOCARDIAL INFARCTION PATIENTS*

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Objective: Knowing the long-term morbimortality after revascularization techniques (Coronary Bypass Graph Surgery_CBGS_ and coronary transminal percutaneous angioplasty _CTPA_) in myocardial acute infarct (AMI) patients.
Methods: Between September 1st, 1997 and December 31st, 2000, 759 patients with AMI (MONICA definition) were attended in all in both, public and private hospitals of Albacete (Spain). We have studied the cardiovascular risk factors (CVRF), diagnostic and therapeutics techniques, and morbimor-

tality in the next following 28 days. Survivors (655 patients), were under control from January 1st, 2004 to June 1st, 2005; during this period we took all records dealing with mortality and cardiovascular events (CVE: angina, AMI, cerebrovascular attack, malignant and supraventricular arrhythmias and peripherical vascular diseases which needs hospital admission). Then bivariant and multivariant statistical analysis was done, with the significant $P < 0.05$. The strong of association was measured with Hazart-ratio (HR) and the population inference with the 95% confidence interval (95% CI).
Results: At AMI event, 65% of patients was 60 years or more (median: 60±10 y), 22% women, 48% had hypertension, 36% hypercholesterolemia, 33% diabetes mellitus, and 36% were active smokers. Thirty-eight percent were treated with fibrinolytic and 3% with primary PTCA, 28% with any type of PTCA and 9% were operated. During the first 28 days, 3% had re_AMI, 20% post_AMI angina, 1.5% mechanical complication, 1% cerebrovascular attack and 12% died. The median follow-up in survivors was 5.7 years and 115 patients died (18%: 12% in CTPA, 14.5% in CBGS and 22% without anyone). In the bivariant analysis, among patients treated with CBGS suffer significantly less AMI and angina events; but a tendency of more cerebrovascular complications (P=0.07). Even so, in the multivariant analysis, the CBG technique appeared as significant independent protective factor compared with those patients without any revascularization, as well as mortality (P=0.04): HR: 0.3 (95% CI: 0.1-0.8; P=0.02) and angina event (P=0.007): HR: 0.3 (95% CI: 0.1-0.6; P=0.002) whereas PTCA technique were not protective: HR: 0.7 (95% CI:0.4-1.2; P=0.2) and HR: 1 (95% CI: 0.7-1.5; P=0.9), respectably.
Conclusions: In our research the CBGS technique is an independent protective factor in appearing new angina events during the follow-up and long-term survival in patients with AMI.
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COMBINED VACUUM-ASSISTED CLOSURE AND TRANSSTERNAL LAVATION THERAPY: NEW METHOD FOR THE PRESERVATION OF THE STERNUM IN DEEP STERNAL WOUND INFECTIONS

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Objective: Deep sternal wound infection after cardiac surgical procedure is a rare but a major problem with high mortality and morbidity. It is known that the preservation of the sternum should be the principal aim of surgical treatment. We therefore developed a combined therapy of low-flow transsternal lavation and V.A.C. (vacuum-assisted closure)-therapy as an adjunct for the definitive closure.
Methods: Five patients with severe deep sternal wound infection were treated with this method. After sternal debridement and restabilisation of the sternum a continuous substernal applied saline fluid (20 ml/h per drain, two drains per patient) and the V.A.C. device were applied until the fluid of the wound was germ-free. Afterwards the V.A.C. device was continued without lavage. Finally direct closure or muscle flap reconstruction was performed.
Results: All patients had complete closure of their complex wounds and no single patient had a reinfection of the sternal wound. In one case, total sternal resection and muscle flap reconstruction was necessary. In two cases the manubrium and parts of the corpus sterni could be preserved. In two cases, the preservation of the entire sternum was possible.
Conclusions: Aggressive surgical treatment by debridement, restablilisation and the combined application of V.A.C. therapy and transsternal lavage allows us to preserve the sternum in four out of five cases of severe deep sternal wound infection.

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TUNNELLING VS. OPEN HARVEST TECHNIQUE IN OBTAINING RADIAL ARTERY FOR CORONARY BYPASS GRAFTING

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Objective: Several studies have documented excellent clinical results and satisfactory short-term as well as mid-term patency rates concerning the selective use of the radial artery as a coronary artery bypass graft. We present a tunneling technique of radial artery harvesting that is less traumatic and does not require special equipment and skills.
Methods: Two interrupted cutaneous incisions are performed along the patient's forearm over the radial artery. Three subcutaneous tunnels remain and the skin over them can be elevated by a Farrabeth retractor hung from the operating table divider bar to access direct visualization of the radial artery.
Results: In 20 patients scheduled for bypass surgery the radial artery was harvested by the conventional open method, while in other 20 patients the radial artery was excised by the tunneling technique. No one needed conversion to open technique. There was no difference between the two methods concerning wound infection, healing disturbances, pain, neurological disturbances, mobility, and conduit quality or conduit patency. The tunneled technique delayed the procedure by a mean of 5 min. The cosmetic result was estimated by the patients as satisfactory in 17 cases of the tunneled technique and in six cases of the standard technique.
Conclusions: We believe that every patient deserves a less invasive technique that improves his satisfaction for the cosmetic result. The method is safe, easily applicable and not cost effective.

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PLICATION OF THE RIGHT ATRIUM IN ORDER TO CONFRONT A RCA UNDER TENSION GRAFT

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Objective: We suggest plication of the right atrium in order to confront a right coronary artery under tension graft (either arterial or venous), if tension is due to a -up to 2 cm - shorter graft than one needed. An under tension graft may result in graft spasm, hypoperfusion and myocardial infarction.
Methods: We present this technique applied in 16 of our patients. The right internal mammary artery was the under tension graft in six cases, the radial artery in one and a saphenous vein in nine. Six patients were operated on-pump and ten patients off-pump.
Results: No perioperative and postoperative arrhythmias, myocardial infarction, hemorrhage, jugular or hepatic congestion were observed. Central vein pressure remained normal. Tricuspid valve -estimated by postoperative echo- was undisturbed.
Conclusions: Plication of the right atrium in case of an under tension graft is a simple, quick and safe technique.

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INTRAOPERATIVE ABLATION IN PATIENTS WITH PERSISTENT ATRIAL FIBRILLATION SUBJECTED TO CARDIAC SURGERY DUE TO MITRAL VALVE DEFECT

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Objective: The aim of the study was the evaluation of the safety and efficacy of intraoperative ablation in patients with persistent atrial fibrillation (AF) subjected to cardiac surgery due to mitral valve defect.
Methods: The intraoperative ablation was performed between 2004–2005 in 26 patients (at mean age 60.4±10.1, range 43–73 years) with persistent AF treated due to essential mitral valve defect. Within all included patients there were 18 women (69%) and 8 men (31%). In 12 patients (46%) we diagnosed isolated mitral stenosis (SM), in four (15%) – mitral regurgitation (MR) at III/IV degree, and in 10 (39%) - complex mitral defect (essential SM+MR). In eight (31%) patients we observed the co-existent tricuspid regurgitation (TR) at III/IV degree and in six (23%) – IIIrd degree TR. Only patients with persistent atrial fibrillation lasting above six months were included to the study. The ablation was performed with the intraoperative ablation system - Cardioblate Surgical Ablation System by Medtronic, using broadcasting waves about frequency between 100 kHz–1 MHz. The ablation within right atrium was performed on the beating heart according to own modified method. The ablation in left atrium was performed after the circulation was stopped, and next the mitral valve defect was corrected.
Results: The mean time of ablation was 12±5 min (range: 9–18 min). The sinus rhythm (SR) was observed in 16 patients (61.5%) directly after the surgery, in 17 (69%) at discharge and in 19 patients (73%) in follow-up observation (after mean 18 months, range 12–24 months). Due to periodic nodal cardiac rhythm with bradycardia one patient (3.8%) required the pacemaker implantation. In three patients (11.5%) atrial fibrillation occurred periodi-

cally, in four (15%) we still observed persistent AF. The obtained results were further analyzed taking into account left atrium size, AF time of duration, and co-existent conditions.
Conclusions: The intraoperative ablation in patients with persistent atrial fibrillation subjected to cardiac surgery due to mitral defect is a safe method with the high efficacy of supraventricular arrhythmia treatment. Early postoperative results show the high efficacy of intraoperative ablation, however the long-term observation is needed to prove this outcomes.

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INTRAOPERATIVE ABLATION WITH ESTECH COBRA RF ABLATION SYSTEM IN PATIENTS WITH PERSISTENT ATRIAL FIBRILLATION SUBJECTED TO CARDIAC SURGERY DUE TO MITRAL VALVE DEFECT – PRELIMINARY REPORT

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Objective: The aim of the study was the evaluation of the safety and efficacy of the intraoperative ablation with ESTECH COBRA RF Ablation System in patients with persistent atrial fibrillation (AF) subjected to cardiac surgery due to mitral valve defect.
Methods: The intraoperative ablation was performed between 2004–2005 in nine patients (at mean age 63.0±18, range 49–76 years) with persistent AF treated due to essential mitral valve defect. Within all included patients there were six women (66%) and three men (33%). In six patients (66%) we diagnosed isolated mitral stenosis (SM), in three (33%) - complex mitral defect (essential SM+MR). In three (33%) patients we observed the co-existent tricuspid regurgitation (TR) at III/IV degree and in four (44%) – IIIrd degree TR. Only patients with persistent atrial fibrillation lasting above six months were included to the study. The ablation was performed with the intraoperative ablation system - ESTECH COBRA RF Ablation System, using broadcasting waves. The ablation within right atrium was performed on the beating heart according to own modified method. The ablation in left atrium was performed after the circulation was stopped, and next the mitral valve defect was corrected.
Results: The mean time of ablation was 16±5 min (range: 12–19 min). The sinus rhythm (SR) was observed in eight patients (89.0%) directly after the surgery, and in seven (78%) in follow-up observation (after mean six months). In two patients (22.0%) we observed periodic slow atrial fibrillation. The obtained results were further analyzed taking into account left atrium size, AF time of duration, and co-existent conditions.
Conclusions: In conclusions the intraoperative ablation in patients with persistent atrial fibrillation subjected to cardiac surgery due to mitral defect is a safe method with the high efficacy of supraventricular arrhythmia treatment. Early postoperative results show the very high efficacy of the intraoperative ablation with ESTECH COBRA RF Ablation System, however, the long-term observations are needed to prove these outcomes.

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ACUTE RENAL FAILURE AFTER CARDIAC SURGERY WITH CARDIOPULMONARY BYPASS – PERIOPERATIVE RISK FACTORS

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Objective: Renal dysfunction remains a serious adverse event of cardiac surgery. When acute renal failure (ARF) is established, then there is severe increase in mortality, hospital stay and cost. ARF after cardiac surgery is thought to be associated with:

i Ischemic injury of the kidney due to the inadequate perfusion.
ii Renal injury by exotoxins (antibiotics, anaesthetic agents, diuretics).
iii Renal injury by endotoxins (myoglobin).

The aim of our study was to determine the perioperative risk factors for the development of ARF.
Methods: We studied 643 adult patients, who underwent cardiac surgery (CABG, valve replacement, aortic dissection type A) with CPB at our clinic from January 2005 to December 2006.
Medical histories, preoperative blood tests, physical findings, operation data and postoperative variables of the patient were collected and examined.
Perioperative management such as general anesthesia medications, CPB achievement, cardioplegic solution, non-pulsative perfusion was standardized for all the patients. When surgical procedures were finished, patients were rewarming and weaned from CPB when temperature was above 36 °C. Patients characteristics such as age, sex, weight, height were collected. Our patients were 30–87 years old and 66.7% male. Among the 643 patients, the 366 (57%) were operated for CABG, 182 (28.3%) for valve replacement, 53 (8.24%) for both and 42 (6.53%) for aortic dissection type A. Some operation variables such as aortic cross clamp time and CPB time were collected as well.
Results: Renal dysfunction was observed in 91 patients (14.1%) where serum creatinine was elevated at least 30% and 31 of them (4.3%) developed ARF for which some dialytic therapy was required. A statistic analysis was performed. The results show that some variables were significantly associated with the development of ARF. Patients with preoperative elevated serum creatinine (r=0.316 P=0.003), increased age (rho=0.482 P=0.00001), extended duration of CPB (rho=0.242 P=0.0024) and cross clamp time (r=0.335 P=0.0002) seem to be risk factors for developing ARF. The type of the operation was not significantly associated with ARF.
Conclusions: The development of ARF is a rather rare complication but a very serious one as it influences the stay of the patient in the ICU and the mortality. We have identified some perioperative variables which may be used as risk factors for developing ARF after cardiac surgery.

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CARDIOPROTECTIVE EFFECT OF NITROGLYCERINE AS AN ADDITIVE TO BLOOD CARDIOPLEGIA DURING CORONARY ARTERY BYPASS GRAFTING

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Objective: Myocardial stunning and reperfusion injury may result in myocardial damage and unfavorable operative outcome after heart surgery. Enrichment of cold-blood cardioplegia with various agents may decrease ischemia-reperfusion injury seen during CABG. The addition of an NO donor to the cardioplegic solution could improve cardiac function and postischemic myocardial function. This study was planned to evaluate the clinical impact of nitroglycerin-enriched cold-blood cardioplegia on early reperfusion injury in patients with ischemic heart disease undergoing CABG.
Methods: Sixty patients undergoing elective CABG with CPB and left ventricular ejection fraction more than 35% were enrolled in this prospective, controlled study. They all underwent similar methods of anesthesia and cardiac surgery. The patients were randomized to standard cold-blood cardioplegia (control group; n=30), or cold-blood cardioplegia containing 3 μg/kg nitroglycerin (case group; n=30). Hemodynamic variables and clinical properties of the patients were intraoperatively and postoperatively evaluated. Myocardial performance was assessed by evaluating clinical properties including need for inotropic support, incidence of arrhythmias, DC Shock or pacemaker requirements, postoperative left ventricular ejection fraction and ICU stay. Data were analysed using SPSS. Ten software and appropriate tests including Q2 and Mann-Whitney tests. P<0.05 was considered as significant.
Results: No differences were found between the two groups with regard to age, sex, pump time, operation time, body mass index and preoperative EF. No early death or perioperative myocardial infarction occurred. In the nitroglycerin -enriched group there was less post bypass arrhythmias (20% vs. 43%; P=0.047) and less need for inotropic support (26.7% vs. 46.7%; P=0.016). DC Shock or pacemaker requirements, postoperative left ventricular ejection fraction and ICU stay were not statistically different between the case and control groups (P>0.05).
Conclusions: These findings are consistent with the hypothesis that nitroglycerin added to cold-blood cardioplegia enhances myocardial protection in the early hours after and during the cardiac surgery and may therefore help to improve outcome of patients undergoing elective aortocoronary bypass surgery.

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SURGICAL REPAIR OF A VENTRICULAR SEPTAL DEFECT AFTER ACUTE MYOCARDIAL INFARCTION

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Objective: We reported an early surgical closure of VSD in combination with LV aneurysmectomy, complications following acute myocardial infarction.
Methods: A 57-year-old female, with risk factors for coronary artery disease (obesity, dyslipidaemia, high blood pressure) had an acute anterior myocardial infarction (10 days before). Pacient was referred for angina at rest, dyspnoea, fatigue. Echocardiography (2D and colour flow Doppler) revealed

the VSD with left-to-right shunt. Coronary angiography showed proximal LAD occlusion. Left ventriculography confirmed the VSD with left-to-right shunt.
Operation was performed 10 days after infarction revealing a moderate antero-apical aneurysm and a 1.5-cm hole in the septum. Antegrade and retrograde blood cardioplegia was used for maximal myocardial protection. Septal repair was done with prosthetic patch sutured with separated 2-0 Ethibond pladgets (classical technique). The superior edges of the patch were brought out through the ventriculotomy. After resection of the free wall edges (the aneurismal area), left ventricle was closed using 2-0 polypropylene (two- layer closure: continous horizontal mattress and running suture reinforced by double Teflon felt strips). Before weaning from CPB, we started the IABP and the pharmacologic inotropic support.
Results: Pacient could be extubated on day 1, weaned from IABP on day 2, and weaned off catecholamines on day 4. Pacient was discharged by the department on day 10.
Postoperative echocardiography (after 1.6 months) revealed the completeness of the repair without residual or recurrent septal rupture (as a result of dehiscence of the patch) and the improvement of LV function.
Conclusions: Although ventricular septal rupture is an infrequent opera a significant operative mortality, early surgical intervention remains the only realistic chance of survival.

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SURGICAL REPAIR OF A GIANT LEFT VENTRICULAR PSEUDOANEURYSM AFTER MYOCARDIAL INFARCTION

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Objective: Pseudoaneurysm is an uncommon complication of myocardial infarction, which results from a free wall rupture contained by pericardial and fibrous tissue, without remnants of myocardial tissue. Large or expanding LV pseudoaneurysms may lead to fatal rupture; hence prompt surgical repair is strongly recommended.
Methods: A 65-year-old woman who suffered a silent myocardial infarction one year earlier was admitted with signs of congestive heart failure: dyspnoea at rest, orthopnoea, paroxysmal nocturnal dyspnoea, fatigue. The posterior-anterior chest X-ray, echocardiography, left ventriculography all revealed a 7/8.3 cm LV pseudoaneurysm posterior to the left ventricle. The operation was performed via median sternotomy. After percutaneous femoral cannulation, CPB was initiated. The pericardium was opened. We found cardio-pericardial adhesions, which was partially dissected (great vessels and right heart). A vent was placed in the right-superior pulmonary vein. After aortic cross-clamping, cardioplegic arrest was induced by antegrade blood cardioplegia. Dissection of the heart was continued on the anterior and lateral wall revealing the superior portion of the pseudoaneurysm. After the pseudoaneurysm incision, we noticed a large cavity (7/8.3 cm) communicating through a narrow neck (2/1.5 cm) with LV. The defect was closed using prothetic patch (2.5/3 cm) sutured with separated 2-0 Ethibond pladgets.
Results: The early postoperative recovery was uneventful. Pacient needed pharmacologic inotropic support (first four days) and temporary pacing for junctional rhythm. She was discharged on day 10. One week after her discharge, she was referred for a pseudoaneurysm of the femoral artery, solved by surgery.
Conclusions: The development of false aneurysm after myocardial infarction is possible, because the cardiac rupture is limited by pre-existing adhesions between the epicardium and the pericardium. In case of chronic pseudoaneurysm, femoral cannulation is not always necessary, classical cannulation could be a safe maneuver. For surgical repair dinecessary, sometimes could be even dangerous.

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WHAT IS THE BEST TIME INTERVAL FOR CARDIOPLEGIA DELIVERY IN CABG WITH CARDIOPULMONARY BYPASS?

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Objective: Intermittent delivery of cold cardioplegia provides myocardial protection during CABG with CPB. There have been different time intervals for cardioplegia delivery systems that have been developed by various surgical centers, however, the optimum interval required to avoid the periods of ischemia is unknown. In this evaluation, the safety associated with different four cardioplegia delivery intervals were compared according to blood gas parameters derived from coronary sinus samples.
Methods: One hundred patients undergoing elective CABG with CPB were enrolled in this prospective study. They all underwent similar methods of anesthesia and cardiac surgery and also received retrograde blood cardioplegia through the coronary sinus catheter. The patients were randomized into four equal groups (each=25) to receive cold antegrade blood cardioplegia with four different intervals (Group A=every 10 min, Group B=every 15 min, Group C=every 20 min, Group D=every 25 min). Blood samples were taken from the coronary sinus before the first and the next subsequent antegrade cardioplegia deliveries. PH, PO_2 and O_2 saturation were measured from the samples and compared among the four groups using SPSS. Ten software and appropriate tests including ANOVA. $P<0.05$ was considered as significant.
Results: PH, PO_2 and O_2 saturation were similar among the four groups before the first antegrade cardioplegia delivery. The results from the next samples taken before the subsequent antegrade cardioplegia deliveries revealed a tendency for patients in the A and B groups to have higher PH, PO_2 and O_2 saturation values compared with the C and D groups ($P<0.01$). PH, PO_2 and O_2 saturation were clinically low in the C group (7.25, 45, and 80% respectively) and D group (7.15, 34, and 77% respectively) before the second cardioplegia delivery and also before the next subsequent antegrade cardioplegia deliveries.
Conclusions: Increasing the time intervals of cardioplegia delivery to more than 15 min will result in myocardial ischemia and clinically unacceptable blood gas parameters taken from the coronary sinus. Therefore delivering antegrade cardioplegia at the intervals of maximally 15 min provides clinically acceptable myocardial protection during coronary bypass surgery.

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A CASE REPORT OF CHRONIC POSTTRAUMATIC THORACIC PSEUDOANEURYSM WHICH APPEARED AS A MEDIASTINAL TUMOR IN PREOPERATIVE FINDINGS

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Objective: Chronic traumatic thoracic aneurysm is considered to be an uncommon disease so few guidelines for surgical intervention exist for this disorder. However, it has been observed that all patients with new symptoms should be operated promptly.
Methods: A 61-year-old man who had a history of blunt chest trauma seventeen years ago was admitted to the department of thoracic surgery. He developed gradual hoarseness in past two months. The roentogenogram of his chest showed widening of upper mediastinum and CT scan showed an inhomogenous mediastinal tumor simulating neoplasm neighboring the aortic arch. An aortogram revealed an aneurysm involving the arch of the aorta.
Results: Resection of the aneurysm, and patch repair of aorta, under profound hypothermic circulatory arrest (PHCA) and CPB via medial sternotomy was preformed. The patient had a smooth postoperative course.
Conclusions: We believe that chronic traumatic thoracic aneurysm at the aortic isthmus should be treated surgically soon after diagnosis because elective surgery presents low risk of morbidity and mortality.

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OFF-PUMP CABG FOR CASES OF ACUTE CORONARY SYNDROME DUE TO LEFT MAIN TRUNK LESION

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Objective: Off-pump coronary bypass grafting (OPCAB) has been an acceptable procedure for coronary artery disease, but the indication for acute coronary syndrome (ACS) due to left main trunk (LMT) lesion (over 75% stenosis) is unclear. The purpose of this study was to evaluate the validity of the outcome of OPCAB for the cases with ASC due to LMT lesion.
Methods: Three hundred and 355 OPCABs were performed from April 2001 to December 2006 in our institution. Fifty-two cases (15%) of them were with ACS due to LMT lesion. We investigated retrospectively the operative results in 52 cases with ACS due to LMT lesion. The characteristics of 52 cases were as follows. Males were 42 cases (81%), mean age was 73.4±9.1 y.o., and mean number of vessels with significant stenosis was 2.4 vessels. Cases with

shock status were four cases (8%) preoperatively. The rate of intra-aortic balloon pumping (IABP) inserted preoperatively was 76%. IABP was inserted for 40 cases (77%) but no case was needed PCPS preoperatively.
Results: OPCAB was performed for 50 cases (96%) and for two cases we switched from OPCAB to on-pump CABG because of ventricular tachycardia or ventricular fibrillation during the operation, but there was no operative death in these cases. Mean bypass number was 2.5 bypasses for 2.4 lesions. Operative complications were perioperative myocardial infarction (two cases) and cerebral hemorrhage (one case). The graft patency was 100% (we had no graft occlusion in the perioperative period).
Conclusions: We successfully performed OPCAB for 50 cases (96%) with ACS due to LMT lesion. Operative results show that OPCAB for the cases with ACS due to LMT lesion is acceptable operative procedure because of no operative death and less serious operative complications. OPCAB for the cases with ACS due to LMT lesion is acceptable procedure if the hemo-dynamic condition of the patients is stable regardless of whether a cardiac support (IABP or PCPS) is used or not.

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SKELETONIZED OR PEDICLED INTERNAL THORACIC ARTERY: A TRANSTHORACIC ECHO DOPPLER STUDY

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Objective: Intraoperative measurements suggest that there could be differences regarding the length, diameter and flow between skeletonized and pedicled internal thoracic artery (ITA). We performed a transthoracic echo Doppler comparison of skeletonized and non-skeletonized ITAs in patients undergoing coronary surgery, postoperatively and after six months.
Methods: Patients (n=56) undergoing CABG were randomized to receive skeletonized (group I) or pedicled ITA (group II). Postoperatively and after six months ITA flow was assessed using transthoracic Duplex Doppler imaging, through a parasternal approach and after the Azoulay maneuver. The ITA diameter, flow and flow profile (diastolic and systolic peak velocities, diastolic and systolic velocity-time integrals, diastolic-to-systolic ratio of the peak velocities, diastolic fraction) were recorded.
Results: The ITA diameter was significantly higher in the skeletonized ITA's (group I 2.3 (±0.2) mm; group II 2.1 (±0.17) mm; P<0.05) postoperatively. At six months there was no significant difference between the diameters in the two groups (group I 2.4 (±0.22) mm; group II 2.3 (±0.20) mm). The flow was greater in the skeletonized arteries but did not differ significantly between the two groups, postoperatively (group I 83 (±26) ml/min; group II 80 (±22) ml/min) and after six months (group I 87 (±25) ml/min; group II 85 (±21) ml/min).
Conclusions: Although the skeletonized ITA has its advantages in the operation and early after (as other studies revealed, preservation of sternal blood flow, longer graft length, larger graft caliber) in the long-term it seems that the two techniques of harvesting lead to the same results, maybe because of the adaptability of the graft to the grafted vessel characteristics.

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CONSCIOUSNESS DISORDERS FOLLOWING CARDIAC SURGERY

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Objective: According to available studies the incidence of postoperative delirium is from 10 to even 255%. The aim of the study was the evaluation of relation between preoperative cognitive impairment and postoperative delirium and looking for the perioperative independent risk factors of postoperative delirium.
Methods: A total of 260 patients admitted for open heart surgery were preoperatively examined with Mini Mental State Examination (MMSE). This research constitutes a part of a broader project in which 45 pre-, intra-, and postoperative cardiosurgical and anesthesiological predictors of delirium have been considered and evaluated. The surgical procedures ranged from coronary artery bypass grafting (CABG), valvular surgery, replacement of ascending aorta, excision of atrial or ventricular myxoma to combined coronary artery bypass grafting with valve replacement. The subjects were recruited consecutively. Individuals that refused to be interviewed as well as those who were in poor general condition or unavailable because of urgent surgery were excluded from the study. Following surgical intervention a diagnosis of delirium according to DSM-IV and ICD-10 criteria was made. All these patients were further evaluated with the Memorial Delirium Assessment Scale (MDAS) and the Delirium Index (DI).
Results: The incidence of postoperative delirium estimated on the basis of ICD-10 and DSMIV criteria was 10% and 11.5%, respectively. However, in up to 6.5% of all individuals a diagnosis of delirium was made with the use of the MDAS. A significant correlation between age and MMSE, and scores of the MDAS and the DI was found. Among all evaluated predictors, we observed that: age, neurological incidents in the history, pre- and postoperative atrial fibrillation, a history of peripheral vascular disease, and diabetes were independent risk factors of postoperative delirium (P<0.05)
Conclusions: The statistical analysis revealed that the incidence of delirium varied from 6.5–11.5%, depending on the type of measure and diagnostic criteria used by the researchers. A correlation between preoperative MMSE scores and postoperative severity and incidence of delirium was found. This correlation was stronger than the association between age and the two scales used to assess the severity of delirium (MDAS and DI). Moreover, it was found that age, not gender, was an independent factor associated with postoperative delirium. The findings of our study reveal a direct link between cognitive impairment and postoperative delirium. Besides age - neurological history, supraventricular arrhythmias, a history of peripheral vascular disease, and diabetes also independently predicted the increased risk of postoperative delirium.

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IN-STENT RESTENOSIS, AS ONE OF THE REASONS OF MYOCARDIAL ISCHEMIA RECURRENCE IN CORONARY ARTERY DISEASE PATIENTS, AFTER PERCUTANEOUS CORONARY INTERVENTIONS

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Objective: The aim of the study is to reveal passing myocardium ischemia in patients after percutaneous coronary interventions at 6–9 months after operation and to estimate frequency and time borders of given pathological process development. To define in-stent restenosis quota as one of the possible reasons of myocardium ischemia relapse, for developing further treatment tactics.
Methods: The 100 patients with percutaneous coronary interventions with stenting operated during 2004–2006 were included into the research. We have applied the following methods of diagnostics: patient examination, biochemical blood samples estimation, ECG, ECG Holter monitoring, stress-echocardiography, coronary angiography.
Results: We used both drug-eluting stents (DES) and bare-metal stents. During stress tests we have detected 23% cases of myocardial ischemia recurrence or silent ischemia in 1–8 month after operation. Coronary angiography was performed in every patient with positive stress tests. In- stent restenosis was revealed in six patients including one case with DES. The main reason of myocardial ischemia recurrence was inability of complete revascularisation because of small vessels diameter and diffuse atherosclerosis. We have marked the following feature – increasing pain sensitiveness level and silent myocardial ischemia beside preoperational period despite of meaning in- stent restenosis. As a treatment option in cases with restenosis two patients were selected for CABG, three patients for PCI with DES and one patient for angioplasty.
Conclusions: Considering the tendency of myocardium ischemia clinical semiology reduction, increase of physical activity tolerance and cases of silent ischemia despite the background of meaning in-stent restenosis, more intensive diagnostic tactic is of great importance for remote results improvement. Every patient need to pass stress tests in 6–9 month after percutaneous coronary interventions despite of angina absence.

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ENDOCARDITIS, THYROID STORM AND HEART FAILURE: A LOST CAUSE?

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Objective: Thyroid storm is a decompensated state of thyroid hormone-induced, severe hypermetabolism that involves multiple organ systems. It can be triggered by various events that pose a stress for a body: infection or sepsis, anesthesia, drugs, trauma and surgery.
To minimise a perioperative risk for adverse events (myocardial ischemia, vasomotor instability and potentially fatal arrhythmias), hyperthyrosis is

always managed before a surgical procedures and there are even some reports that the below euthyrotic state is favorable prior surgery.
Methods: We report a case of an unfortunate, but very rare, combination of several critical conditions: severe aortic and mitral regurgitation due to endocarditis, previously unrecognised throtoxicosis and heart failure.
Results: Our patient had an unfortunate, but very rare, combination of several critical conditions: severe aortic and mitral regurgitation due to endocarditis, previously unrecognised throtoxicosis, that escalated to a thyroid crisis due to infection, and refractory heart failure. There was a detrimental combination of increased volume load on the heart, caused by valvular insuficiencies and hyperdynamic circulation due to thyroid storm and even though the patient was placed on an agressive drug treatment for all three conditions, that alone was insufficient to stop the vicious circle of volume overload that started and progressively worsened his condition.
We opted for an emergency valve replacement surgery and concomitant plasma exchange and successfully resolved both causes of heart failure simultaneously.
Conclusions: Reports about open heart surgery in patients with thyroid storm are scarce. Our case shows that open heart suregy is possible in thyroid storm patients and can even be a life saving procedure for them.

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DELIRIUM AFTER CORONARY ARTERY BYPASS GRAFTING: INCIDENCE, RISK FACTORS AND CONSEQUENCES

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Objective: During postoperative period, following cardiac surgery, we closely monitor multiply organ systems for developing signs of failure. Delirium, as one of the central nervous system dysfunction clinical manifestations, is often under-recognised and ignored. The aim of our study was to analyze large contemporary patient population, undergoing on-pump coronary artery bypass grafting (CABG) at our institution and identify the prevalence, risk factors and outcomes of postoperative delirium.
Methods: We reviewed data of 1367 consecutive adult patients undergoing on-pump CABG at Vilnius University hospital Santariskiu Clinics. Baseline demographics, operative data and postoperative outcomes were recorded prospectively using standardized data entry form and computerized database system. Multivariate logistic regression analysis was conducted to determine independent predictors of postoperative confusion development.
Results: Delirium was detected in 28 (2.04%) patients. Logistic regression analysis reveled eight factors such as: age, more than 65 years (P<0.01), preoperative risk evaluation score (EuroSCORE) more than five (P<0.05), preoperative hemodynamic support by intraaortic balloon pump (IABP) (P<0.01), peripheral vascular disease (P<0.05), postoperative arrhythmias (P<0.001), perioperative myocardial infarction (P<0.01) and blood product usage (P<0.001) as independent predictors of postoperative delirium after CABG procedures. Postoperative delirium was associated with significantly higher mortality rate (17.9% vs. 3.9%, P=0.013) and prolonged ICU stay (6.8±4.9 vs. 2.0±2.7 days, P<0.001).
Conclusions: Delirium, complicating postoperative period after CABG, is most strongly associated with advanced age, blood product usage and perioperative hemodynamic instability. It is s an important and independent risk factor for prolonged intensive care unit stay and higher like hood of death.

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PRIMARY CARDIAC LYMPHOMA

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Objective: Primary cardiac lymphoma is an extremely rare disease with very poor prognosis. We report a case of a 45-year-old man with a large primary B-cell cardiac lymphoma who was admitted to our hospital with superior vena caval syndrome.
Methods: Imaging examinations are the best methods for initial diagnosis and include echocardiography, computed tomography scan, magnetic resonance imaging and radioisotope scan. In our case transesophageal echocardiography revealed a mass in the right atrium and the patient was transferred immediately to the operation room.
Results: During the operation a large tumor of the right atrium with mediastinal infiltration was found extending in both caval veins. The tumor was resected and the biopsy revealed an aggressive B-cell lymphoma.
Conclusions: As a conclusion we can say that cardiac lymphomas are very aggressive tumors and need high clinical suspicion at the early stages of the disease. At that time chemotherapy can take place and have positive impact on the prognosis. Surgical treatment has little to offer to these patients.

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HEMODYNAMIC RESULTS WITH SMALL SIZE SUPRA-ANNULAR PROSTHETHESES (19, 21 mm) FOR AORTIC VALVE REPLACEMENT AND SMALL ANNULUS FIBROSIS

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Objective: Hemodinamic results with small size supra-annular prostheses (19, 21 mm) for Aortic Valve Replacement and small annulus fibrosis.
Methods: From 1998 to 2006, 49 patients underwent aortic valve replacement (AVR) in small annulus fibrosis with small size supra-annular (SA) prostheses 'MedEng-2' (19 and 21 mm) at the department of heart disease reconstructive surgery, of Transplantology and Artificiall Organs Research Institute.
Results: All the patients were classified into two groups according to their body surface area (BSA). Group 1 – 21 patients, BSA>1.7 m^2, group 2 – 28 patients, BSA <1.7 m^2.
Twenty-six patients underwent isolated aortic valve replacement (AVR), 23 patients – combined aortic and mitral valve replacement.
The peak gradient across prostheses for 19 mm was 24.9 mmHg (group 1) and 24.0 mmHg (group 2); for 21 mm – 23.5 mmHg (group 1) and 20.3 mmHg (group 2).
The positive dynamics of cardiac cavity size suggest the process reversibility of left ventricular compensatory remodeling after the implantation of small size supra-annular prostheses.
Conclusions: Thus, small size supra-annular prostheses allow AVR without aortic root reconstruction, even in patients with BSA>1.7 m^2, without significant hemodynamic deficit.
The use of supra-annular prostheses for combined aortic and mitral valve replacement in the small aortic annulus is the preferred strategy to provide better correlation between prosthetic valves.

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RADIAL ARTERY FOR CABG

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Objective: Long-term studies have shown that internal thoracic artery (ITA) have higher patency rate compared with saphenous veins grafts (SVG). The role of radial artery as a conduit for myocardial revascularization procedures should still be defined.
Methods: The study was designed as a retrospective investigation to evaluate the usage of the radial artery (RA) graft in a patients referred to arterial revascularisation. From April 1, 1997 to December 31, 2006, 607 patients (pts) were operated on using RA, ITA and SVG. Allen test was used to prove adequate palmar circulation. Radial artery was harvested using semisceletonized technique.
Results: Mean age of the patient was 57±9 years. There were 552 (91%) male and 55 (9%) female. The average distal anastomosis per patient was 3.9±1.2 and RA grafts 1.3±0.7. Double radial artery grafting was performed in 4% (25) of patients. Total arterial revascularisation was performed in 136 patients (22%). There were 13 deaths (2.1%) in the whole group. Stress test was performed in 122 patients were at 3–36 month following surgery. Ninety-three percent of patients were in CCS functional class 0 or 1. Angiographic evaluation was performed in 60 symptomatic patients at 32±27 (4–95) month after surgery. Patent ITA was found in 58 cases of 63 (92%), RA – in 60 of 72 (83%) and SVG – in 56 of 83 (67%). There were no more significant complications of the arm.
Conclusions: Radial artery is a good conduit for myocardial revascularization: harvesting technique is simple; it has a good length to achieve the distal parts of all coronary arteries. Mid-term results of the RA patency tend to be satisfactory.

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IS SEDATION WITH DEXMEDETOMIDINE ALWAYS SAFE IN POST-CABG PATIENTS?

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Objective: Dexmedetomidine (DEX) is a new α^2-receptor agonist increasingly used for ICU sedation. The use of DEX has been considered safe for patients after coronary artery bypass surgery (CABG). We describe two cases of potentially serious side-effects that appear to be related to the use of DEX.
Methods: Sedation protocol with DEX included the use of DEX for CABG patients with good left ventricular ejection fraction (LVEF). Loading dose of 0.5 μg/kg was given in a short, 10 min. infusion directly after arrival to the ICU. This was followed by constant infusion of 0.2 μg/kg/kg/h for another four postoperative hours.
Results: Patient one (male, aged 65, LVEF 59%) was admitted to the ICU after uneventful CABG. During DEX infusion he remained stable. One hour after termination of DEX infusion arterial pressure decreased and bradycardia developed. Symptoms of low cardiac output occurred with no signs of myocardial ischaemia. Epinephrine and norepinephrine infusions were added and IABP was inserted. Patient spent nine days in ICU, inotropes were gradually weaned and IABP was removed after seven days. LVEF on discharge was similar to baseline levels.
Patient two (female, aged 58, LVEF 60%) developed low arterial pressure despite adequate volume replacement during the third hour of DEX infusion. Very low systemic vascular resistance was confirmed. DEX infusion was terminated and patient was treated with norepinephrine for 24 h. Further postoperative course was uneventful.
Herr et al. (J Cardiothorac Vasc Anesth 2003, 17: 576) describe 295 post-CABG patients sedated with much higher dose of DEX (1.0 μg/kg loading dose followed by 0.2–0.7 μg/kg/kg/h infusion). In this study the use of DEX was beneficial for the patients – this agent significantly reduced the use of epinephrine (P=0.030).
Conclusions: Dexmedetomidine, previously described as a safe drug with some beneficial properties, may also cause a profound depression of a circulatory system and prolong ICU stay.

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INFLUENCE OF CARDIOPULMONARY BYPASS ON NEUROCOGNITIVE FUNCTIONS AMONG PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFT SURGERY

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Objective: Cognitive decline after coronary artery bypass graft surgery (CABG) is an important problem among patients undergoing cardiac surgery.
To estimate the influence of surgery with cardiopulmonary bypass on the changes in neurocognitive functions during in-hospital observation.
Methods: We analyzed neurocognitive functions such as verbal fluency, verbal memory, nonverbal memory, attention, concentration and psychomotor performance, at admission and 6–7 days after surgery, among 188 patients qualified for CABG. Group A (n=73) comprised patients undergoing surgery without cardiopulmonary bypass, whereas Group B (n=115) comprised patients undergoing conventional CABG. We used the Beck Depression Inventory and a Mini Mental State Examination Test to evaluate patients for depressive symptoms or possible dementia. Patients who scored lower than 21 points in the MMSE test, or had depressive symptoms at baseline were excluded from further analyses. Neurocognitive functions were evaluated with the following tests: Verbal Fluency Test, Trail Making Test, FAS test of verbal fluency, Benton Revised Visual Retention, Rey Auditory Verbal Learning Test, Digit Symbol Subtest W-B, Digit Span Subtest W-B. Each test yielded one or more main variables, treated as independent results. A patient was defined as having a cognitive decline when the results obtained postoperatively were lower by at least 20%, compared with the preoperative period in at least 20% of the main variables.
Results: The groups did not differ significantly with regard to clinical characteristics and the preoperative estimation of neurocognitive decline. In the postoperative period the frequency of cognitive decline was present amongst 31 (42.47%) patients in group A and 72 (62.61%) patients in group B (P=0.007). The use of cardiopulmonary bypass was the only independent predictor of cognitive decline: OR=2.2 (95% CI 1.24-4.14 P=0.008).
Conclusions: Cognitive decline occurs in all patients treated with coronary artery bypass graft surgery. However, it is more frequent among patients undergoing cardiac surgery with cardiopulmonary bypass.

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RELATION BETWEEN SIMPLIFIED THERAPEUTIC INTERVENTION SCORING SYSTEM (TISS-28) AND COST OF ICU STAY IN CARDIAC SURGERY

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Objective: TISS reliably measures nursing workload in the intensive care unit (ICU) population including cardiac surgical patients. One TISS-28 point equals approximately 10 min of each 8 h nurse's shift, therefore a nurse is capable of delivering care equal to 40–50 TISS points/shift. We tried to assess whether a simplified version (TISS-28) can reflect the cost of ICU stay in cardiac surgical patients.
Methods: We retrospectively analyzed 359 consecutive patients admitted to our surgical ICU after various cardiac surgical procedures in the period of three months. Patients underwent coronary artery surgery (n=264), valve replacement or repair (n=55), coronary+valve surgery (n=20), aortic aneurysm repair (n=6), heart transplantation (n=6) or other procedures (n=8). TISS-28 score was calculated for each day of patient's stay in the ICU area. Time of ICU stay was dependent on patient's overall postoperative condition. Individual cost of ICU stay and cumulative TISS-28 score was calculated for each patient. For all the uncompleted days of ICU stay (<24 h), costs and TISS-28 were calculated as the appropriate fraction (for the amount of h) to avoid inaccuracies. Spearman correlation was used for statistical analysis. P<0.05 was considered significant.
Results: Cumulative individual TISS-28 calculated for each patient significantly correlated with individual overall ICU cost (r=0.76, P<0.0001). Correlation was also significant, when TISS-28 was correlated with the cost of diagnostic tests or drugs and blood products alone (r=0.75, P<0.0001 and 0.72, P<0.0001, respectively).
Conclusions: TISS-28 reliably reflects cost of ICU stay after various cardiac surgical procedures.

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DOES LEFT INTERNAL THORACIC ARTERY GRAFT IMPROVE CORONARY MICROCIRCULATION OF CHRONIC TOTAL OCCLUSION OF LEFT ANTERIOR DESCENDING ARTERY?

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Objective: Coronary flow reserve (CFR) reflects characteristics of coronary microcirculation. The purpose of this study is to evaluate the efficacy of coronary artery bypass grafting (CABG) for chronic total occlusion (CTO) of the left anterior descending artery (LAD) by analysis of CFR.
Methods: We studied 59 patients (M/F=51/8, age: 66.±9.2 years old) who had undergone CABG via the left internal thoracic artery (LITA). Group C consisted of 11 patients with CTO of LAD (collateral from the right coronary artery) without prior Q-wave myocardial infarction (MI). Group S consisted of 48 patients with significant stenosis of LAD. Three weeks after CABG, a doppler guide wire was inserted into the LAD via the LITA graft to measure coronary flow reserve (CFR). The CFR of LAD was assessed by the ratio of distal hyperemia (intra-graft infusion of 50 μg ATP) to baseline average peak velocity (APV).
Results: In all cases LITA grafts were successfully bypassed to the LAD. There were no significant differences in age, gender or coronary risk factors in Group C and S. In Group C, APV increased significantly from 20.5±8.4 cm/s to 46.5±21.3 cm/s in hyperemia. In Group S, APV increased significantly from 16.1±7.1 cm/s to 40.7±17.1 cm/s in hyperemia. There were no significant differences in the CFR of Group C: 2.3±0.3 and Group S: 2.7±0.8 and the patients had an increase in CFR>2.0 during pharmacological stress.
Conclusions: After CABG, the CFR of Group C showed over 2.0. LITA graft improved coronary microcirculation in CTO without prior Q-wave MI. We suggest that CTO lesion may benefit from CABG.

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SINGLE CORONARY ARTERY. THE CLINICAL IMPACT OF THIS RARE CORONARY ANOMALY

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Objective: When there is a single coronary aortic ostium for all the coronary blood flows, the condition is called a single coronary artery. In the general population, the incidence of single coronary artery is approximately 0.024%. There are several classifications for this anomaly which has been correlated with angina pectoris and congestive heart failure. We studied two patients with unstable angina who underwent CABG in our hospital with a single coronary artery.
Methods: In both patients coronary angiography took place and revealed that right coronary artery arose as a terminal extension of the left anterior descending artery, traversed in the posterior interventricular sulcus retrogradely, and finally gave several minor branches to the right side of the heart. According to Lipton et al this anomaly is classified as L-type/II.
Results: The Right coronary artery could not be identified during the operation and only Left coronary and Circumflex were finally by passed. However both patients had an uncomplicated postoperative course and after 6 and 12 months respectively of follow-up had no symptoms of angina pectoris.
Conclusions: As a conclusion we could say that cardiac surgeons and cardiologists must be familiarized with rare anatomic anomalies of coronary arteries because their presence can make things more difficult and can often change the initial surgical plan.

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CLINICAL APPLICATION OF AUTOLOGOUS BONE MARROW MONONUCLEAR CELLS IN PATIENTS WITH NON-ACUTE CORONARY ARTERY DISEASE (2.5 YEAR FOLLOW-UP).

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Objective: To what extent, if any, is effective intracoronary and intramyocardial delivery of autologous bone marrow mononuclear cells (ABMMC) in patients with non-acute ischemic heart disease still remains unclear.
Methods: Autologous transplantation of ABMMC was performed in 96 patients with non-acute ischemic heart disease. Intramyocardial delivery was used as adjunctive therapy to coronary artery bypass grafting (CABG), as well as intracoronary infusion during PTCA in eight and two patients, respectively. For 86 patients with counterindications (CABG and/or PTCA), the ABMMC suspension was injected intracoronarily during coronary angiography, with 4–6x10 8 nucleated cells, including 0.8-1.6 x 108 mononuclear and 0.5-1.8 x106 CD34+cells, being introduced for each patient.
Results: The patients were followed for 30 months. We observed clinical improvement in 82 patients. Five patients passed away. A significant reduction in the number of angina episodes and nitroglycerin consumption was noted in 80% patients. Single-photon emission computer tomography (SPECT) revealed a significant improvement in the initially non- and/or hypoperfusable myocardium area (s). Positron emission tomography (PET) demonstrated an appreciable improvement in both myocardial viability and perfusion. Echocardiography revealed some decrease in end-diastolic and end-systolic volume of left ventricle (LV) as well as an increase of global LV ejection fraction in patients with initially dilated LV.
Conclusions: Autologous bone marrow cell therapy can be considered to be a distinct strategy for chronic human ischemic heart disease as an efficient and safe approach to the restoration of the myocardium perfusion.

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ATRIAL FIBRILLATION AFTER CARDIAC SURGERY

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Objective: Atrial fibrillation (AF) after cardiac surgery occurs in 30–50% of the patients and represents the most common postoperative arrhythmic complication. The etiology of AF after open-heart surgery has not yet been completely elucidated. The aim of the present study was to evaluate clinical predictors of AF after CABG with cardiopulmonary bypass.
Methods: The study consisted of 320 patients undergoing CABG with cardiopulmonary bypass (aged 65.1±0.95 years old). Patients were monitored for 10 days postoperatively for the development of AF. To establish the predictors for postoperative AF, we performed linear regression analysis.
Results: Hundred and twenty (37.5%) of the total study population developed AF during the postoperative period. The development of AF was positively correlated with age (r=0.259, *P*=0.003), chronic obstructive pulmonary disease (r=0.323, *P*=0.0001) and postoperative fever (r=0.179, *P*=0.081). Gender, body mass index, cardiopulmonary bypass time and increased cross-clamp time were not predictive for the complication. In multivariate analysis, AF was significantly correlated with age (β(SE)=0.14 (0.005), *P*=0.018) and to a lesser degree with obstructive pulmonary disease (β(SE)=0.280 (0.149), *P*=0.066).
Conclusions: Postoperative AF remains the most common complication after cardiac surgery. In this study we showed that advanced age and obstructive pulmonary disease are independent risk factors for the development of AF after CABG with cardiopulmonary bypass.

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HYPERAMYLASEMIA AFTER CARDIAC SURGERY

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Objective: Although severe pancreatitis develops in <1–3% of patients after cardiac surgery, hyperamylasemia is very common (30–60%) and usually causes no clinical concern. The exact mechanisms of postoperative hyperamylasemia are not clear. In this study we evaluate the determinants, characteristics, and consequences of hyperamylasemia in the early postoperative period following CABG with cardiopulmonary bypass.
Methods: The study population consisted of 320 patients (aged 66.1±0.95 years old), undergoing CABG with cardiopulmonary bypass. The levels of amylase, billirubin and creatinine were observed for 10 days postoperatively. To establish the predictors for postoperative hyperamylasemia, we performed linear regression analysis.
Results: Hundred and twenty patients (38%) had amylase levels >300 (U/l) (556±93 U/l). Amylase levels in the overall population was positively correlated with creatinine levels (rho=0.505, *P*=0.00001), while a positive correlation was also observed between billirubin and amylase levels (rho=0.379, *P*=0.0001). Age and gender were also correlated to a smaller degree (rho=0.242, *P*=0.027) and (rho=0.217, *P*=0.046) respectively. In multivariate analysis, serum creatinine was significantly correlated with serum amylase, independently from cardiopulmonary bypass time and increased cross-clamp time (β=121.5 (SE:47.4), *P*=0.012).
Conclusions: In this study we showed that hyperamylasemia is correlated with serum creatinine, independently from cardiopulmonary bypass time and increased cross-clamp time. It is therefore likely that either renal function affects the vulnerability of pancreatic tissue to ischemic damage or decreased rate of amylase excretion into urine, rather than pancreatic cellular damage is the major source of hyperamylasemia after cardiac surgery with cardiopulmonary bypass.

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JAUNDICE AFTER OPEN HEART SURGERY

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Objective: We studied the determinants, characteristics, and consequences of jaundice in the early postoperative period following cardiac surgery.
Methods: We studied two hundred and sixty five patients (aged 66.8±0.95 years old) subjected to cardiac surgery for a variety of cardiac lesions. The levels of billirubin were observed for 10 days postoperatively.
Results: The incidence of early postoperative jaundice, as defined by a serum bilirubin concentration of 3.0 mg/100 ml or greater, was 15%. The jaundice was mild (bilirubin concentration 3.0–6.0 mg/100 ml) in 29 patients (11%) and moderate to severe (above 6.0 mg/100 ml) in ten patients (4%). Increased cross-clamp time was important contributor for the development of jaundice (rho=0.331, *P*=0.002) while sex, age and type of operation were not predictive of the complication. Bilirubin was also correlated with creatinine levels (rho=0.328, *P*=0.002) and amylase levels (rho=0.505, *P*=0.00001). The mortality rate and the length of stay was higher only in the group with sever jaundice.
Conclusions: In this study we showed that postoperative jaundice is correlated with increased cross-clamp time, creatinine levels and amylase levels. Furthermore, the mortality rate and the length of stay were higher only in patients with severe jaundice.

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THE RISK FACTORS OF GASTRODUODENAL COMPLICATIONS AFTER HEART SURGERY

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Objective: Gastroduodenal complications in patients after heart surgery are very serious problems especially for life prognosis. The aim of our study was to estimate the risk factors of gastroduodenal bleeding and perforation after heart surgery and create the method for prognosis of these complications.
Methods: We estimate the histories of the disease of all patients from heart surgery department of Omsk Regional Clinical hospital from the beginning of 2003 till the end of 2005 (378 men and 181 women, the mean age 48.76+13.21 years). We made a multifactorial analysis of all potential risk factors.
Results: After heart surgery we found the gastroduodenal complications in 23 patients (4.1%) The most of them (22) had bleeding. Analyzing the factors of complications we found that the significant risk factors are: using of anticoagulation therapy before surgery (P<0.001), gastroduodenal erosions and ulcers in anamnesis (P<0.001). These factors can lead to a total hypoxia and stress-induced damage of upper gastrointestinal mucosa. In addition to these risk factors we found that the grade of heart failure, long period of mechanical ventilation and period of aorta occlusion during surgery are also significant risk factors for gastroduodenal complications after heart surgery (P<0.001). We found that the use of NSAID before surgery is not significant risk factor for gastroduodenal complications after heart surgery (P>0.05).
Conclusions: The risk for gastroduodenal complications after heart surgery consist of before and during surgery risk factors, especially from the grade of heart failure, long period of mechanical ventilation and long period of aorta occlusion during surgery, using of anticoagulation therapy before surgery, gastroduodenal erosions and ulcers in anamnesis. The preventive treatment should be planed for all patients before heart surgery in conditions of mechanical ventilation and mechanical blood circulation, excluding patients younger than 40 years without risk factors for gastroduodenal complications and low grade of heart failure.

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ANTIBACTERIAL PREVENTING OF ENDOCARDITIS DURING HEART VALVES PROSTHESIS

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Objective: The problem of endocarditis preventing during heart valves prosthesis is one of the serious problems of heart surgery. The aim of our study was to estimate the profit of treatment regimen of antibacterial preventing of endocarditis after valves prosthesis consisting of ceftriaxon+rifampicin+fluconazol compared with traditional treatment regimen using only cefalosporins antibiotics in patients after heart surgery because of aseptic heart defects.
Methods: We estimate the 253 patients from heart surgery department of Omsk Regional Clinical hospital from the beginning of 2003 till the end of 2005 (134 men and 119 women), the mean age 48.8+0.7 years. All patients underwent the heart surgery on valves. The patients were divided into three groups. The first group were the patients with bacterial endocarditis treated with antibiotics depending of bacterial sensitivity in accordance with traditional treatment regimen (n=56). The second group consist of the patients who underwent the heart surgery because of aseptic heart defects treated with only traditional preventing endocarditis treatment regimen using only cefalosporins (n=130). And the third group consist of the patients who underwent the heart surgery because of aseptic heart defects treated with preventing endocarditis treatment regimen using the combination ceftriaxon+rifampicin+fluconazol (n=67). In all groups of patients we estimated the risk of early endocarditis incidence.
Results: The incidence of early endocarditis after heart valves prosthesis was in first group of patients - 8.9% (n=5), in second - 3.1% (n=4) and in third 1.5% (n=1). The only one 45 age women in the third group who had the early endocarditis after heart valves prosthesis had additional risk factors like the episode of heart surgery before because of congenital defect of septum of the heart in the age of 20 and during second operation she underwent of heart valves prosthesis because of rheumatic heart disease. The patients of the third group had 2.07 times significantly lower incidences of risk of early endocarditis after heart valves prosthesis vs. patients on second group. In patients who had bacterial heart valves damage before surgery the incidence of early prosthesis endocarditis was in 2.8 and 5.9 times greater than in second and third group accordingly.
Conclusions: In accordance with our results the use of combination of ceftriaxon+rifampicin+fluconazol is more preferable for antibacterial preventing of en-docarditis after valves prosthesis. The bacterial damage of heart valves before surgery is significant risk factor for early endocarditis after heart valves prosthesis even after use of traditional preventing endocarditis treatment regimen.

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CABG AND LV RECONSTRUCTIVE SURGERY IN PATIENTS WITH SEVERE LV DYSFUNCTION: PREDICTIVE VALUE OF QRS DURATION

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Objective: The 12-lead electrocardiogram (ECG) is a routine test for suspected cardiac disease. Few data exist regarding the direct relationship between QRS duration (QRSd) alone and survival. It has been reported a significantly higher relative risk for cardiac mortality in patients with QRS>150 ms. Some studies have demonstrated that only left bundle branch block was associated with worse survival. Others have proposed that QRS prolongation (=120 ms) is an independent predictor of increased total mortality in patients with heart failure. We hypothesized that QRS=120 ms is an independent predictor for survival after CABG and LV reconstructive surgery.
Methods: We performed a retrospective analysis to examine the association between preoperative prolongation of QRSd=110 ms and survival. We also analyzed the effects of prolonging the QRS duration on NYHA functional class (FC) at late follow-up period (mean 23.8±19.1, max 60 months). We evaluated the resting baseline standard surface ECG in 138 consecutive patients (mean LVEF 32.8±7.2%, mean NYHA FC 3.5±0.6) undergoing CABG and LV reconstruction procedure. Three groups on the basis of baseline QRSd: A) QRS=110 ms QRS<120 ms; B) QRS=120 ms; C)=120 ms were identified.
The groups were compared with respect to total survival. The percentages between groups were compared with χ^2 or Fisher's exact test. For exploring the relationship between survival and some explanatory variables Cox regression was used. A value of=0.05 was considered significant. Statistical analysis was performed with SAS 9.1.
Results: No correlation between preoperative QRSd and NYHA FC at follow-up was identified (QRS=120 ms, P=0.75; QRS=130 ms, P=0.83; QRS=140 ms, P=0.61). QRS=110 ms (but <120 ms) was not significant risk factor (P=0.075). Prolonged QRS was associated with a significant increase in mortality: QRS=120 ms, regression coefficient b=1.39, standard error of b=0.53, P=0.009, risk (95% CI)=4.02 (1.41;11.45); QRS=130 ms, regression coefficient b=1.49, standard error of b=0.49, P=0.0025, risk (95% CI)=4.45 (1.69;11.7).
Conclusions: QRS prolongation=120 ms – a simple non-invasive marker – predicts survival after CABG and LV restoration surgery in patients with ischemic LV dysfunction.

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NEBULAZER THERAPY IN POSTOPERATIONAL PERIOD AFTER AORTIC VALVE REPLACEMENT

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Objective: Prevention of postoperational lungs complications takes significant importance in postoperational treatment of patients after heart-valve replacement. One of the effective methods of preparations injecting is the usage of nebulaezer therapy.
The aim of research: to evaluate the effectiveness of nebulazer therapy in postoperational period after aortic valve replacement.
Methods: There were examined 30 patients at the age of 35.7±11.8 years old. Twenty-seven of them were men and three were women. The patients were divided into two groups: first – there were 19 patients who were taking nebulazer therapy in nearly postoperational period before and after extubation. The second group – there were 11 patients – for control. It was taken to account PCO_2, PO_2, SaO_2; the peak stream of exhalation from the extubation moment till the third day after operation. There was used a nebulizer with oxygen stream 10 l/min. Nebulization was made according to our scheme.

Results: Comparative evaluation showed that in the first group the indicators of blood gases were good. PO_2 - from 90±0.9 mmHg till 105±1, 8 mmHg; PCO_2 from 42±1.2 mmHg till 38±2.7 mmHg. In the second group PO_2 was from 90±0.7 mmHg till 93±1.7 mmHg; PCO_2 was from 42±1.2 mmHg till 40±2.1 mmHg.
The peak stream of exhalation increased more in the first group from190±50 ml till 360±30 ml (P<0.01), than in the second group – from 196±60 ml till 290±20 ml. also was mentioned the blood saturation from 89±2.4% till 98±0.94% in the first group; from 90±2.4% till 95±1.3% in the second one.
Conclusions: The usage of nebulazer therapy after operations makes better the indicators of blood gases and the effectiveness of outside breathing functions, which promotes lowering of a number of postoperational respirathorical complications.

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VERY EARLY EXTUBATION AFTER PEDIATRIC CARDIAC SURGERY

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Objective: The concept of early extubation after pediatric cardiac surgery is not new. In recent years, there have been several articles that examined the practice of early extubation. The term of 'early extubation' may have included extubation up to 6–8 h in these studies. The aim of this report was to evaluate the results of the very early extubation (within 3 h postoperatively) in 153 consecutive pediatric patients who undergone cardiac surgery.
Methods: To evaluate the role of very early extubation on outcome, retrospective data were collected from hospital records.
Results: One hundred and fifty three consequtive pediatric patients underwent cardiac surgery from January 2004 to December 2006 with a median age 39.8±39.9 months (10–210 months). One hundred and fifty one very early extubation was accomplished in 98.7% of the patients. Extubation time ranged 15–180 min with a median duration 101.27±61.9 min. No patient required reintubation. There was no hospital death. Two children required mechanical ventilation more than 6 h (because of postoperative bleeding in one patient and hemodynamic instability in the other).
Conclusions: Very early extubation of patients is possible in most pediatric patients who undergone cardiac surgery related to not only simple pathologies, but also complex cardiac anomalies. These acceptable results suggest that very early extubation may be safe for pediatric patients.

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SUBXIPHOID PERICARDIAL WINDOW FOR PERICARDIAL EFFUSION

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Objective: Pericardial effusion may occur as a result of malignancy, renal failure, infectious or inflammatory process, radiation, acute myocardial infarction, or trauma. The aim of the report was to evaluate effectiveness of subxiphoid pericardial window in the treatment of pericardial effusion or tamponade.
Methods: We reviewed 158 patients who underwent subxiphoid pericardial window and drainage from January 1999 to December 2006. There was 89 male and 69 female with a mean age 41.6±13.5 years. Etiologic factors were renal failure in 81 patients (51.3%), malignancy in 39 (24.7%), tuberculosis in 18 (11.4%), postpericardiotomy syndrome in four (2.5%), systemic lupus erythematosus in two (1.3%), and unknown in 14 patients (8.9%).
Results: The drainage volume was 250–1600 (mean 745±319.2 ml) at the operation. In hospital mortality rate was 0.6% (because of low cardiac output). Postoperative echocardiography showed minimal or no pericardial effusion in 98.1% of the patients.
Conclusions: The results suggest that subxiphoid pericardial window may be safe, effective and less invasive method for the patients with pericardial effusion or pericardial tamponade.

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CORONARY REVASCULARIZATION FOR PREMENOPAUSAL WOMEN

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Objective: The incidence of coronary artery disease is low in premenopausal women and increased in postmenopausal women. In addition bilateral oophorectomy and premature menopause are increased risk factors for atherosclerosis. The cardiovascular systems are important target organ of estrogens action. The aim of this report is to evaluate the results of coronary artery bypass surgery in premenopausal women.
Methods: This study reviews data on 72 women younger than 45 years of age who underwent coronary revascularization from January 1999 to November 2006. All of the patients were in premenopausal period.
Results: There was a high incidence of coronary risk factors, hyperlipidemia in 34 patients (47.2%), smoking in 56 (77.8%), hypertension in 24 (33.3%), diabetes mellitus in 26 (36.1%), and family history in 16 patients (22.2%). seven patients (8.3%) had a history of bilateral oopherectomy. A total of 178 bypasses (2.5±0.9 grafts per patient) were performed. Left internal mammary graft was always used left anterior descending artery bypass. In hospital mortality rate was 1.4% (one patient).
Conclusions: In this study, we observed a high incidence of smoking and oopherectomy in patients who underwent coronary revascularization under 45 years of age. It may be inform the patients who underwent oopherectomy in premenopausal period about increased risk of coronary artery disease and importance of other risk factors especially smoking.

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DOUBLE-ORIFICE RIGHT ATRIOVENTRICULAR VALVE ASSOCIATED WITH VENTRICULAR SEPTAL DEFECT AND WPW SYNDROME

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Objective: To report the case of a double-orifice right atrioventricular valve associated with ventricular septal defect and WPW syndrome. Double – orifice or duplication of atrioventricular valves is a very rare malformation the characterized by the presence of a double orifice in either mitral or tricuspid position. A fully developed subvalvular apparatus is an obligatory characteristic of true duplication valve. This extremely rare malformation was for the first time reported by Pisenti in 1888. Mitral valve duplication was classified into three types by Hartman in 1937: 'Lock' (L), 'Brücke' and 'Sonderstellung'. Sanchez – Cascos described three types of tricuspid valve duplication in 1967: 1) the commissural type similar to Hartman's 'L' variant, 2) the central type encompassed Hartman's 'B' and 'S' variants and 3) the hole- type defect was described as a hole within the cusp or valve leaflet. These malformations with some exceptions were usually revealed during operation or autopsy. The anatomic characteristic our case is not complying with any of classification schemes established previously and is reported for the first time.
Methods: A 35-year-old female underwent examination and treatment at our clinic. The diagnosis of double-orifice right atrioventricular valve with associated ventricular septal defect and WPW syndrome was established preoperatively by means of computed tomography, transesophageal echoscopy and electrophysiological investigation.
Results: The preoperative diagnosis was confirmed during the operation. At operation we found tricuspid valves and atrial cavity to be separated by a muscular septum originating from intervalvular margin. The cavities of the right atrium had a connection between them and v. cavae had a separate flow towards tricuspid valves. We performed excision of muscular septum that was dividing the atrial cavity, closed the ventricular septal defect and performed destruction of additional Kent's band; both tricuspid valves were competent and required no correction.
Conclusions: Nevertheless the double-orifice right atriventricular valve is an extremely rare congenital malformation, it may be successfully diagnosed prior operation and treated by means of surgical intervention.

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ICU READMISSION AFTER CORONARY ARTERY BYPASS GRAFTING: RISK FACTORS AND OUTCOMES

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Objective: Improving the clinical effectiveness of the intensive care unit (ICU) has become an increasingly important aspect of the postoperative care of cardiac surgical patients. The increasing number of high-risk coro-

nary artery bypass grafting (CABG) patients and limited ICU resources has led us to evaluate ICU readmission of patients undergoing CABG surgery at our institution.
Methods: A retrospective study held in 14 beds adult ICU. Two thousand seven hundred and eighty consecutive coronary artery bypass patients operated on between January 1, 2002 and December 31, 2005 in a university hospital were subjected to the investigation. Two thousand six hundred and seventy three patients who were discharged alive after first ICU admission were analyzed.
Results: From 2673 adult patients who underwent CABG surgery and were discharged alive after the first ICU stay 3.1% (82) of patients required readmission to the ICU. The main reasons for readmission were cardiac insufficiency – 46 (52.8%) patients and respiratory failure – 20 (22.9%). Multivariate analysis revealed that no treatment with β- blockers preoperatively (P=0.007, odds ratio 1.89, 95% CI 1.18–3.05) and failure of early extubation (P=0.004. odds ratio 1.90, 95% CI 1.21–2.97) were the only significant predictors of ICU readmission. The hospital mortality of patients who were readmitted to ICU was significantly higher compared to those who did not require readmission (18.2% vs. 2.95%, P<0.05).
Conclusions: Main reasons of ICU readmission were cardiac and respiratory failure. Identification of patients who were not treated with β-blocking agents preoperatively or failed early extubation may help to identify the patients at risk of ICU readmission.

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REDO CORONARY ARTERY BYPASS GRAFTING WITH AND WITHOUT CARDIOPULMONARY BYPASS: SINGLE CENTER EXPERIENCE

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Objective: Redo CABG is associated with higher perioperative risk and worse outcome. The aim of the study was to asses whether off-pump redo CABG is associated with reduced mortality and morbidity compared to conventional procedures in our institution.
Methods: We conducted a retrospective study of 154 consecutive redo CABG patients operated on between January 2000 and December 2006. Twenty-one of them were operated off-pump and 133 using the conventional coronary revascularization. Perioperative variables and postoperative outcomes were compared.
Results: Preoperative characteristics were similar in both groups. The mean EuroSCORE in off-pump group was 5.1±2.0 and in on-pump 5.7±2.1. Off-pump patients had shorter operative time (184±42 min vs. 254±85 min), less graft rate (1.7±0.8 vs. 2.8±1.0), less postoperative blood loss (399±351 ml vs. 870±783 ml) and postoperative blood transfusion rate (9.5% vs. 41%). Off-pump patients had shorter postoperative ICU length of stay (1.5±1.4 days vs. 2.2±1.4 days). Perioperative myocardial infarction (4.8% off-pump vs. 4.5% on-pump), and in hospital mortality (4.7% off-pump vs. 7.5% on-pump) was comparable between the groups.
Conclusions: Redo coronary revascularization can be safely performed off-pump, with the same mortality rate as on-pump. However, off-pump redo surgery was associated with decreased morbidity.

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THE IMPORTANCE OF MEDICAL TREATMENT TO PATIENTS WAITING FOR THE HEART TRANSPLANT

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Objective: According to the European Society of Cardiology, 4% of European citizens have a pathological heart failure (HF). When HF is diagnosed, ~ 50% of all patients die in the first four years, and in the case of end-stage HF, 50% die in the first year. HF is treated medically, with the help of mechanical circulatory support systems and heart transplant.
Methods: Patients with marginal HF are on the list as heart transplant recipients. In our Heart Surgery Centre, heart transplant operations started in 1987. Since then up to the year 2000, 173 recipients were on the waiting list for heart transplant and 16 heart transplant operations were performed (9%). Heart transplant operations were performed sporadically, 1–2 times per year; there also were years with no heart transplant at all. In the last five years, 5–6 heart transplant operations were performed per year, and on the waiting list there were 95 recipients - 12 female and 83 male. Thirteen of them were diagnosed ischemic cardiomyopathy, 1 – hypertrophic cardiomyopathy, 81 – dilatative cardiomyopathy. The age of recipients varies from 18 to 65 years (average 41.5 years). Left ventricle ejection fraction (LV EF) of all of them was <20%. All of them were treated medically with ACE inhibitors, diuretics, BAB, aldosterone antagonists, glykozides, sometimes medicine with a positive inotropic effect was administered (dopamine, dobutamine, levosimendan). The majority of the patients had the intravenous adrenomimetics therapy, antiarrhythmic drugs. All of them were administered anticoagulants or antiagregants due to the increased risk of thromboembolic complications.
Results: Due to application of medical treatment, 29 patients lived to see the heart transplant (31%), 39 recipients died (41%), two patients (2%) were excluded from the recipients list as their LV EF improved significantly (one of them was given resynchronizing therapy along with medical treatment; the other patient changed way of life and was successfully treated medically so that LV EF improved up to 40%). Because of contraindications to heart transplant, four recipients (4%) were excluded from the list. At the moment 21 recipients (22%) are waiting for heart transplant.
Conclusions: 1. When complex heart failure treatment was applied, heart transplant increased by 9–30%. 2. The condition of 2% of recipients improved, which resulted in the fact that they no longer needed heart transplant.

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MIMINIMALLY INVASIVE CORONARY SURGERY IN PATIENTS WITH PREVIOUS AORTIC VALVE REPLACEMENT

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Objective: The reoperative cardiac surgery remains still a challenge in daily practice due to most common incidents of serious problems during and after operation compared to first cardiac operation. There is still a place to look for a methods which allows surgeons to avoid the complications like bleeding, prolonged hospital stay and higher mortality in this patients.
In this case report we would like to present two cases of minimally invasive coronary artery bypass grafting in patients after previous aortic valve replacement.
Methods: From 1999 to 2007 minimally invasive coronary artery bypass grafting was performed in 169 patients. In this cohort a thoracoscopic LITA harvesting along with an EACAB (endoscopic atraumatic CABG) was adopted in 127 patients. In this group there were two patients who have had in the past aortic valve replacement and single coronary artery disease (LAD) was the indication to reoperative cardiac surgery. Both patients were operated using EACAB procedure with thoracoscopic LITA harvesting.
Results: Operative technique was similar to the patients without previous cardiac surgery. There were no atelectases in left pleural cavity and no complications during mammary artery harvesting and anastomosis. Both patients didn't need any inotropic support. The postoperative drainage was low and no blood transfusion was necessary. The hospital stay was five days and was the same like in cases of other EACAB's patients.
Conclusions: The minimally invasive coronary bypass grafting can be a good alternative for the patients with single LAD stenosis after previous valve operation. The limited access allows to cut down on heart preparation and decrease perioperative risk in this patients. This goods results need the analysis in larger group of cases, but this first observation let to consider hybrid procedures (PCI and EACAB) in patients with multivessel coronary artery disease succeed valve replacement.

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IMPACT OF PROSTHESIS RELATED ECHOCARDIOGRAPHIC INDEXES ON OPTIMAL SMALL-SIZE AORTIC VALVE REPLACEMENT IN 3 YEARS OBSERVATION

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Objective: Suboptimal implantation of small size mechanical aortic valves is a constant clinical problem, because of lacking data accurately determining prosthesis size and type on Effective Orifice Area Index (EOAI), hemodynamic function and left ventricular (LV) mass reduction in long-term observation.
Methods: We studied 50 patients (pt's) with mean age 58.6±21 years and mean LVEF 52.4±6% who undergo valve replacement therapy (AVR) for severe aortic stenosis with 19–23 mm Sorin, Medtronic, St. Jude, Carbomedics and On-X valves. LV mass and mass index, EOA index, rest and exercise transvalvular gradient in dobutamine stress echo (DSE) were analyzed with refer-

ence to valve type and diameter, time of operation and exercise capacity in NYHA class.
Results: All analyzed patient survived the observation period. In more than 75% of patients the marked postoperative improvement of NYHA class and significant drop of peak (PG) and mean gradient (MG) were observed. LV mass decreased in all groups in 3rd year follow-up from 321.16 to 241.4 g, significant only in On-X and St. Jude groups and 268.11–212.26 g (P=0.017 and P=0.031). The LV mass index decreased in all patients mean 20.6% from 162.27 to 128.513 g/m^2 without significant differences between groups. 19 mm valves produced significantly higher stress MG in comparison to 21 and 23 mm valves (P=0.032) especially in patients with BSA>1.7 m^2. The mean value of EOAindex was 0.81 cm^2/m^2 for all valves. Analyzed group of On-X valves were presented significant lower rest and stress gradients (P=0.023). The mean value of stress PG and MG increased in 3rd year (P=0.051) for all valve types without any clinical response.
Conclusions: Good clinical outcome and LV mass reduction after small size AVR were not correlated with high rest and stress gradient of analyzed valves. Values of mass and EOA indexes have demonstrated the medium mismatch of most of implanted prostheses except adequate matched Sorin valves (BSA – 1.68 m^2). Only On-X valves revealed an optimal performance in aortic position with significant regression of LV mass and mass index independent on valve size and patients BSA in long-term observation.

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SEVORANE AS A COMPONENT OF FAST-TRACK PROTOCOL DURING OPEN-HEART SURGERY

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Objective: The aim this study was to compare Sevorane and Isoflurane techniques of anesthesia during open heart surgery.
Methods: Beginning from December 2005 to December 2006 was operated 1578 patients, underwent CABG and Valvular diseases in Normothermic CPB. We compared two groups normothermic patients. Sevorane group included 500 patients; mean age was 55.8±10.5 years, BSA 1.92±0.24 m^2, t °C during CPB – 36.2±1.5 °C, time of ischemia was 49.8±1.5 min, time CPB – 94±4 min. Isoflurane group was 500 normothermic patients underwent open heart surgery.
In sevorane group anesthesia was induced with Sevorane® 1.7–2.1 MAC, Vecuronium 0.03 mg kg^{-1}; maintenance of anesthesia was 1.5–2.1 MAC Sevorane®; during CPB – Fentanyl 5–7 μg kg^{-1}, Vecuronium 0.03 mg kg^{-1}, Midazolam 0.2 mg kg^{-1}.
In isoflurane group anesthesia was induced with Fentanyl 5 μg kg^{-1}, Midazolam 0.2 mg kg^{-1}, Vecuronium 0.03 mg kg^{-1}; maintenance of anesthesia was 1.3–1.5 MAC Isoflurane; during CPB – a continuous infusion of Fentanyl 5 μg kg^{-1} h^{-1} and Midazolam 0.2 mg kg^{-1} h^{-1}.
We use antegrade cardioplegia Custodiol® 20 ml/kg (ante-retrograde road used in aortic valve disorders, multivalve corrections, and conditions couple with aortic valve abnormalities).
We assessed the time respiratory support, duration of stay in ICU, necessity and duration inotrope therapy, determined the intraoperative BIS, hemodynamic profile, biochemical tests such as intra- and postoperative levels of glucose, lactate, maloune dialdehyde, creatinine, urea, and leukocytes count.
Results: It has been show that in Sevorane group time of stay in ICU decrease 6.3±1.6 vs. 18.2±1.5 h (P<0.05); time respiratory support 35±16 min vs. 780±44 min (P<0.05), significantly decreased necessity of inotrope therapy 1% vs. 7% (P<0.05), and it duration.
Conclusions: Our results indicate that using of Sevorane® permits to reduce time of time of respiratory support, time of stay in ICU, to reduce necessity and duration inotrope therapy in postoperative period; Sevorane® is a more convenient for guaranteeing fast track protocol during open heart surgery.

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OPERATING ROOM EXTUBATION IN OPEN HEART SURGERY: SEVORANE ULTRA-FAST-TRACK ANESTHESIA

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Objective: The aim this study was to present a group of 150 patients where operating room extubation was achieved by using Sevorane anesthesia during open heart surgery.
Methods: The study was designed as prospective audit of 150 patients undergoing open heart surgery and extubating in OR. Mean age was 55.8±10.5 years, BSA 1.92±0.24 m^2, t °C during CPB – 36.2±1.5 °C, time of ischemia was 49.8±1.5 min, time CPB – 94±4 min. Anesthesia was induced with Sevorane® 1.7–2.1 MAC, Vecuronium 0.03 mg kg^{-1}; maintenance of anesthesia was 1.5–2.1 MAC Sevorane®; during CPB – Fentanyl 5–7 μg kg^{-1}, Vecuronium 0.03 mg kg^{-1}, Midazolam 0.2 mg kg^{-1}. Postoperative analgesia was achieved by either Tramadol or Ketonal.
We use antegrade cardioplegia Custodiol ® 20 ml/kg (ante-retrograde road used in aortic valve disorders, multivalve corrections, and conditions couple with aortic valve abnormalities).
We assessed the time respiratory support, necessity and duration vassoactive therapy, determined the intraoperative BIS, hemodynamic profile, biochemical tests such as intra- and postoperative levels of glucose, lactate, maloune dialdehyde, creatinine, urea, and WBC count; pain scores as means (S.D.).
Results: All patients (CABG – 88, CABG and mitral valve replacement – 4, CABG and aortic valve replacement – 5, Bentall procedure – 5, aortic valve replacement – 15, mitral valve replacement – 19, redo mitral valve replacement – 2, CABG and remodeling LV – 12) were extubated within 20 min after surgery. There were no any complications. Pain scores postoperatively were low within 1.8, 1.6 immediately and 6 h after surgery respectively. Time of stay in ICU was 6.3±1.6 h.
Conclusions: Our results indicate that using of Sevorane® permits to reduce time of respiratory support after open heart surgery (Ultra-fast-track anesthesia) and time of stay in ICU.

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INTRAOPERATIONAL CARDIOANAESTHESIOLOGICAL MULTIFACTOR MONITORING METHOD

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Objective: The objective of this work was to develop an effective and simple intraoperational method of collecting and analyzing anesthesia monitoring parameters and to approve it in clinical practice.
Methods: We used the information gathered from Datex Ohmeda S/5 anaesthesia monitors and Datex Collect software as raw material for this research. Original CardioAnesthesia® software developed by the authors was taken as a basis for multifactorial intraoperational cardioanesthesiological analysis. Data collecting starts since an admission of the patient to the operation room. All preoperational laboratory and instrumental data is continiously added to the database. Individual patient data ID allows combining the obtained data into a general information system. Parameters, available for automatic monitoring and registration are heart rate, ECG, arterial, CVP, PA pressure, cardiac output, ventilation and gases data, inhalation anesthetics concentration, rectal, nasal and blood temperature, etc. All important events (start of anesthesia, beginning of operation, sternotomy, bypass start, cooling, aorta cross clamping, rewarming, clamp-off, bypass stop, sternum closing, end of operation) are also simultaneously registrated in manual mode. Drugs dozes and infusions duration are also saved for further analysis.
Results: The collected information is formed in a database, which can be presented as an electronic anesthesia form. The statistical analyzing system integrated into the program allows to prepare a detailed report of the received information.
Conclusions: We are sure that CardioAnesthesia® software can be very helpful in anesthesiologists and nurse's everyday work. The main benefit of the program is the opportunity to manage a qualitative and abstruse scientific research.

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SIMULTANEOUS MITRAL AND TRICUSPID VALVE REPAIR IN RHEUMATIC DISEASE. A 30-YEAR EXPERIENCE

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Objective: To study the very long-term results (30-year experience) in a group of patients who underwent simultaneous mitral and tricuspid valve repair for rheumatic heart valve disease.
Methods: Between 1974 and 2005, 153 patients (mean age: 46±13 years) having a rheumatic organic mitral and tricuspid valve lesion underwent

simultaneous valve repair. There were 132 females and 21 males. One hundred and seventeen patients were in NYHA class III-IV (76.4%) and 86% of them were in atrial fibrillation. Sixteen patients (10.5%) had previous valve operations. Mitral valve repair consisted in commissurotomy and annuloplasty in 70%, isolated commissurotomy in 16% and isolated annuloplasty in 14%. Subvalvular apparatus repair were done in 10.5% of the cases. Tricuspid valve repair was performed with isolated tricuspid annuloplasty in 73.1%, annuloplasty plus commissurotomy in 17.7% and isolated commissurotomy in the remaining 9.2%.
Results: Hospital mortality was nine patients (5.9%). Multivariate analysis showed previous valve surgery and post-clamping time as predictive risk factors. Mean follow-up was 19.2 years (range: 1.3–30 years). Complete follow-up was 98.7% with an accumulative follow-up of 3003 patients-yr. Late mortality was 92 patients (60.1%). Multivariate analysis showed age over 65 years and cardiopulmonary bypass time as predictive risk factors for late mortality. During the follow-up 63 patients required a valve reoperation (43.8%). Actuarial curve free from reoperation was 31.5±6.8% at 30 years. Multivariate analysis showed mitral valve repair without the use of a prosthetic ring as a risk factor for reoperation. Actuarial survival curve was 17.4±6.2% at 30 years.
Conclusions: Simultaneous mitral and tricuspid valve repair due to rheumatic heart valve disease is an acceptable surgical option with satisfactory early and long-term results. The use of a prosthetic ring is recommended for mitral valve repair.

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LARGE ASCENDING AORTIC ANEURYSM AND SEVERE AORTIC REGURGITATION IN A 19-YEAR-OLD PATIENT WITH MARFAN SYNDROME

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Objective: A 19-year-old male was addmitted because of dyspnea on exertion and palpitations in May 2006.
Methods: He had physical features of Marfan syndrome. Transthoracic echocardiography showed a large ascending aortic aneurysm, severe aortic regurgitation, and mildly dilated left ventricle. Operation was performed via cardiopulmonary bypass with bicaval and aortic cannulation under moderate hypothermy (28–32 °C): myocardial protection was assured by antegrade isothermic blood cardioplegia.
Results: He underwent replacement of the ascending aorta and aortic valve using composite graft with prosthetic valve (Benthall's operation). Marfan patients with aortic aneurysms and regurgitations can undergo surgery with a low operative mortality and morbidity.
Conclusions: In marfan syndrome, aortic root dissection and rupture and chronic aortic regurgitation are the primary causes of death. Appropriately timed surgical treatment can substantially improve the prognosis.

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NEUROLOGIC MANIFESTATION OF CARDIAC MYXOMA

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Objective: We present the results of analysis of 16 patients between January 1992 and December 2006.
Methods: Nine were women (56%) and seven were men (44%). Average age was 53 during operation. Thirteen myxomas were left atrium (LA) (81%) and three were at right atrium (RA) (19%). A women with transient vertigo and paresthesia right pemiface, upper and lower extremity (6.2%). In all patient accurate diagnosis was with echocardiography.
Results: Patient were operated under cardiopulmonary bypass and tumors were excised radically from their endocardial origins. In 11 of 13 patients. LA myxoma were originated from interatrial septum and in two from posterior free wall of LA. In three cases with RA myxoma, mysomas were originating from interatrial septum. Patients were discharged in the mean 6 days postoperatively. Hospital and late follow-up mortality were 0.00%. Average postoperative follow-up was 8 years 5 months.
Conclusions: Myxoma is the most frequent primary cardiac tumor. They can be emboly source due to their intracardiac localization and fragility. Cerebral emboly before surgery is not uncommon. Selective therapy method for myxomas is surgical resection. Delayed neurologic event following surgery are rare.

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DOUBLE VALVE REPLACEMENT COMBINED WITH CORONARY ARTERY BYPASS GRAFTING; OUR CLINIC EXPERIENCE

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Objective: Coronary artery disease in patients with valvular heart disease must be treated during valvular surgery. This surgical procedure has high mortality and morbidity due to increase cardiopulmonary bypass time, aortic cross clamp time and a lot of co-morbid disease. The aim of the present study was to define early and mild results in the high-risk group of patients after coronary revascularization with combined aortic and mitral valve replacement.
Methods: The data of patients who underwent cardiac surgery between March 2001 and November 2006 were reviewed. During this time period eight patients with combined replacement of both left heart valves and additional coronary bypass were identified six patients were male and two female. The mean age was 71.3±8.7 years. All patients were preoperatively in the functional New York Heart Association (NHYA) class III or IIII.
Results: Nine person cases mechanical prostheses were implanted. The other patients had been implanted bioprosthesis. All of the mechanical prostheses was bileaflet valve. The mean graft number was 1.8±1.2. Thirty person had had left internal mamarial artery grafts. Median ICU and hospital day's 3–16 days. At mean follow-up 1–72 months. Early mortality rate was 14.5%. Actuarial survival rates at 1 and 5 years were 84% and 74% respectively. A lot of the patients (% 82.3) have been NYHA class I or II.
Conclusions: Although patients with double valve disease and concomitant coronary artery disease are a high-risk group patients undergoing cardiac surgery and this procedure increased cardiopulmonary bypass time, aortic cross clamp time. Thus simultaneous coronary bypass grafting with combined left cardiac valve replacement has an acceptable operative risk and satisfactory early and mid-term results.

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OPEN HEART SURGERY AND INTRAOPERATIVE AORTIC DISSECTION

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Objective: Intraoperative acute aortic dissection is a rare but potentially fatal complication of open heart operations. If the dissection is promptly recognized and repaired, however, the outcome may be significiantly. In this study, we reviewed the hospital records of patients with dissection of the aortic arch occurring as a complication of a cardiac surgery.
Methods: We performed 2674 open heart surgery in the Atatürk education and research hospital in March 2000-November 2006. During this period, 2674 surgical procedures with the use of cardiopulmonary bypass and aortic cannulation were performed, and six patients (0.22%) with iatrogenic aortic dissection were identified. Dissection was discovered intraoperatively in four patients and postoperatively after complications developed in two of the four patients whose injuries were discovered intraoperatively and repaired, no mortality. Of the two whose injuries were discovered after operation, one (50%) died. The primary cause of death was ventricular dysfunction resulting from myocardial ischemia. Dissections originated at the aortic cannulation site in two patients, at the cross-clamp site in one patient and a result of direct injury in one, at the proximal anastomosis in one patient, at the site of the partial-occlusion clamp in one patient. Two techniques of repair were used: primary repair and patch or tube graft insertion. There were no death in the patients who underwent primary repair and two deaths in patients requiring graft replacement.
Results: Four of the patients' coronary artery surgery, one of the patient aortic valve surgery and one of the patient mitral valve surgery performed after that occurred aortic dissection. Four of the patients diagnosed intraoperatively with Type A dissection (stanfort clacifation), one of the patients was sudden aortic rupture and after that developed death. One of the patients was developed gross drainage in ICU unit that emergently back to operation room for surgery. The entire patient was performed operation under cardio-pulmonary bypass. One of the patient performed under total circulatory arrest and deep hypothermia that performed supracoronary bypass graft interposition. The other patients performed under cardiopulmonary bypass and performed local graft for aortoplasty.

Conclusions: The mechanism of dissection could be explained by the direct examination of the aortic wall specimen especially seen of the calcification aortic portion, related with arterial cannulation place, and avoid this area for proximal anatomizes and side aortic clamp application. Aortic dissection should be prompt early diagnosis and this segment replaced with appropriate graft. Keeping in mind the same principle like for an acute aortic dissection.

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ENCIRCLING ALL OF THE HEART BY BONE CAGE DUE TO CHRONIC CONSTRICTIVE TUBERCULOUS PERICARDITIS

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Objective: The frequency of tuberculous pericarditis has diminished in recent years, paralleling the reduction in incidence of pulmonary tuberculosis. Tuberculosis is responsible for approximately 10% of instances of constrictive pericarditis.
Methods: Large calcific pericardial deposits are specific signs for pericardial tuberculosis. The calcific deposits may vary in size from microscopic to massive, encircling all or most of the heart and readily visible by radiographic examination. In this study we are presenting a massive calcific pericardial heart disease due to tuberculosis and encircling all of the heart.
Results: We are reporting the pathogenesis, clinical and surgical indications for operation, and the prognosis.
Conclusions: Conventional open pericardiectomy via the median sternotomy, which enables a safer, wider, and more effective approach and it relieved the symptoms and altered the hemodynamic findings.

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CORONARY ARTERY BYPASS SURGERY IN HEMODIALYSIS DEPENDENT END STAGE RENAL DISEASE PATIENTS: THE RESULTS OF CONVENTIONAL CORONARY ARTERY BYPASS AND BEATING HEART CORONARY ARTERY BYPASS SURGERY

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Objective: Cardiovascular disease remains the most frequent cause of death for patients with end-stage renal disease. The aim of this study was to analyze the perioperative and short-term results of surgical revascularization in this high-risk population and to determine the potential benefits of off-pump CABG for hemodialysis patients. We used ESRD patients with a diagnosis of coronary artery disease who did not have surgical revascularization or percutaneous coronary interventions.
Methods: From April 2001 through October 2006, 21 patients with end-stage renal disease who were on hemodialysis underwent CABG. The off-pump group consisted of 11 patients and the on-pump group consisted of ten patients. Preoperative risk factors and operative results were analyzed, and longitudinal survival data obtained.
Results: Patient's demographics and coronary risk factors were similar in off-pump and on-pump groups. The total number of anastomoses per off-pump patient was 1.73±0.65, and with cardiopulmonary bypass it was 2.10±0.74 (*P*=not significant). There were one hospital death in the on-pump group and none in the off-pump group. The postoperative complication rate was low in both groups. The length of intubation time was shorter in the off-pump group but not statistically different from the on-pump group. Postoperative ICU stay and hospital stay were significantly shorter in the off-pump group than in the on-pump group.
Conclusions: In the context of coronary artery bypass surgery both procedures can use with low morbidity and mortality in patients undergoing chronic dialysis. OPCAB produced better outcomes than conventional CABG procedure and seems to offer a greater benefit to dialysis patients.

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ANALYSIS OF COST ENTER ON-PUMP AND OFF-PUMP CORONARY ARTERY BYPASS PROCEDURES

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Objective: One of the most important facts is effecting the health politics of a country is the influence of the applied treatment on the cost. All of the centers around the world are trying to reevaluate their techniques and applications for better patient care while decreasing the costs.
Methods: The study is a prospective non-randomized study. Data of 294 patients who have been operated in our clinic for coronary artery disease were prospectively collected between March 2001 and through July 2005. There were 147 patients in conventional CABG group (Group 1), and 147 patients OPCAB group (Group 2). Operation team and perfusionist team were the same for both of the groups. For total cost calculation preoperative, operative and postoperative unit cost was calculated for every patient separately and these parameters were accepted as variable parameters. Variable and fixed direct costs were including bed distraction (nursery service) cost, operation room cost, transfusion cost, postoperative intensive care unit cost, and postoperative complication costs and these were calculated separately.
Results: With on-pump procedure; the operation time, ventilatory support duration, and intensive care unit stay decrease. These allow the early discharge and also minimize the productive power lost. The main parameters determined in our study showed that off-pump procedure can be performed much more economically than the on-pump procedure.

	On-pump	Off-pump	*P*-value
Service cost ($)	404.1	214.6	0.002
CPB cost ($)	510.1		
Blood transfusion ($)	166.7	122.8	<0.001
Suture cost ($)	106.1	48.2	<0.001
Anesthesia ($)	500.1	497.3	NS
Procedure cost ($)	958.6	724	0.002
Intensive care unit cost ($)	1486.7	704	0.001
Total cost ($)	4135.3	2312.7	0.001

Conclusions: Besides the safety of a procedure, cost of the technology is a also important and must be taken into consideration. Moreover, a new method that decreases the cost must also aim to decrease the morbidity and hospitalization.

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POSTOPERATIVE COMPLICATIONS IN HEMODIALYSIS-DEPENDENT END-STAGE RENAL DISEASE PATIENTS AFTER CORONARY ARTERY BYPASS SURGERY

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Objective: Our study's purpose is; to investigate the complications in the time of postoperative that occur on renal failure patients who are addictive to dialysis and on whom the method of conventional and coroner arter revascularization are carried on beating heart and their effects on morbidity and mortality.
Methods: From April 2001 through October 2006, 21 patients with end-stage renal disease who were on hemodialysis underwent CABG. The off-pump group consisted of 11 patients and the on-pump group consisted of ten patients. We encountered five morbidity in 21 patients.
Results: The most founded morbidity; was atrial fibrillation. All the patients who entered atrial fibrillation turned to sinus ritm with pharmacologic therapy. The complication about neurologic system, infection and myocardium infarctuse were not found. Early mortality was found in one case. A patient on whom a method of conventional revasculiration was carried, was lost because of pulmonary failure in postoperative early period (ARDS). The tests of patient about pulmonary function in preoperative period was showing a further lung illness mark. This patient was lost because of pulmonary failure in the fifth days of postoperative period.
Conclusions: The fact of success of coronary artery bypass surgery has brought up with it the fact of reality that this kind of surgery can be carried on the patient of other illness also with success. We are in the belief that the rate of morbidity and organ dysfunction that are carried on the patient who are operated with the procedure of coronary artery bypass that is determined in beating heart which shows a meaningful decrease in patients of high-risk group.

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OUR BRUCELLA ENDOCARDITIS CASE WHICH WAS DIAGNOSED THE MITRAL KISSING/STALLIT VEGETATION

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Objective: Vegetations which are the most wanted invention for the echocardiographic diagnoising in the time of infective endocarditis impulsives can be displayed in the rate of 13–18% and give clinic symptom in a rate of 10–50%. Because the vegetations generally occur on the side of valve on which the current speed is low when settling on the face of ventricular cover in aort failure, can show mitroaortic expansion rarely. This special settling form that cover both aort and mitral stoppers on ventricular face are called as 'kissing/stallit vegetation'.
Methods: Our case was a man who was dealing with animal breeeding at the age of 58. He was dealing his triple antibiotherapy by taking the Brucella diagnosis with the specific symptomatology and positive serologic tests in our Infection Clinic. In his echocardiografic evaluation, besides mobile mass lesions which are compatible with vegetations on the left and noncoroner leaflets of aort valve, 3. ° aort and mitral and 2.° tricuspit regurgitation were determined. Besides all these ones, in his abdominal CT splenic infarctus and hipodensitey that is thought as secondary visual were determined. The coroner angiogram of him was found normal.
Results: The patient whose medical therapy completed was taken to operation. In the peroperatuar exploration after aortotomy, besides right coroner leaflet perforation complication multiple vegetations also observed on the left coronary leaflet. Both of the leaflets were destructed. In the native aortic valve excision aorticomitral anulus resultant a pocket forming was observed as a consequence of abcess destruction. There was also another diagnosis after the left atriotomy which was a serious failure as a retraction at mitral posterior leaflet. With mechanic bileaflet valves, AVR+MVR (St. Jude) was carried on our patient. On the tenth day of postop, dual antibiotherapy was continued on the patient who was discharged with surgical cure about six week and by the 6th month of postop in control echo mechanic valves were discovered as normofunctional.
Conclusions: Brucella infection is an important health problem for our country. Its rare complication endocarditis is fatal and it continues morbid. In all infective endocarditis cases included Brucella, their being easy, cheap, noninvasive and repeatibility are very important in the appointment of therapy protocol forming and ecocardiography in the mortality and morbidity appointment of patient. Because the serious destruction that it formed on the valve we are in the belief of its success on the radical therapy of it besides the surgical therapy of antibiotherapy.

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A RIGHT CORONARY ARTERY FISTULA DRAINING INTO THE RIGHT ATRIUM ASSOCIATED WITH MITRAL VALVE STENOSIS: THE FIRST CASE IN LITERATURE

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Objective: Coronary artery fistulae, being a rare form of congenital anomalies of the coronary arteries, are usually abnormal communications between a branch of coronary artery and the four cardiac chambers or a major vessel. The incidence is accepted as 1:50.000 live births and they are diagnosed in approximately 0.2% of the adult population undergoing coronary angiography. In reviewing the literature, the coincidence of mitral stenosis and congenital artery fistula (CAF) is rare.
Methods: In this study, we report a CAF case associated with mitral valve stenosis. A connection between right coronary artery and right atrium was detected by coronary angiographic study performed before valve replacement surgery+surgical radiofrequency ablation on the patient who had only dyspnea and fatigue complaints.
Results: Among the case presentations that represent coronary artery anomalies associated with mitral valve disease, there is no any fistula opening into right atrium. After surgical repair, the occluded fistula and normal coronary anatomy were diagnosed in the coronary angiography postoperative one month.
Conclusions: This pathology can be diagnosed more frequently if coronary angiography is performed simultaneously with cardiac catheterization to evaluate valve functions or myocardial ischemia not due to atherosclerotic etiology, in each valvular heart disease case. Surgical repair of CAF is satisfactory and to prevent probable complications and improve the quality of life, it is the first choice.

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AORTIC VALVE DISEASES AND ITS SURGICAL TREATMENT

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Objective: The aim of research: to estimate results of aortic valve at rheumatic heart diseases.
Methods: Since 2001 – 2006 were executed 62 prosthesis of aortic valve at its rheumatic defeat. Men - 56, women - 6, at the age of 35.7±11.8 years. Thirty-nine patients had insufficiency of aortic valve, 23 had combined aortic defect with prevalence of a stenosis. One-folding artificial limbs have been implanted to 44 patients ('Liks N 20' - 7, 'Liks N 22' - 12, 'Liks N24' - 17, 'Liks N26' -6, 'EMIKS N25' - 2), two-folding to 12 patients ('Carbonics N22'-4, 'Carbonics N24' - 4, 'Carbonics N26' - 2, 'MedIng N23' - 1, Carbomedics 23 - 1). To six patients are implanted bioprosthesis 'Carpentier-Edwards' firms Baxter (19-1, 21-1, 23-4). Time bypass has made 110.8±44.3 min, occlusion of aorta 80.9±32.9 min, temperature of cooling 30.8±2.0 °C. In 54 cases it is executed selective cardioplegia in coronary arteries, in eight cases retro cardioplegia through a coronary sine.
Results: At one patient after the basic stage, interoperated, jamming a mechanical artificial limb that has demanded repeated pressing of aorta and re-implantation a biological artificial limb has been marked. In two cases the technique of enlarging a fibrous ring on Manouguian-Seybold-Epting has been executed, in one case was used Nicks method. In 14 cases are implanted artificial limbs of small diameters 'Carpentier-Edwards' N19 - 1, 'Liks N20-2', 'Carpentier-Edwards' N21 - 3, 'Liks N22' - 8. In two cases regarding to calcinosis of aortic valve of the IV degree were done supra-annular sewing ring (Top-Hat) with flange on outflow. On echocardiography it was marked that at these patients peak prosthesis the gradient after operation has made on the average 35.1±9.5 mmHg. At patients implanted artificial limbs more than 23 mm the peak gradient was equaled 21.3±5.5 by mmHg.
The result of operation of 60 patients is recognized satisfactory. Hospital lethality has made 3.2% (2).
Conclusions: Results of aortic valve at rheumatic heart diseases was estimated and we came to conclusion that such factor is actual to our region.

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FIRST FIBRO-AORTIC RING ENLARGING OPERATIONS REGARDING TO AORTIC VALVE DISEASE

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Objective: The aim of research: to evaluate first results of enlarging of the fibro-aortic ring in the case of aortic valve replacement.
Methods: There were done 62 aortic valve replacements in the case of rheumatoid disease. Men – 52, women – 10 at the age of 35.7±11.8 years old. The 39 of them had aortic regurgitation, 23 had combined aortic disease with stenosis. All patients were operated on open heart. The oneleaflet prosthesis were implanted to 44 patients, bileaflet – to 12 patients. Six patients were implanted bioprosthesis 'Carpentier - Edwards' of the Baxter.
Results: From 2004 first time in our Center were done operations as the methodic of enlarging of the fibrotic root of aorta. In two cases were used the methodocs of Manouguian-Seybold-Epting, in one case was used the Nicks method. In 14 cases were replaced prosthesis with small diameter 'Carpentier-Edwards' N19-1, 'Liks'N20-2, 'Carpentier-Edwards' N21-3, 'Liks'N22-8. The time of bypass was 110.8±44.3 min, occlusion of the aorta 80.9±32.9 min, the freezing temperature 30.8±2.0 °C. In 54 cases were done selectional cardioplegia into coronary arteries; in eight cases were done retrogradic cardioplegia through the coronary sinus. The results of research: in one case fibro-aortic ring was employed by a dacron patch which was fixed by lonely stitches in combination with uninterrupted (continuous) stitch. In another case was used csenopericardic patch («Kem-kor»), which was fixed by interrupted stitch. In one case was used autopericardic patch. In two cases at while operation period appeared bleeding caused of blood's percolation through synthetic patch. That is why the blood coming from drainages was received by cell saver C.A.T.S 'Fresenius', became clear and this Er-mass pour in back in to vein of patient. The echocardiography showed that in these two cases peak

gradient of valve became 21.3±5.5 mmHg after operation. In cases where were implanted prosthesis with 21 mm diameter this peak gradient was 40.1±5.5 mmHg. In 60 cases the results of operations were satisfactory. The mortality was 3.2% (2).
Conclusions: Operations in cases with high transaortic gradient of implanting prosthesis should be done at the root of aorta. In the case when fibrotic ring of aorta is too narrow there should be done one of the methods of fibrosis broadening.

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EFFECTS OF ATYPICAL PNEUMONIA AGENTS ON PROGRESSION OF ATHEROSCLEROSIS AND ACUTE CORONARY SYNDROME

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Objective: To investigate the presence of various atypical pneumonia agents (Chlamydia pneumoniae, cytomegalovirus, Mycoplasma pneumoniae), which are considered to have a role in ethiopathogenesis of atherosclerosis, in aortic biopsies without macroscopically visible plaque and in internal thoracic artery biopsies.
Methods: Thirty-three patients (Group 1), who had undergone coronary bypass operation and ten nonatherosclerotic patients (Group 2), were included in the study. Seventy-six tissue biopsies were taken for this study. Biopsies from the patients in Group 1a were obtained from atherom plaque free aortic tissue and 33 biopsies (Group 1b) were obtained from their internal thoracic artery. Following DNA extraction, nested PCR was used to detect Chlamydia pneumoniae DNA and real time PCR was used to detect cytomegalovirus and Mycoplasma pneumoniae DNA. Moreover, blood parameters of the patients, like lipid profile, CRP, fibrinogen and characteristics of the patient's operation were recorded.
Results: Chlamydia pneumoniae DNA was detected in five of 33 biopsy samples from coronary bypass patients, whereas, none of the control patients were positive for this agent (P=0.001). Neither CMV nor Mycoplasma pneumoniae was detected in IMA and aortic biopsies of both bypass and control patients. Elevated total cholesterol levels (P=0.02) and positive CRP (P=0.001) was found in C. pneumoniae positive patients. Prevalence of acute coronary syndrome was significantly higher in C. pneumoniae detected patients compared (P=0.001).
Conclusions: Detection of C. pneumoniae DNA in atheroma free aortic biopsies obtained might indicate that this microorganism assisted in progression of atheroma plaque. There was a strong relationship between detection of this microorganism in aortic wall and acute coronary syndrome. The absence of the DNA of corresponding microorganisms in IMA wall may show its resistance to infective agents and so to atherosclerosis, which is a result of the prevailing endothelial functions of this artery.

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BIATRIAL MYXOMA: AN EXCEPTIONAL CASE IN CARDIAC SURGERY

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Objective: We review our experience of the successful management of a large biatrial myxoma in a middle-aged woman. This particular case is especially interesting because both stalks originated from opposite sides at the same point of the atrial septum and it is possible that the myxomas grew evenly - one in the right atrium, the other in the left. Therefore, one can say that they are myxomas- twins.
Methods: Previously healthy 63-year-old woman was referred to the heart surgery center after transthoracic echocardiography which showed in the left and right atriums large tumor masses. This woman had the history of progressively worsening exertional dyspnea lasting six months. The patient was scheduled for an operation. Operation was performed via median sternotomy, under extracorporeal circulation, using standard aortic and bicaval cannulation and moderate hypothermia. Myocardial protection was achieved by antegrade blood cardioplegia.
Results: When a longitudinal right atriotomy was performed, we found an elastic mass in the right atrial with a short stalk attached to the interatrial septum, close to the fossa ovalis. The interatrial septum was incised and from the opposite side it was found that both stalks were grown together. On closer inspection, one can sumise that they had developed from a single point. A resection of the right stalk was made along with the entire zone of attachment, and the right myxoma was removed. The mass from the left atrium was then completely removed through the thus created atrial septal defect. The artificial atrial septum defect (4.5 cm in diameter) was then closed with a Goretex patch, and closure of the right atriotomy was achieved. After measurements it was observed that the left atrial myxoma had a diameter of 70x60 mm and the right one diameter was 68x58 mm. Histological examination revealed myxoma with no signs of malignancy. The patient's postoperative course was uncomplicated. For the above described patient the diagnosis was clearly and precisely established by the two-dimensional echocardiographic examination. The same diagnosis was confirmed by MRI and findings during the operation.
Conclusions: Cardiac myxomas are benign intracavitary neoplasms. The majority (75%) occur in the left atrium, biatrial myxomas are extremely rare.

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FIRST EXPERIENCES WITH 'OMNEX' IN CARDIAC SURGERY

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Objective: Calcified aortic walls might put surgeons in trouble because it can be difficult to close after aortic valve procedures. Some surgical sealants are on the market but they are not strong enough to seal aortotomy suture line reliably. 'Omnex' is a new surgical glue to prevent bleeding from critical suture lines.
Methods: 'Omnex' was used in 22 patients to seal aototomy suture lines in severely calcified aortic walls. Eighteen patients underwent standard aortic valve replacement, three patients underwent replacement of the ascending aorta and one patient underwent Bentall´s procedure. Rate of rethoracotomy, chest tube loss after 24 h and demand of blood platelet units was measured.
Results: No patient died. There was no rethoracotomy in this group. All suture lines where reported as 'primarily dry'. Chest tube blood loss was 817±386 ml. Mean demand of blood units was 2.3 per patient, mean demand of platelets was 0.7 units per patient.
Conclusions: Preliminary data for 'Omnex' suggests that it is a powerful and highly effective surgical sealant that is able to reinforce and to achieve hemostasis along critical suture lines in cardiothoracic surgery.

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COMPARATIVE DATA OF DIFFERENT TYPES OF STENTLESS BIOPROSTHESES: BIOMECHANICAL AND HEMODYNAMIC ASPECTS

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Objective: This study was performed to assess biomechanical and hemodynamic effects of stentless bioprostheses in aortic valve disease surgery (in elderly patients).
Methods: Stentless bioprostheses were implanted in 33 patients with isolated aortic valve disease between 2002 and 2006 in clinic of cardiovascular surgery. All patients were retirees (the mean age being 60±7.3 years). We implanted stentless xenografts Medtronic Freestyle in 21 patients, AB-Mono-Kemerovo and AB-Composite-Kemerovo in 12. Degenerative aortic stenosis was indication in 27 cases, whereas aortic insufficiency due to infective endocarditis in six patients. We used subcoronary technique with coronary sinuses excising in 27 patients and fool root technique in six cases.
Hemodynamics and biomechanical results were assessed with transthoracic and transesophageal echocardiography (Sequoia Acuson XP - 128).
Results: Circular precommissural deformations of leaflet in patients after subcoronary implantation were higher (0.55) than the same figure in patients after full root technique (0.33). Index of radial leaflet deformations was higher too (35–38%)
The mean pressure gradient (Pmean) in hospital 13.6±1.8 mmHg and four year after Medtronic Freestyle bioprosthesis (23 mm) implantation - 11.2±2.3 mmHg. The mean pressure gradient (Pmean) in hospital 11±1.6 mmHg and four year after Medtronic Freestyle bioprosthesis (25 mm) implantation - 10.2±2.5 mmHg. In patients with xenografts AB-Mono-Kemerovo the mean gradient amounted to 12±1.6 mmHg, whereas Pmax in patients with AB-Composite-Kemerovo was 7 mmHg, respectively.

Conclusions: Initial experience in aortic valve replacement with the stentless bioprostheses showed their good hemodynamic efficiency. However, only long-term follow-up will determine valve durability and bacterial resistance of stentless bioprostheses, but nevertheless their usage seems to be perspective.

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MITRAL VALVE REPAIR WITH DIFFERENT TYPES OF PROSTHETIC RINGS: BIOMECHANICAL AND CLINICAL ASPECTS

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Objective: Annuloplasty rings are used to treat mitral regurgitation (MR), but their exact effects and influence of different types of the rings on LV geometry and the overall mitral valve complex during long-term follow-up remain uncertain.
Methods: From November 2002 to December 2006, 37 patients (26 males, 11 females) were operated on for mitral regurgitation of different ethiologies (degenerative process – 17, infective endocarditis – 8, posttraumatic cords rupture – 1, congenital – 1). All patients were divided into two groups (1 – implantation of rigid prosthetic rings - 17 patients), 2 – implantation of semirigid prosthetic rings - 20 patients). Patients were in New York Heart Association class II-III with grade II-III mitral regurgitation (2.3±0.7). Mean age was 33.1 years. All interventions were performed through the right sided thoracotomy into the fourth intercostal space as less traumatic approach. While performing preoperative transECHO studies the changes of the leaflets were evaluated using developed protocol based on precise Lam's anatomical classification of the MV. Patients with infective endocarditis were operated during 2–4 weeks since the onset of the disease. Mitral valve repair was performed in all patients.
Results: Hospital mortality was 2.7%. During one year after operation one patients was reoperated (repeat valvuloplasty with suturing of paravalvular leak). Trivial residual mitral regurgitation observed in three patients.
Doppler parameters in patients with different types of rings after six months (P<0.05). Peak velocity (m/s): rigid - 2.2±0.5; semirigid - 1.7±0.3. Mean gradient: rigid - 4.2±1.4 mmHg; semirigid - 3.6±1.1 mmHg.
Conclusions: 1) Mitral valve repair with prosthetic rings for mitral regurgitation can be performed with low mortality and good valve function. 2) Using semirigid prosthetic rings are more physiological.

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MITRAL VALVE REPAIR WITH POSTERIOR LEAFLET OF THE TRICUSPID VALVE: ANATOMICAL CONSIDERATIONS

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Objective: Different complicated types of mitral valve lesions are still out of reach pf conventional repairs. Transferring of the posterior leaflet of the tricuspid valve with its sabvalvular apparatus for the reconstruction of the mitral valve is a new autograft technique which allows to make MV repair in cases where its less predictable.
Methods: We fulfilled 60 anatomical experiments with removing of the middle scallop of the posterior leaflet of the TV with its subvalvular apparatus and examined its structure with particular regard to the subvalvular apparatus. After being excised 'en bloc' the tricuspid autograft (leaflet, cordae and papillary muscle) was implanted into mitral position for reconstruction of as follows zones (anterolateral commisures – four cases, posteromedial commisures – four cases, P1 – 3, P2 – 3, P3 – 3). The tricuspid valve was subsequently repaired by annular plication and leaflet suturing.
Results: Feasibility of repair was accessed after inspection of TV. Special attention was paid upon the subvalvular apparatus of the tricuspid valve which was of three types: I- presence of two papillary muscles of posterior leaflet of TV 14 (23.3%), II- presence of one papillary muscle of posterior leaflet of TV 28 (46.7%), III- absence of papillary muscles of posterior leaflet of TV 18 (30%). In cases of absence of papillary muscles of posterior leaflet of TV (type III) all the cords were attached to the right ventrical wall and anterior papillary muscle of the anterior leaflet. In the study we had found that there are limitations of using tricuspid autograft in all cases, because of the structure of its subvalvular apparatus.
Conclusions: Mitral valve lesions that are out of reach of conventional repair techniques can be repaired by tricuspid autograft transferring. It can be done in cases of I and II types of structure of subvalvular apparatus of posterior leaflet of TV.

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FIRST EXPERIENCE OF AORTIC VALVE-SPARING OPERATIONS FOR AORTIC ROOT ANEURYSM WITH AORTIC REGURGITATION

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Objective: Aortic root aneurysm in many cases combines with aortic valve insufficiency. Aortic regurgitation may come out from both morphological changes of aortic valve leaflets and dilatation of aortic valve ring, sinuses of Valsalva and sino-tubular junction. In 1992 David and Feindel proposed valve-sparing operations for treatment of patients with dilated aortic valve ring, sinuses of Valsalva, sino-tubular junction and unaltered aortic valve leaflets. This method consists in aortic root prosthesis and reimplantation of aortic valve into vascular graft. Advantages of this method are low incidence of prosthetic valve-related thombosis and thromboemboly, infectious endocarditis and lower risk of bleeding concerned with inadequate anticoagulation therapy.
Methods: From May to September, 2006, in our center were performed six operations by Tirone David I method. Patients' age ranged from 22 to 64 (mean age 51.33±15.22). All patients had aortic root aneurysm with dilatation of aortic valve ring, sinuses of Valsalva and sino-tubular junction combined with severe aortic regurgitation and safe aortic valve leaflets. All patients had normal or moderately low LVEF and no significant concomitant pathology. In addition to David procedure two patients required mitral annuloplasty due to severe mitral regurgitation, one patient underwent CABG of LAD.
Results: All patients survived. One patient required reoperation owing to bleeding in early postoperative period. In one case Q-MI of lower LV wall diagnosed postoperatively, LVEF was safe. Further period in all patients was without peculiarities, all wounds healed primarily. Histological examination showed cystic medionecrosis in three cases (50%) and aortic wall atherosclerosis (50%) in three cases. Before discharge every patient underwent ultrasound examination which showed aortic regurgitation 0-1 grade. Two patients were examined six months later: one had minor aortic regurgitation, another – moderate aortic regurgitation, LV size significantly decreased. No one had neurological events, thromboses of infectious complications.
Conclusions: Valve-sparing operations are safe for treatment of patients with aortic root aneurysm combined with aortic regurgitation and unaltered aortic valve leaflets. Further research is required to estimate distant results of valve-sparing operations.

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LONG-TERM OUTCOMES AFTER ISOLATED CORONARY ARTERY BYPASS GRAFTING AND CONCOMITANT DOR PROCEDURE FOR LEFT VENTRICULAR RECONSTRUCTION IN PATIENTS WITH SEVERE VENTRICULAR DYSFUNCTION

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Objective: Controversy still exists regarding the optimal surgical technique for treatment of patients with coronary artery disease (CAD) and severe LV dysfunction. The aim of this study was to evaluate and compare functional status, according to the NYHA functional class, at long-term follow-up period after isolated coronary artery bypass grafting and concomitant Dor procedure for LV reconstruction.
Methods: We retrospectively analyzed two groups of patients with CAD and LV dysfunction: 1 g – 216 consecutive patients with mean LVEF 31.01±5.1%, who underwent CABG alone; 2 g – 135 consecutive patients with LVEF 32.8±8.7%, who underwent Dor procedure for LV repair and concomitant CABG. We compared NYHA functional class, mean LV diastolic dimension (LVdd) in these groups at long-term follow-up period.
Results: At follow-up patients clinical symptoms improved and were in better mean NYHA functional class with respect to the preoperative value. In 1 g NYHA functional class improved from 3.3±0.5 to 2.49±0.5 (P<0.001) at one year postoperatively. In NYHA functional class I-II were 51% of patients at one year, 40% of patients after three years and 33% after seven years postoperatively. Mean LVdd increased from 6.02±0.63 to 6.98±2.1 cm at late follow-up period. In II group NYHA functional class improved from 3.47±0.58

to 2.31±0.47 (P<0.001) at 1 year postoperatively. In NYHA functional class I-II at 1 year postoperatively were 60.3% of patients, and after five years postoperatively – 47.5% of patients. Mean LVdd remained unchanged at late follow-up period: 6.37±0.84 cm vs. 6.22±0.40 cm (P=0.32). Benefit from isolated CABG is time limited with large percentage of patients eventually developing recurrent or persisting heart failure symptoms.
Conclusions: We have demonstrated that the functional status of patients with severe LV dysfunction at late follow-up period after isolated CABG remains suboptimal and is inferior to CABG plus ventricular restoration.

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THE PLACE OF CORONARY ENDARTERECTOMY IN SINGLE HEART SURGERY CENTER

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Objective: To review and summarize the outcomes and clinical experience of coronary endarterectomy and bypass grafting for patients with diffused coronary artery disease.
Methods: We retrospectively reviewed 92 cases of patients who underwent adjunctive coronary endarterectomy between January 1988 and January 2006. Coronary artery disease treated with combined endarterectomy and coronary artery bypass grafting. Endarterectomies were performed on the LAD 27.2% circumflex artery 15.2%, right coronary artery 53.2%, diagonal artery 4.4%. The mean number of distal anastomoses was 3.62 per patients.
Results: During follow-up mean 82 of survivors were asymptomatic or in improved condition. The early mortality was 3.26%.
Conclusions: Coronary endarterectomy and bypass grafting is feasible and can be performed safety in patients with diffused coronary artery disease with increased completeness of myocardial revascularization.

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THE INFLUENCE OF BETA BLOCKER ON PARASYMPATHETIC NERVE ACTIVITY

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Objective: We previously reported that aging and disease state relate to the cumulative parasympathetic nerve system (PNS) activity per day. Based on pervious findings, we investigate whether methods that increase PNS activity would improve the condition of disease, especially β-blocker administration.
Methods: Ten healthy 22–24-year-old volunteers underwent measurement of every RR interval over 24 h by Holter ECG as a control study. On another day, the same subjects took 60 mg long-acting propranol every morning as an experimental study and RR intervals were measured by the same method. Measured RR intervals were divided into continuous ten minutes intervals and PNS activity was analyzed by the Coarse Graining Spectral Analysis method for each period. Calculated PNS activity was defined as the mean value for the period and those values were accumulated over 24 h as the cumulative PNS activity per day.
Results: The cumulative PNS activity per day was 15.12±3.78 on the experimental day and 12.85±2.36 on the control day and a significant difference (P<0.0258) was recognized in both groups on statistical analysis. Subjective feelings of vigor on the Profile of Mood State test was 5.31±2.83 on the experimental day and 2.97±2.10 on the control day. There was a significant difference (P<0.0088) between the two groups.
Conclusions: Large scale research on the effect of beta-blocker medication after myocardial infarction showed improvement in the prognosis. In 2004, Meihau Li et al. reported that vagal nerve stimulation by an electric pacemaker improved the prognosis after experimental myocardial infarction in rat. However, neither report clarified the mechanisms of these effects. From our past experimental finding that aging and disease condition affect cumulative PNS activity per day, we suspect that any method of enhancing PNS activity may improve the disease condition in heart failure. In this experiment, beta-blocker medication evidenced the enhancement of PNS activity and the improvements described the reports sited above may depend on the enhancement of PNS activity. During critical period such as an impending life crisis, the tension and energy supply needed to recover place demands that enhance sympathetic nerve system (SNS) activity. During recovery from such crisis, excess activation of SNS may exhaust the reserved recovery power and may negatively influence the prognosis. We must consider actively using methods of enhancing PNS such as beta-blocker to promote recover and encourage patients during postoperative care after open heart surgery.

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COARCTATION OF THE AORTA ASSOCIATED WITH LEFT SUBCLAVIAN ARTERY ANEURYSM

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Objective: Aneurysm of left subclavian artery in association with coarctation of aorta is a rare phenomenon especially in the younger population. Occasional reports have been presented from the adult population and aortic/aneurysmal complications were suggested to be <3% of the patients with coarctation under the age of 20. We present a 19-year-old male patient with coarctation of the aorta associated with left subclavian artery aneurysm.
Methods: A 19-year-old male patient was admitted for lower extremity varices. Upon physical examination, he was severely hypertensive and his lower extremity pulses were nonpalpable. Plain chest radiogram showed intercostal notching and a pale, nonspecific opacification of the left superolateral aspect of the aortic arch. Digital substraction angiography demonstrated severe coarctation of the aorta and a 45 mm left subclavian artery aneurysm.
Results: A left posterolateral thoracotomy from 4th intercostal space was performed for surgical exposure. Upon aortotomy, a discrete ring-like coarctation tissue was observed in the aorta just below the level of the subclavian artery orifice. Complete excision of the coarctation tissue was followed by aortoplasty with Dacron patch. Additionally, the subclavian aneurysm was completely excised and a 10 mm Dacron (Gelweave, Sulzer Vascutek, Renfrewshire, Scotland, UK) tube graft interposition was performed. Patient was extubated at postoperative 2nd hour and discharged on day six after an uneventful postoperative period on antihypertensive medication.
Conclusions: Isolated aneurysms of subclavian artery are rare in especially teenager/young adult population and usually associated with atherosclerosis or thoracic outlet syndrome. Aneurysms associated with coarctation, however, involves aorta itself or are related to high pressure proximal to the coarctation if not mycotic. They may result in significant morbidity/mortality if left untreated. Prompt diagnosis and surgical treatment in particularly hypertensive patients such as ours precludes a significant risk of rupture and compression of adjacent structures usually observed in these patients.

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SUCCESSFUL CARDIAC AUTOTRANSPLANTATION FOR SURGICAL TREATMENT OF GIANT LEFT ATRIUM, SEVERE MITRAL AND TRICUSPID REGURGITATION AND SEVERE HEMODYNAMIC DISTURBANCES

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Objective: Arrythmogenic remodelling of left atrium is a common complication of atrial fibrillation, leading to severe hemodynamic disturbances. Different methods left atrium walls suture plication are widely used as a surgical option for atriomegaly treatment and sinus rhythm recovery. These techniques may also be accomplished by Cox-Maze procedure. Unfortunately, these operations, sometimes, are not effective. In such cases autotransplantation may be used as an alternative.
Methods: A 60-year old woman had severe thyreotoxic craw and persistent atrial fibrillation since 1984. Since 2003 - shortness of breath after minimal physical activity, oedema. In December 2005 the patient was admitted to therapeutic department of V.A. Almazov Research Institute of Cardiology with severe congestive heart failure NYHA class IV. Massive combined therapy decreased NYHA class to III. Echocardiographic data revealed severe mitral, tricuspid regurgitation and dilatation of heart chambers: LA – 106x110 mm, LA volume – 810 ml, LVEDD – 69 mm, LVESD – 38 mm, EF – 75%, mitral valve annulus – 50 mm, tricuspid valve annulus - 48 mm. PA pressure – 68 mmHg. The patient was selected for cardiac autotransplantation surgical treatment. Bypass time - 194 min, cross clamp time - 164 min.

Results: Early postoperative period was stable, without complications. Echocardiographic data three months after surgery: LA – 60x76 mm, LA volume – 175 ml, LVEDD – 59 mm, LVESD – 41 mm, EF – 57%, PA pressure – 45 mmHg, no mitral and tricuspid regurgitation. Bradycardia with HR 40–50 developed six weeks after surgery. ECG data revealed AV node rhythm (40 beats per minute), atrial asystolia. Holter ECG monitor registrated several 4-s pauses during 24 h. The patient was selected for DDDR pacemaker placement. Early postoperative period was stable.
Conclusions: This case report demonstrates modern opportunities for surgical remodeling of left atrium, complicated by valve disease. We are sure that success of this operation is an achievement of all surgical team, using of anesthesia and bypass guidelines, postoperative intensive care management and adequate surgical technique.

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ALLOMETRIC GROWTH OF HEART VALVES IN HEALTHY CHILDREN

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Objective: To study the growth of heart valves in healthy children.
Methods: Cardiac morphometrical data of 1447 healthy children who died from noncardiac causes at the age of 0–15 years were analyzed (Schulz D.M., Giordano D.A., 1962). We created parametric models of dependence of the following characteristics on children's age and height: ratio of each valve perimeter to its initial size (P/Po) and ratio of each valve perimeter to body height (P/H).
Results: Based on the data of cardiac valves growth in accordance with children's development (P/H) we identified three distinctive periods with: 1) valve growth outpacing body growth, 2) delay between valve and body growth and 3) equal valve and body growth. First and second periods of allometric growth were longest for mitral and aortic valves and depended on gender. In girls their duration was less than in boys. We determined two periods while studying the pace of heart valves growth: 1) unequal enlargement with more rapid growth of semilunar valves in comparison with atrioventricular valves and 2) equal enlargement with the same growth pace of all heart valves.
Conclusions: Allometric growth of the heart valves in healthy children comprised three periods. Total duration of first and second periods depended on gender and differed for each valve. Heart growth after birth was characterized by outpaced development of semilunar valves compared to atrioventricular valves; that period lasted up to 28.7 months, thereafter the equal growth of all valves started.

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SEQUENTIAL GRAFTING WITH TANDEM PEDICLED INTERNAL THORACIC ARTERIES CONDUIT FOR MULTIPLE LEFT ANTERIOR DESCENDING CORONARY ARTERY LESIONS

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Objective: Over the last decade, percutaneous coronary intervention methods of myocardial revascularization have been applied progressively to patients with less and less attractive anatomical substrates. Therefore, an increasing number of the remaining patients present to surgeons with advanced and diffuse coronary artery disease (CAD) that requires coronary artery bypass grafting. The presence of diffusely diseased coronary arteries mandates complementary revascularization techniques to be employed. The multiple sequential anastomoses technique was suggested by some authors to be the first choice technique to ravascularize the entire left anterior descending (LAD) coronary artery system in the presence of the diffuse CAD.
Methods: A 54-year-old man was admitted with progressive post infarction angina not relieved by optimal medical therapy. Angiocardiography revealed moderately impaired left ventricular function, with severe triple-vessel disease including multisegment diseased LAD (four consecutive lesions up to 90% stenosis) supplying the well contracting myocardium. We have used vein conduit to graft the right coronary system. Although either pedicled left internal thoracic artery (ITA) or pedicled right ITA didn't have enough length for sequential grafting of the multiple diseased LAD, our strategy was lengthening of one arterial conduit with another arterial conduit. The lengthening conduit [a free, short segment (6–7 cm) of pedicled left ITA] was connected to the donor conduit (in situ pedicled right ITA) with an end-to-end anastomosis. With this tandem arterial conduit we have performed multiple sequential anastomoses on diseased LAD artery, using the route anterior to aorta. The pedicled right ITA grafted proximal LAD, while with added left ITA segment we have performed additional two anastomoses on LAD. Care was taken to anchor the pedicles precisely with stay sutures to prevent tension or buckling of the tandem conduit or anastomoses. The remnant of in situ pedicled LITA grafted the first marginal branch of circumflex artery.
Results: The patient's postoperative course and convalescence progressed without any difficulty, and he was discharged with no angina. A predischarge check angiogram done on 10th postoperative day showed patent tandem (in situ right ITA - free left ITA segment) arterial conduit and all sequential anastomoses. The patient has been on regular follow-up for 12 months, is in NYHA class I with a normal stress test.
Conclusions: We strongly believe that this technique is an attractive variation on bilateral pedicled ITA left-sided revascularization in cases of multivessel coronary artery disease, including LAD arteries with multiple lesions.

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25-YEAR EXPERIENCE WITH ENDARTERECTOMY FOR DIFFUSE CORONARY ARTERY DISEASE – IS IT WORTHWHILE?

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Objective: Despite its long history and development, coronary artery endarterectomy (CAE) still remains one of the most controversial methods in cardiac surgery. The aim of this study was to evaluate 25-year experience with CAE for treatment of diffuse coronary artery disease (CAD).
Methods: During the 25-year period (1981–2005), 20054 patients (pts) had coronary artery bypass grafting (CABG) procedures, including 1427 cases of CAE (7.1%). The mean age of the patients was 62.8±7.8 years, and 1024 patients (71.8%) were men. Eight hundred and twenty patients (57.5%) had sustained previous myocardial infarction, and ejection fraction of <30% was registered in 29.1% of patients (415/1427). Triple vessel disease was detected in 1186 patients (83.1%), left main stenosis in 186 (13.0%), and unstable angina in 506 patients (35.5%), while 912 patients (63.9%) were in NYHA class III or IV. For the left coronary artery system we have used extensive open CAE, with long arterietomies and on-lay patch bypass grafting. For the right coronary artery we preferred closed CAE (converted to the open one, if necessary). Single vessel CAE was performed in 1083 (75.9%) patients, double in 267 (18.7%) and triple in 77 (5.4%) patients. Till the end of 1997 myocardial protection was achieved by a single dose (up to 500 cc) of cold, crystalloid cardioplegic solution together with efficient topical cooling of the heart. Later on, myocardial protection was obtained by repeated doses of cold, crystalloid or blood cardioplegic solution combined with topical cooling (ice slush) of the heart.
Results: Hospital mortality was 5.7% (81/1427) and the postoperative infarction rate was 9.7% (138/1427). Inotropic support was necessary in 17.3% of patients (247/1427) and six patients (0.4%) required mechanical circulatory support beyond the intraaortic balloon pump. After a mean follow-up of 123.6 months (8–253), the actuarial survival rates were 82%, 70.5% and 61.5% at 5, 10 and 12 years, respectively. Freedom from recurrent angina was 83.5%, 73.3% and 63% at 5, 10 and 12 years respectively. There were 48 redo procedures during the follow-up period, with a mortality of 6.3% (3/48).
Conclusions: The results have supported CAE to be a worthwhile procedure in patients with diffuse CAD, despite somewhat higher hospital mortality and postoperative morbidity.

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EFFECTS OF SIVELESTAT SODIUM HYDRATE ON RESPIRATORY FAILURE AFTER THORACIC AORTIC SURGERY WITH DEEP HYPOTHERMIC CIRCULATORY ARREST

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Objective: The patients undergoing thoracic aortic surgery with deep hypothermia complicate frequent postoperative respiratory failure associated with systemic inflammatory response syndrome (SIRS). A specific neutrophil elastase inhibitor, sivelestat sodium hydrate (SSH) is reported to be an innovate therapeutic drug for acute lung injury. In this study we evaluate the protective effects of SSH on respiratory failure after thoracic aortic surgery with deep hypothermic circulatory arrest.

Methods: From January 1999 to April 2005, 79 consective patients underwent thoracic aortic surgery with deep hypothermia. Among them, 28 patients had postoperative respiratory failure, their PaO_2/FiO_2 (P/F) ratios were <150, including Stanford type A aortic dissection in 15 and thoracic aortic aneurysm in 13 patients. They were retrospectively randomized to two groups: group S (n=8); SSH was administered continuously at 0.2 mg/kg/h to weaning from respirator, group C (n=20); non-SSH therapies were performed. They were comparable with respect to clinical data.
Results: There were no significant differences with regard to age, operation time, total cardiopulmonary bypass time, circulatory arrest time, cardiac arrest time, intraoperative blood loss, and total transfusion volume between the two groups. The P/F ratios in directly after operation were 96±22 (S.D.) and 92±23 in the S and C groups, and there was no significant difference between the both groups. The P/F ratios in the S and C groups significantly increased at 12, 24, 48, and 90 h after the operation, to 121±42 and 124±62, 121±43 and 114±38, 144±49 and 126±41, and 172±68 and 141±141±54, respectively (P<0.05). The increase of the ratio as improvement of pulmonary function was marked in the S group. The duration of ventilation, the length of intensive care unit stay, and the length of hospital stay were 192±139 and 228±263 h, 20±17 and 41±43 days, and 61±43 and 89±68 days in the S and C group, and those periods of the S group were relatively shorter than those of the C group.
Conclusions: A specific neutrophil elastase inhibitor, SSH improves the pulmonary function in patients undergoing thoracic aortic surgery with deep hypothermia complicating postoperative respiratory failure, and has possibilities of reduction of the periods for need of mechanical ventilation, intensive care unit stay, and hospital stay.

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MEDIASTINAL HEMATOMA AND LEFT MAIN DISSECTION FOLLOWING BLUNT CHEST TRAUMA

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Objective: Traumatic coronary artery injury with myocardial infarction is a rare but potentially fatal complication. It usually associated with multiple organs trauma. Once the diagnosis delayed, ventricular function impairment or even death could be resulted in. We describe a patient who sustained blunt chest trauma that resulted in mediastinal hematoma and acute dissection of the left main coronary artery.
Methods: A 40-year-old man unrestrained passenger was involved in a head-on motor vehicle collision. He was brought to our hospital with stable vital signs but complained of chest pain. Examination upon arrival revealed mild respiratory distress, flail anterior chest wall, sternal fracture was impressed. The chest film revealed widening of the superior mediastinum, and the chest computed tomographic scan revealed retrosternal hematoma and multiple ribs fractures. Electrocardiogram (ECG) demonstrated ST-segment elevations in leads V1 to V3 suggestive of acute anterior myocardial infarction. Echocardiography demonstrated mild reduced left ventricular ejection and hypokinesia of anterior and anteriolateral wall. Because of anterior flail chest and mild respiratory distress, he was admitted for further evaluation. Six hours later, he needed ventilator support due to respiratory failure. The hemodynamic status was stable during the course, and he was successfully extubated on the 6th admission day.
Because of increased cardiac enzyme, abnormal ECG, and echocardiographic finding, he was arranged a coronary angiography to rule out coronary artery injury. During the procedure, distal left main dissection involving to proximal left anterior descending artery (LAD) was noted. The patient experienced chest discomfort with blood pressure 80/40 mmHg. Percutaneous intervention was considered high-risk because of left main disease involving proximal LAD. The patient was taken to the operating room for emergent off-pump coronary artery bypass grafting with reversed saphenous bypass to distal LAD and distal left circumflex arteries.
Results: The recovery course was uneventful, and he was discharged on 7th postoperative day. Follow-up angiography was performed two months later, and it revealed the dissection of left main trunk was completely healed, but the left ventricular function was not recovered.
Conclusions: Percutaneous intervention was successfully performed with satisfactory early results. In our case it was considered to be high-risk because of the anatomic feature of the lesion and recent mediastinal hematoma. The OPCAB approach was found effective in high-risk patients, because it reduce postoperative coagulapathy, blood transfusions, renal and neurologic complications.

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MULTIPLE CORONARY ARTERY ANEURYSMS THAT CAUSE THROMBOSIS; TWENTY-TWO-MONTH FOLLOW-UP RESULTS WITH MULTI-SLICE SPIRAL COMPUTERIZED TOMOGRAPHY

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Objective: Aneurysms of the coronary arteries are extremely rare. The most common cause is atherosclerosis. Coronary aneurysms may be asymptomatic, or they may be complicated by thrombosis and rupture. We report a multiple coronary artery aneurysm that caused thrombosis in a patient, along with 22-month follow-up results with multi-slice spiral computerized tomography.
Methods: A 43-year-old man was admitted to hospital with a diagnosis of acute inferior myocardial infarction. He underwent thrombolytic treatment with streptokinase. Cardiac catheterization revealed multiple large aneurysms of the proximal coronary arteries and intracoronary thrombosis in the midportion of the circumflex coronary artery (Figure 1). His multi-slice spiral computerized tomography revealed an organized thrombus in the CX coronary artery, no critical stenosis and no change in the coronary aneurysm after 22 months (Figure 2).
Conclusions: The patient did not experience any problem during the 22-month follow-up period. In our opinion, middle diameter coronary artery aneurysms that are asymptomatic and not accompanied by critical stenosis can be followed up with medical treatment, and multi-slice spiral computerized tomography is a safe way to follow-up these patients.

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ECHOCARDIOGRAPHIC EVALUATION OF EFFICIENCY OF OPERATIVE INTERVENTIONS FOR VENTRICULAR SEPTAL DEFECTS ASSOCIATED WITH AORTIC VALVE INCOMPETENCE

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Objective: The study was aimed at elaboration of optimal estimation criteria for VSD closure with aortic valve (AV) replacement comparing to VSD closure and AV plasty.
Methods: From 1991 to 2006, forty patients with VSD associated with AV insufficiency were operated on at the clinic. Males were 29, females were 11. The patients' age ranged from 3.5–42 (mean 16.36±8.12).
In the preoperative period AV insufficiency degree and presence of left ventricle hypertrophy (LVH) were estimated. Echocardiographic parameters of the left ventricle (LV) such as end-systolic dimension (ESD), end-systolic volume (ESV), end-diastolic dimension (EDD), end-diastolic volume (EDV), stroke volume (SV) were calculated relating to the body surface area (BSA). Received indexed parameters (i-ESD, i-ESV, i-EDD, i-EDV, i-SV) were evaluated before and after the operative correction. LV mass index (LVMI) and wall relative thickness (WRT) were estimated in complex, using general criteria for concentric and eccentric LVH.
Results: There was no aortic insufficiency in 12 patients (50%) after AV plasty. Eight patients with preoperative aortic insufficiency of 2nd and 3rd degree presented after aortic plasty minimal residual regurgitation or aortic regurgitation of 1st and 2nd degrees. In this group of patients we observed decrease in i-EDV and i-EDD within first three days after the operation from 177.04±63.55 to 117.51±56.56 ml/m^2 and from 5.24±1.48 to 4.39±1.27 cm/m^2 respectively (P<0.05). There has been observed a decrease in i-EDV and i-EDD in early postoperative period in patients after AV replacement from 205.92±63.36 to 157.19±57.97 ml/m^2 and from 4.89±0.97 to 4.35±1.02 cm/m^2 respectively (P<0.05). Gradient of systolic pressure at the prosthesis ranged from 21–39 mmHg, there were no regurgitation after prosthesing.
LVMI was calculated in 20 patients (50%). It should be noted that values of LVMI in majority of patients (80%) exceeded above-mentioned criteria consisting mean value of 257.4 g/m^2. However, WRT of the LV exceeded 0.45 (concentric LVH) in four patients only (20%). Twelve patients (60%) presented eccentric LVH, and four patients (20%) had normal LV geometry. We observed LV mass regression and reduction of mean LVMI in early postoperative period from 257.39±128.13 to 209.31±117.93 g/m^2 (P<0.04).
Conclusions: Echocardiographic parameters i-EDV, i-EDD, LVMI and aortic insufficiency degree are the optimal criteria to determine LVH and AV status in these patients. Further studying on these parameters is needed that could be used as indication to different types of operative interventions.

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PREDICTORS OF WORSENING OF PATIENTS' QUALITY OF LIFE SIX MONTHS AFTER CORONARY ARTERY BYPASS SURGERY

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Objective: The possibility to predict the change in quality of life after coronary artery bypass surgery (CABG) being unclear, the aim was to evaluate the change of quality of life and predictors of worsening of quality of life in patients six months after CABG.
Methods: We studied 208 consecutive patients, who underwent elective CABG. The Nottingham Health Profile Questionnaire part one was used as the model for quality of life determination. Questionnaire contains 38 subjective statements divided into six sections: physical mobility, social isolation, emotional reaction, energy, pain and sleep. We distributed the questionnaire to all patients before CABG and six months after CABG. One hundred ninety two patients filled in the postoperative questionnaire.
Results: The comparison between mean preoperative and postoperative scores showed an improvement in all sections of quality of life ($P<0.001$). NYHA functional class was significantly improved after CABG (2.23±0.65 vs. 1.58±0.59, $P<0.001$). Independent predictors of patients worsened by CABG were as follows: female gender in the pain section ($P=0.002$; OR=4.27; CI 1.74–10.47), diabetes mellitus in the physical mobility section ($P=0.003$; OR=8.09; CI 2.04–32.09), low ejection fraction in the physical mobility ($P=0.047$; OR=0.73; CI 0.56–0.95) and emotional reaction ($P=0.03$; OR=0.86; CI 0.60–0.93) sections and postoperative complications in the social isolation ($P=0.002$; OR=4.63; CI 1.79–11.99), sleep ($P=0.03$; OR=2.71; CI 1.12–6.51) and pain ($P=0.005$; OR=3.39; CI 1.45–7.97) sections.
Conclusions: The predictive factors for quality of life worsening six months after CABG are female gender, diabetes mellitus, low ejection fraction and presence of postoperative complications.

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INDUCED MYOCARDIAL INFARCTION USING LIGATION OF THE LEFT ANTERIOR DESCENDING CORONARY ARTERY MAJOR DIAGONAL BRANCH: DEVELOPMENT OF AN OVINE MODEL

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Objective: We report experimental myocardial infarction by occluding coronary arteries in ovine models.
Methods: Twelve ewes were included in the study. After the chest was opened by left lateral thoracotomy incision, the second diagonal branch of the left anterior descending coronary artery was ligated at a point approximately 40% distant from its base. Prophylactic antiarrhythmics were administered. Animals were mechanically ventilated during surgery and stayed at ICU for 24 h afterwards. Experiments were then evaluated by echocardiographic, electrocardiographic, hemodynamic, serologic and morphologic investigations. Echocardiographic measurements were repeated after two months and animals were then sacrificed for postmortem cardiac examinations.
Results: All animals survived the surgical procedure. Cyanotic discoloration and hypokinesia in the cardiac tissue in an area of 3×4 cm plus ST-segment elevations was detected immediately after vessel ligation. Moreover, there were pathologic Q- waves two months later. Echocardiographic evaluations revealed an average of 30% relative decrease in cardiac ejection fraction. Wall motion analysis demonstrated anteroapical hypokinesia and akinesia in all animals one day and two months after operation. Thin walled infracted areas with tissue fibrosis were evident in pathologic investigations two months after surgery.
Conclusions: In conclusion, we developed a practical and safe method of producing myocardial infarction in large animal models.

Vascular Posters

1*

THE ADVANTAGES OF EXTRAANATOMIC BYPASS (EAB) APPLICATIONS

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Objective: EAB is the method used for patients prone to develop lesions or complications during bypass surgery in the anatomic location. This study aims to demonstrate the advantages of EAB applications with PTFE material in these patients.
Methods: Forty patients who underwent EAB in our clinics between September 2001 and December 2005 were analysed, retrospectively. Thirty-six (90%) were male and four (10%) were female patients. EAB was applied to the upper extremity in four patient (10%), and to the lower extremity in 36 (90%) patients. Twelve patients (30%) received general anaesthesia, while spinal/epidural anaesthesia was applied to 28 patients (70%). PTFE graft material was used in all patients. Axillobifemoral bypass was applied to 20 patients (50%), femorofemoral bypass to ten patients (25%), right femoro-left popliteal bypass to six patients (15%), and subclavian-subclavian bypass to four patients (10%). Postoperatively, the patients were followed up for 2 h in the intensive care unit, and were usually mobilized 36–48 h after the surgery. Anti-aggregating and antithrombotic agents were administered routinely.
Results: Postoperatively, surgery-related morbidity was detected in two patients (5%). In one 65-year-old patient with axillobifemoral bypass, thrombectomy was applied to the graft on the third day. In another 42-year-old patient with axillobifemoral bypass, thrombectomy was required on the left leg of the graft due to delayed thrombosis.
Conclusions: I believe that EAB procedures are beneficial both for the patient load as well as economically, as the postoperative mobilization of these patients is faster because no abdominal invasive procedures are required, and less time is spent in the intensive care unit rather than the cost of the material used.

2*

PERTHES SYNDROME IN A COMPRESSIVE POLYTRAUMA CASE

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Objective: Thorax traumas have a wide spectrum from simple cot fractures to major injuries. Thorax effection rate is 25% in major traumas. Sudden pressure increase in venous system due to thoracal and/or abdominal traumatic compression causes a characteristic clinical picture of perthes syndrome with petechias and blue red color at conjunctiva, neck and head skin and mucosa.
Methods: A 31-year-old patient admitted to emergency service because of a tractor accident. He referred to our clinic for further investigation of suspicious flap image of ascendent aorta seen in emergent suboptimal echo.
Results: Symptomatic treatment was began because of bilateral erythemas and pethecias at conjunctiva, head and neck. There was not a dissection flap in thoraco-abdominal CT and TTE. There was a persistent V.C.S. Outpatient clinic control was recommended for bilateral subconjunctival hemorrhagy. Orthopedic consultation showed left iliac wing fracture and three weeks rest was recommended. Other consultation results were normal and he was discharged with symptomatic treatment.
Conclusions: Positive pressure due to compression is rapidly delivered to head and neck via innominate and jugular veins without valvulas and pressure increases suddenly in small venules and capillaries. It causes petechias and small hemorragies. Diagnosis of perthes syndrome is confirmed with clinical evaluation and it is treated symptomatically.

3*

HYBRID APPROACH BY EXTRATHORACIC REVASCULARIZATION IN A COMPLEX TYPE-B DISSECTED PATIENT

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Objective: Surgical treatment of acute type-B aortic dissection (AD) still entails a high mortality and morbidity rate, mostly in patients with visceral vessels involvement. EVAR for type-B AD provides immediate advantages over open repair and an hybrid approach can be an alternative modality when stent-graft placement across the origin of arch vessels is required. We report a case of a patient treated with an hybrid approach for a such complicated type-B dissection, involving distal aortic arch, with a small ascending aortic aneurysm.
Methods: A 56-year-old male patient was admitted for chest pain and hypertension, unresponsive to medical therapy. At chest X-ray an acute type-B dissection was suspected and successively confirmed by contrast- enhanced spiral computed tomography (CT scan). The dissection involved distal arch, left subclavian artery and visceral vessels, all originating from the true lumen, except the left renal artery. Clinical picture was complicated by an aneurysm of ascending aorta with a maximum diameter of 45 mm and extensive dissection up to both common iliac arteries. An hybrid treatment consisting of an extrathoracic right-to-left carotido-carotid bypass and stent-grafting repair from the origin of the brachiocephalic artery to the celiac axis was stepwise performed in operative cath-lab theatre, covering left common carotid and left subclavian arteries, using multiple Valiant Medtronic stent-grafts.
Results: No major complication occurred and at six months CT scan follow-up a complete thromboexclusion of distal arch and descending aorta was observed. A close CT scan follow-up for the ascending aortic aneurysm and dissected abdominal aorta was scheduled.
Conclusions: The hybrid approach allows the fixation of the stent-graft in the aortic arch, expanding the indication of endovascular repair. In our case, the extra-thoracic bypass associated with EVAR facilitates the prospective repair of the aneurysmatic ascending aorta by conventional surgery and of the dissected infrarenal abdominal aorta by EVAR.

4*

USEFULNESS OF ENDOVASCULAR TECHNIQUE IN CASE OF AORTIC INTRA-LUMINAL NEOPLASMATIC MASS CAUSING LIMB ISCHEMIA

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Objective: The reason of acute limb ischemia is usually thromboembolism due to arteriosclerotic lesions or atrial fibrilation. Other causes occur rarely. We present a case of acute lower limb ischemia caused by thromboembolism due to a growing intra-luminal aortic mass.
Methods: Fifty-one-year-old man was admitted to our Department due to critical right lower limb ischemia of two weeks duration, with necrosis of fifth toe (ABI 0.42) and history of chronic back pain of lumbar region. Local fibrinolysis (rTPA) was administered, through catheter placed in superficial femoral artery. Due to inefficiency of initial treatment this was followed by successful surgical thrombectomy of right popliteal artery.
Results: During hospitalization he was diagnosed of microcytic anemia of unknown origin. Further workup revealed mass in abdominal aorta on angio-CT that reduced the lumen to 11 mm. To maintain patency of abdominal aorta and prevent microembolism of lower limbs arteries stentgraft was deployed successfully (Zenith, Cook), below renal arteries. In addition remodeling of narrowed aorta was performed by balloon angioplasty. During the procedure, part of the mass was sampled for histopatological workup. Nonsecreting myeloma mutiplex (CS III acc. Durie-Salmon) was then diagnosed. Chemotherapy regiments were administered and patient had the bone marrow transplantation eight months after. In two years follow-up there were no signs of peripheral microembolism.
Conclusions: This case demonstrates feasibility and effectiveness of stent-graft endovascular technique as a prevention of thromboembolism due to intra-luminal abdominal aortic mass in course of myeloma multiplex.

5*

HISTOLOGIC AND ULTRA STRUCTURAL EVALUATION OF THE MORPHOLOGIC CHANGES IN THE ARTERIAL WALL AFTER THE IMPLANTATION OF ENDOPROSTHESES IN ANIMALS WITH AND WITHOUT ATHEROMATOSIS. STUDY IN THE RABBIT

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Objective: The implantation into the arterial lumen of a stent has repercussions in the homodynamic system of the metabolism of the different layer of the arterial wall. The authors have an experimental study with the purpose of evaluation of the repercussions of the implantation of endoprostheses graft into the arterial wall in normal and atheromatosis animals.

Methods: The main group of animals is divided in two subgroups, the first with atheromatosis induction and the second without treatment. Each subgroup is subdivided in two groups, a group with simulated operation and the other placed an endoprostethic graft of ePTFE into abdominal aorta. The half of the animals is examined a one month and the rest a three months wit extraction of the distal abdominal aorta. The pieces were analyzed with histological methods and ultrastructural examination with transmission microscopic and scanning microscopic.
Results: The study found that ePTFE endoprostetic grafts placed in atherosclerotic animals increased the intimal hyperplasia and wall alterations in aortic vessel compared with the control group and the implantation in normal animals but this group has less alteration of atherosclerotic group without endoprosthetic grafts.
Conclusions: Different factors develop the reactive changes in the wall arteries for the lead to atheromatosis in arteries with endoprostheses implantation, but the lipid factor in induction of atheromatosis increase the possibility of alteration of different layers of the artery composition. The endoprostheses application is a important factor for the develop the changes in the wall artery.

6*

HISTOLOGICAL CHANGES OF THE WALL AORTA IN THE ENDOVASCULAR RECONSTRUCTION OF THE AORTA RUPTURE. EXPERIMENTAL STUDY IN THE PIG

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Objective: Replacement of ruptured thoracic aorta gives rise to complex technical problems. Endovascular treatment is an alternative technique with less risqué and better results. The effects of implantation of an endoluminal endoprostheses in the aorta have repercussions in the aortic wall, but the histological relationship is unknowns.
Methods: Twelve Landrace pigs were utilized in this study. For laparotomic approach the abdominal aorta is dissected and a partial rupture of the arterial wall is made. A cutdown and right femoral arteriotomy were then performed and 14 F haemostatic sheaths were introduced. A 5 F measuring pigtail catheter was introduced. A aortogram was obtained and the mediolateral diameter of the pig infrarenal aorta was measured. All aorta measured 8–11 mm. In the aorta a HemobanthR (Gore) intravascular stent 8X40 mm) was deployed into the infrarenal aorta in four animals. In other four animals a WallfraftR (Boston Scientific) endoprostheses is paced in identical conditions of the anterior group. A stent graft of about 1–2 mm larger of the aortic diameter at the level. All end of the procedure a angiogram is performed in all animals.
The was repaired with the use of 6/0 polypropylene sutures. The groin and abdominal wall was closed. At 30 days, the pigs again underwent the regimen of preanesthesia medication and general endotracheal intubations and inhalator anaesthesia. Euthanasia of the pigs was then undertaken with an intravenous dose of pentobarbital sodium at 100 mg/kg to effect. Necropsy was the performed. The aorta was resected and fixed for histopathologic examination with the use of the histological techniques. The specimens were trimmed, the stent wires were carefully removed, and the section were processed through graded alcohols, clearing agent and embedded in paraffin. Two type's of slides produced from each specimen: haematoxylin-eosin and Masson trichrome.
Results: The stent in the endoluminal placement provoque interactions between the wall arterial and the prostheses implanted endoluminaly with fibrotic responses of the biological structures with special participation of the intimal and muscle layers.
Conclusions: The arterial wall response is accelerated with the implantation of stent graft in the site of disruption after the induced rupture of the aorta in the experimental model. The arterial repair has relations with the organization collagen matrix and the proliferative response in the experimental group with the endoprostheses implantation.

7*

STUDY OF THE LESION IN THE BIOPROSTHESES SEEDING WITH ENDOTHELIAL CELLS TREATED WITH ETHANOL AND LIPIDS

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Objective: To find the lesions on the bioprostheses seeding with endothelial cells cultured under influence of ethanol and dietary lipids excesses.
Methods: Animals: 50 Wistar rats were studied.
Interventions: The animals were anasthetized with chorhidrate of ketamine (60 mg/kg wheigth). A middle incisión of the abdominal region were performed and opened the abdominal cavity with the dissection of the aorta artery of the animal, and a biologic graft and implanted for microsurgery techniques. In the half of the animal the prostheses were seeding with endothelial cells. A half of animals of each group were treated with alcoholic and hipelipemic diets. After the experimental period, the rat opered and evalued. The bioprostheses of the animals were studied with angiografy, Doppler and photopletismography techniques, gross examination and the pieces were processed for morphological and morphostructural study.
Results: The effects of the alcoholic and lipidic diets on the bioprostheses, is similar of the autologous arterial wall. The alcohol is a risk factor associated a atherosclerotic diets. The seeding of the prostheses with endotelial cells have a little beneficious effect of the results in the control group but the alcohol and hiperlipemic treatment increase the lesions in the arterial wall.
Conclusions: The effect of the consumption of alcohol and lipidic fed is important in the changes that occur in the bioprostheses in relation of the results of the seeding endothelial cells on the patologic wall.

8*

TWO CASES WITH GIANT TUMOR, RARELY LOCATION AT ANTERIOR CHEST WALL

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Objective: Primary chest wall tumors account 1–1.5% of all primary tumors. Angiosarcomas are rare malignant tumors originating from vascular endothelium and immitating the vascular structure. Although sarcomas are occasional after irradiation, there are angiosarcomas developed after radiotherapy for different type malign tumors. The period between radiotherapy and sarcoma development is very variable and generally over 10 years.
Methods: Although it is frequent at abdominal wall, desmoid tumor is a rare primary tumor at chest wall. These benign tumors do not metastize, develop rapidly and agressively invade the adjacent tissues.
Results: In this study we evaluated a giant angiosarcoma at right anterior hemithorax upper quadrant in a 30-year-old patient which we thought to develop in late period after radiotherapy performed for Hodgkin disease 13 years before and totally extirpated with surgery, and radical resection of a giant desmoid tumor which infiltrated brachial plexus at right anterior chest wall and its diagnosis and therapy modalities were reported under the light of literature.
Conclusions: After surgical resection local recurrence is not infrequent so, planning radiotherapy is a therapy stage.

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MONITORIZATION OF THE SEVERITY OF SYMPTOMS BY CONSERVATIVE MEDICAL THERAPY IN RAYNAUD PHENOMENON

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Objective: Paliative therapy is usually preferred in the treatment of reynaud phenomenon (RP). In this study, it was aimed to evaluate the efficiency of the two different treatment modalities and alterations in the subjective-symptomps of the patients with RP by visual analagous scale (VAS)
Methods: One hundered and twenty-six patients were enrolled in this study between January 2002 and October 2005. Patients were warned to avoid smoking, cold exposure and to use gloves in cold seasons. Patients were divided in to two groups. Nifedipine 30 mg, acetyl salicilic acid 100 mg and pentoxyphylin 400 mg (three times a day) were given to group 1. Nifedipine 30 mg and acetyl salicilic acid 100 mg were given to group 2. VAS was performed for each patients in the first, 15th, 30th, 60th, 90th and the end of 6th month of the treatment. The mean VAS values of the patients are shown on the table 1.

	1st day	5th day	30th day	60th day	90th day	6th month
Group 1	7.0	6.0	5.5	4.0	3.0	1.0
Group 2	7.0	7.0	6.0	4.0	3.0	2.0

Results: Mean VAS values during the whole follow-up period are equal in both groups. More than 95% improvement of symptomps have been detected in 80% of patients in group 1 and 70% of the patients in group 2.
Conclusions: VAS appears to be useful method to monitarize the response to the symptomatic therapy for RP. Finally, monitarization of the symptomatic therapy response may increase the Professional satisfaction.

10*

EVALUATION OF ISCHEMIC INJURY TO THE SPINAL CORD AFTER DURING THORACIC AORTIC WALL OCCLUSION WITH ENDOPROSTHESES IN A RABBIT MODEL

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Objective: To evaluate the physiopathology of the ischemia spinal with its important clinical repercussions, after the implantation of endoprotheses in the thoracoabdominal aorta level with the hypothetic implication of the spinal arteries with your occlusion.
Methods: An experimental study has been made using the rabbits like experimentation animal. Thirty-six animals with the purpose of valuing the repercussions at level have been used to spinal cord of the sealed one of the thoraco-abdominal aorta by means of the positioning of a endoprostheses of PTFE of 5 mm placed at thoraco-abdominal level, sealing to all the thoracic aorta from the birth of subclavian artery and the proximal part of the abdominal aorta to the origin of the caeliac trunk through a distal aortic arteriotomy using a device to endovascular, in comparison of a second group to which a dissection of the thoracic aorta was made to him and both compared with the group witness to whom a simulated operation practiced to him. For the valuation of the repercussions measurements by means of a sensor placed at level of the spinal marrow by route have been made later that obtained the potentials bioelectric with microsoundings. The study is being made of subacute form determining the potentials of action to the two hours of practiced the intraluminal sealed one, to the 8 h and both days in sub-groups of six animals each one. At the end of the study the spinal marrow for its histological processing has been obtained.
Results: The collected data reveal that the important affectation but of the marrow happens to the 8 h of made the intraluminal sealed one and that to the 48 h clear indications of spinal recovery in the group of the sealed one existed to endovascular. Possibly in the rabbit equalizers start up such as the collateral circulation as much at level of abdominal the parietals glasses thoracic like those of the own spinal marrow. The valuation of the used model must make consider that the used vessels are normal free of pathology on the one hand, but by another one for this same reason, the evaluated territories can be but sensible to the action of ischemia to not to have developed of chronic form other mechanisms of haemodynamic compensation.
Conclusions: The valuation of the used model must make consider that the used vessels are normal free of pathology.

11*

STUDY OF THE PREVENTION OF SKELETAL MUSCLE TISSUE ISCHAEMIC DAMAGE BY ADMINISTRATION OF A PLATELET ACTIVATION FACTOR (PAF) ANTAGONIST

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Objective: The purpose of the study was to evaluate the possible protective effects of a PAF (WEB 2086) factor in the ischaemia-reperfusion of striated muscle.
Methods: Fifty-four rats were used in the study, divided into three groups: a Control group with no action, a Comparison group on which ischaemia and reperfusion was conducted, and an Experimental group in which ischaemia and reperfusion of the limb was performed, with pre-bypass treatment with WEB 2086. Evaluation of the animals was by assessment of the general appearance, trophic status, vitality, functional exploration of the hind legs and histological and morphometric study of the soleus muscle. For statistical analysis of the quantifiable variables, the statistical software SPSSR was used.
Results: No modifications were evidenced from the functional point of view nor were gross or histological changes observed in the subjective assessment, between the different study groups; in the morphometric-histological study, tissue damage alterations were noted in the ischaemic group that did not appear with administration of the PAF antagonist, WEB 2086.
Conclusions: Consideration has been given first to the effects of ischaemia-reperfusion on the experimental model used, and it has been seen that the damage was evidenced by objective, quantifiable observations in terms of its degree and development. These can be made evident by quantifying morphometric studies of the damage to the muscle tissue in which it was possible to establish the protective effective of the PAF antagonist, WEB 2086, in addition to appreciating the effects of the ischaemia-reperfusion in the limb.

12*

EVALUATION OF SIMULATOR TEACHING AND TRAINING IN ENDOVASCULAR TECHNIQUES

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Objective: The authors show the results of a study done with the purpose of assessing the ability to learn the basic techniques of endovascular procedures using simulators.
Methods: The study was conducted with the participation by 20 physicians being trained in the speciality, who received an intensive training course during five days in the facets of theoretical knowledge and practical skills developed on endovascular technique simulators. Upon conclusion of the training period, a survey and two tests were carried out, one on theory and the other practical, to evaluate their knowledge, level of learning, and skills acquired.
Results: The results of the evaluation demonstrated a high degree of capability and learning by the group that took the course, with positive assessment by the students of the strategies and techniques used in the course. It was also seen that it is possible to learn the basic techniques in an intensive five-day training course.
Consideration was given to the possibility of basic technical training over a short period of time, and questions are raised on the adequate application of the procedures if wider education is not available, with the possibility of a comparison with other alternative techniques. The study questions the use of animal models because of the validity of non-biological simulators whose efficiency and effectiveness have already been confirmed.
Conclusions: We conclude by stating that the basic techniques of endovascular procedures can be learned with a high level of technical capability in an intensive course.

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HYPERHOMOCYSTEINEMIA AS A RISK FACTOR FOR VENOUS THROMBOSIS IN BELARUS

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Objective: Hyperhomocysteinemia (HHcy) is a common metabolic disorder and a risk factor for venous thrombosis (VT) in Western populations. The aim of this study was to evaluate prevalence of HHcy and risk for VT associated with HHcy in Byelorussian population.
Methods: We have studied total homocysteine (tHcy) level in 39 patients and 103 healthy blood donors as control subjects. tHcy measured by immunometric enzyme immunoassay. A nonparametric criterion by Mann-Whitney was used to compare tHcy concentrations in patients and controls. Logistic regression used to determine risk for VT associated with HHcy.
Results: tHcy levels vary in wide borders in patients (from 4.5 to 50.6μmol/l, mean 15.7+2.87) and controls (from 5.1 to 32.2μmol/l, mean 12.84+1.1 μmol/l). Difference between tHcy concentrations in patients and controls was not statistically significant (P=0.11). However, tHcy concentration above 20μmol/l was found in 30.77% (95% confidence interval (CI) 18.75–46.42) of patients and only 10.68% (95% CI 6.07–18.12) controls. HHcy was associated with mild but statistically significant risk for VT (the odds ratio (OR) 1.07 95% CI 1.01-1.14, P=0.02). Increased tHcy level was associated with the dose-dependent increase of risk for VT. The OR for VT was 2.3 (95% CI 0.5–14.2) when tHcy concentration was 15–25μmol/l and 2.8 (95% CI 0.7–6.8) when tHcy level was above 25 μmol/l.
Conclusions: HHcy is a common metabolic disorder and mild risk factor for VT in Belarus.

14*

TREATMENT PROGRESS OF LOWER AND UPPER EXTREMITY DEEP VEIN THROMBOSES

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Objective: Upper extremity deep vein thromboses (UEDVT) usually result from invasive vascular interventions. Lower extremity deep vein thromboses (LEDVT), on the other hand, occur due to immobilization, malignancies, Becker cysts, Behçet's disease, trauma, etc. This study aims to investigate the risk factors, diagnosis, and complications of DVT, in addition to the treatment strategies and prognoses of this pathology.
Methods: Two hundred and thirty patients were treated for DVT between October 2001 and December 2005. One hundred and eighty patients had LEDVT (110 female and 70 male patients), and 50 patients had UEDVT (32 female and 18 male patients). Diagnosis was established by Doppler US in all patients. The patients initially received LMWH standard heparin, followed by Warfarin therapy. The patients were followed up by Doppler US after 3, 6, and 12 months. Ten patients with UEDVT, and 70 patients with LEDVT were admitted to the hospital. For outpatients, LMWH and Warfarin were started from the first day. Inpatients also received standard heparin and Warfarin therapy. Extremity elevation was applied to both groups.
Results: Among the UEDVT group, central venous catheter was determined as a risk factor in 24 patients, trauma in four patients, and systemic diseases in ten patients (renal and malignancies). In the LEDVT group, on the other hand, immobilization was found in 110 patients, history of surgery in 32 patients, malignancies in 22 patients, post-pregnancy in two patients and varicose veins in six patients. Among LEDVT patients, the thrombosis was bilateral in 30 patients, on the right side in 100 patients, and on the left extremity in 50 patients. All UEDVT cases were left-sided. The mean time until the onset of therapy was five days (1–9 days). Two patients in the UEDVT group and five patients in the LEDVT group died to reasons not related to DVT. Pulmonary emboli developed in three patients from the LEDVT group. No mortality occurred due to DVT or the treatment given. Following a therapy of six months, improvement in the Doppler US readings as well as the subjective complaints occurred more rapidly in the UEDVT group.
Conclusions: No difference was observed in the improvement process between DVT in- and outpatients. It is possible to avoid DVT complications also in outpatients. Response to therapy and outcome in UEDVT is more rapidly compared to LEDVT. We found that improvement of subjective complaints occurs more rapidly in the UEDVT group.

15*

CASE REPORT: MOBILE THROMBUS IN ATHEROSCLEROTIC INTERNAL CAROTID ARTERY

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Objective: Mobile thrombus of the atherosclerotic internal carotid artery (ICA) is a high-risk situation of distal embolisation causing stroke. This clinical situation demands immediate attention, especially in patients suffering from acute stroke. Surgical treatment is commonly recommended only after two weeks of acute stroke. Up to now there exists no definite treatment consensus for mobile thrombus of ICA in the condition of acute stroke.
We present a case of emergency surgical treatment of mobile thrombus of atherosclerotic ICA with satisfactory clinical results.
Methods: A 63-year-old female patient with a history of hypertension and two left hemisphere strokes during two weeks was admitted in the department of vascular surgery four days after the second stroke. The patient suffered from right-side hemiparesis and sensomotoric aphasia. During these two weeks the patient received antithrombotic (aspirin 150 mg per day) and antihypertensive treatment. Duplex-scanning after the first stroke detected 60–70% ipsilateral atherosclerotic stenosis of the left ICA, no ulceration or potentially embolic lesions in the plaque area was observed. Two weeks later, immediately after the second stroke, about 70% stenosis of the left ICA and a floating thrombus distal from the plaque were detected by Duplex-scanning and CT-angiography. The patient underwent an emergency thrombendarterectomy of the left ICA. The eversion technique was used for surgery.
Results: Removed soft atherosclerotic plaque had a smooth surface and was without ulceration on visual examination and the distal mobile thrombus was easily removed from plaque surface.
The patient had no perioperative complications.
Conclusions: We suggest thorough consideration of emergency surgical approach in patients suffering from acute stroke with mobile thrombus in atherosclerotic ICA, to prevent very early stroke recurrence.

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COILING OF THE COMMON CAROTID AND ILIAC ARTERIES AS A CAUSE OF CEREBROVASCULAR INSUFFICIENCY AND ISCHEMIC ULCER OF THE LEG

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Objective: Coiling of the arteries is a rare morphologic entity, most frequently described in the internal carotid arteries. In other arteries, coiling is rarely reported because it remains asymptomatic. The aim of our paper is to show that coiling of common carotid and iliac arteries could be the cause of vascular insufficiency.
Methods: Herein, we present two patients with coiling of the left common carotid artery and right common iliac artery presented with cerebrovascular insufficiency and ischemic ulcer of the right toe.
Results: First patient was a 67-year-old woman with the history of transitory ischemic attacks during the last year. Color duplex Scan and arteriography did not show any significant changes in internal carotid arteries. However, an unusual coiling of almost 3600 was registered in left common carotid artery. Partial resection of left common carotid artery was performed. In 6 months follow-up period neurological symptoms resolved and patient is well. Second patient was a 72-year-old man with the history of ischemic ulcer of the right toe during the last two months. ABPI was 0.0 and 0.4 on the right foot. Color duplex Scan and arteriography revealed coiling of 3600 in right external iliac artery. Partial resection of affected artery and end to end reconstruction was performed. In two months follow-up period ischemic ulcer of the toe healed with ABPI of right foot measuring 0.0 and 0.8.
Conclusions: The cases presented in this paper show that coiling of the arteries could be the cause of vascular insufficiency with ischemic manifestation. This condition is easily surgically treated eliminating ischemic symptoms in affected patients.

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SURGERY OF THE CAROTID ARTERY: LOCAL ANESTHESIA VS. GENERAL ANESTHESIA

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Objective: Carotid artery surgery is safely and commonly performed under general, regional or local anesthesia. The aim of the study was to compare local and general anesthesia in carotid artery surgery in order to establish whether differences exist in terms of perioperative results, use of intraoperative shunts and costs.
Methods: We retrospectively reviewed the data on 426 patients who underwent carotid endarterectomy with either local or general anesthesia at our institution over a four-year period of time. All available clinical, pathologic and postoperative data were reviewed and analyzed for postoperative results. Surgical indications, outcome, operative techniques, and complications were compared.
Results: A total of 306 carotid endarterectomy operations under local and 127 under general anesthesia were performed and analyzed. Groups were similar in means of age, sex and preoperative risk factor distribution. The local anesthesia group was associated with a lower incidence of shunt placement and operative time when compared to the general anesthesia group. Postoperative intensive care unit requirement, hospital stay and costs were also lower with the local anesthesia. Significant difference between neurological complications and mortality rate was not observed between the two groups.
Conclusions: Carotid endarterectomy performed under local or general anesthesia is associated with low morbidity and mortality rates. Local anesthesia enables the surgeon to assess the neurological status during the procedure. It is also associated with decreased shunt usage, decreased operative time and in high-risk patients lower intensive care unit requirement and hospital stay.

18*

MULTIPLE CARTILAGINEOUS EXOSTOSIS AS A CAUSE OF GIANT POPLITEAL ARTERY PSEUDOANEURYSM

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Objective: Popliteal artery pseudoaneurysm is much less common than true aneurysm in this region. The most frequently it is consequence of penetrating trauma of popliteal region (usually from stabs or gunshots). We present a case of giant popliteal pseudoaneurysm that was a result of multiple cartilagineous exostosis in knee region.
Methods: Sixteen-year-old girl was presented to orthopedist due to mild blunt trauma with severe pain of the knee. In clinical examination and X-ray no abnormalities were found except multiple cartilagineous exostosis of epiphysis of distal femoral and proximal tibial bones. The extremity was immobilized in plaster for six weeks. After that, the knee region was still painful. Physical examination revealed 10 cm popliteal fossa tumor. NMR and CT scans were performed and confirmed the diagnosis of 10x9x5 cm pseudoaneurysm of popliteal artery.
She was admitted to our department three months after the trauma. An elective surgery was performed under general anesthesia through medial approach. With proximal and distal clamping the pseudoaneurysm was opened. A 3 mm hole was found on postero-lateral wall of the popliteal artery closely to the exostosis. It was repaired with primary sutures. During the same surgical procedure cartilagineous exostosis were removed by orthopaedist.
Results: In postoperative period there were no complications except distal edema and patient was discharged in 5-th postoperative day. One-year follow-up was uneventful with peripheral vessels normal blood flow in color duplex ultrasound.
Conclusions: This case demonstrates very rare cause of popliteal artery pseudoaneurysm due to multiple cartilagineous exostosis and effectiveness of its surgical treatment.

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GIANT RIGHT FEMORAL PSEUDOANEURYSM, DIAGNOSED 7 YEARS AFTER CARDIAC CATHETERIZATION

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Objective: Of the iatrogenic vascular injuries peripheral vasculary injuries frequency, due to cardiac catheterization, increase paralel with diagnostic and therapeutic procedures. Majority of them develops at femoral region, which is frequently used for cardiac catheterization.
Methods: Our patient had cardiac catheterization seven years ago and a small aneurysm was developed. It became a giant lesion during the last six months and patient also had multiple major cardiovasculary pathologies.
Results: We are reporting our diagnostic procedures, graft interposition after total resection of giant pseudoaneurysm and successful arterial reconstruction with the help of literature.
Conclusions: The reported incidence of iatrogenic pseudoaneurysm formation after coronary artery interventions ranges from 3.2–7.7%, and the rates noted after diagnostic angiography range from 0.2–1%. It is important to follow the patients closely for early diagnosis and treatment, because of it can appear months after catheterization. Treatment must be with less invasive procedures, instead of surgery, but if surgical reconstruction is obligatory, extremity function and vitality can be saved if performed before complication and morbidity and mortality risk is decreased.