ASGBI abstracts 2007

Poster presentations

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ASGBI abstracts 2007

Poster presentations

The Annual Scientific Meeting of the Association of Surgeons of Great Britain and Ireland takes place this year at Manchester Central (18th–20th April 2007), under the presidency of Professor Brian J Rowlands.
Posters were presented in the following categories:

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Mohiuddin MK, Gicquel J, Robson J, Todhunter C, Hanson JM, Mansfield JC: Post operative Crohn's disease: The role of faecal lactoferrin in detecting clinical relapse after ileocaecal resection and measurement of faecal ASCA. *Br J Surg* 2007, **94** (Suppl 2): 2.

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Basic/applied clinical science

Basic/applied clinical science 0033

Immune tolerance induction of small bowel transplantation by IL-10 combined with Tripterygium wilfordii modified dendritic cells in rats

W. Wu, T. Hen, H. Wang
The First Affiliated Hospital of Nanjing Medical University, Nanjing, China

Background: The Chinese traditional medicine, tripterygium glycoside (Tw) has a remarkable anti-inflammatory and immune adjustment effect. In this study, we investigated the effect of allograft immune tolerance induction by donor IL-10 combined with Tw modified dendritic cells (DCs) for providing theoretical and practical basis for anti-rejection of small bowel transplantation.
Methods: DCs were isolated from rat long bone marrow and cultured in vitro, 7 days after the culture, interleukin-10 (IL-10) and Tw were applied for two more days. Cell morphologic changes and MHC-II, CD80, CD86, CD40 expression were observed in the following groups: A (control), B (50 ng/ml IL-10), C (5μ g/ml Tw), D (200 ng/ml IL-10), E (20μ g/ml Tw), F (50 ng/ml IL-10 + 5μ g/ml Tw), G (200 ng/ml IL-10 + 20μ g/ml Tw). The recipient rats were pretreated with donor modified DC or with donor not modified DC. Small bowel transplantation was performed and the survival time of small bowel allografts were observed.
Results: DCs in group G showed a significantly lower expression of the costimulatory molecules on surface, which could inhibit DC maturation and immune response activity obviously. The survival time in the groups of control, not modified DC and IL-10 com-bined with Tw modified DC were (7·33 ± 2·42) days, (8·33 ± 2·94) days and (18·5 ± 5·17) days respectively. Statistical analysis showed that there was no significant difference between not modified DC group and control group. However, the survival time of small bowel allografts in IL-10 combined with Tw modified DC group was significantly different from that in the other two groups ($P < 0·01$).
Conclusion: The pretreatment with donor IL-10 combined with Tw modified DC can prolong the survival time of rat small bowel allografts after transplantation.

Basic/applied clinical science 0076

Indirect allorecognition of HLA public T cell epitopes: implications for the induction of antigen specific transplant tolerance

R. Hanvesakul, B. Maillere, D. Briggs, R. Baker, M. Larche, S. Ball
Renal Transplantation, University Hospital Birmingham, Birmingham

Background: Indirect allorecognition provides T cell help for the generation of class-switched anti-HLA antibody and T cell activation through this pathway is independently associated with chronic allograft nephropathy. It is therefore likely to be important in 'chronic rejection' but has also been associated with graft acceptance in various experimental models of transplantation. The identification of indirectly presented peptide epitopes has been confined to highly polymorphic sequences in the membrane distal domain(s) of MHC class I & II. We have systematically studied responses to peptides derived from the complete sequence of a single MHC class I molecule: HLA-A2.
Methods: 53 overlapping 15mer peptides that spanned the primary sequence of HLA*020101 were made using F-moc technology. Their binding affinity to 13 different MHC class II molecules was studied in a competition assay by ELISA. *P*eptides from several locations exhibited promiscuous binding to MHC class II, some of which correlated with previously recognised α1 & α2 domain sequences but others lay in the non-polymorphic α3 and transmembrane domains. 30 peptides that bound one or more MHC class II were used to stimulate *P*BMCs from 55 renal transplant listed patients with known antibody sensitisation histories. Their responses were assessed by γ-interferon elispot.
Results: 22/55 patients responded to peptides from HLA-A2 and this was associated with but not confined to, those who had made antibody to HLA-A2 (14/18). 19/22 patients responded to peptides derived from the polymorphic α1 and α2 domains and 18/22 responded to peptides from the α3 and transmembrane domain, the sequence of which shows little polymorphism, such that the epitopes so identified may reasonably be termed 'public'. In 6 patients, the sequence of such 'public' T cell epitopes was identical to self, that is the response was autoimmune.
Conclusion: The finding of responses to indirect 'public' T cell epitopes derived from MHC class I has implications for the immune response to alloantigen, its regulation and the application of antigen specific immunotherapy to transplantation.

Basic/applied clinical science 0105

Genomic DNA hypermethylation in colorectal mucosa of patients with ulcerative colitis

K. T. J. Khoo[1], R. P. Arasaradnam[1], D. Commane[2], S. B. Kelly[1], D. M. Bradburn[1], I. T. Johnson[3], J. C. Mathers[2]
[1]Northumbria Healthcare NHS Trust, Northumberland, [2]HNRC, Newcastle University, Newcastle, [3]IFR, Norwich

Background: Alterations in DNA methylation patterns are seen commonly in tumours and may be affected by folate status. In Ulcerative Colitis (UC), folate status may be adversely affected by chronic inflammation, malabsorption and certain drugs. Our aim was to assess the genomic DNA methylation status in the macroscopically normal mucosa and folate status in a cohort of UC patients.
Methods: Colorectal mucosal biopsies were obtained and DNA extracted from 244 patients. Genomic DNA methylation was measured using the tritium-labeled cytosine extension assay (^{3}[H] dCT*P*). In this assay, the extent of ^{3}[H] dCT*P* incorporation into DNA is inversely proportional to the global DNA methylation status.
Results:

Subject Group	Age (SD)	Genomic DNA methylation (DPM × 10^3/μg DNA)	RCF concentrations (ng/ml)
UC ($n = 24$) 17 Male: 7 Female	58 (±12)	4·1* (2·6–6·3)	190* (160–227)
Control ($n = 220$) 118 Male: 102 Female	51 (±13)	14·5 (13–15·8)	346 (330–370)

*Statistically significant; Figures in brackets indicate 95% confidence intervals.

Conclusion: We have shown a higher methylation status in UC patients, with a corresponding lower folate status compared to control subjects. Our findings are in contrast with a previous report, but our study size was significantly larger, involved quiescent UC and used a more reproducible assay. Further investigation is required to determine the precise effects of folate status on genomic methylation and its association with colorectal cancer.

Basic/applied clinical science 0127

Bacterial dysbiosis in pouchitis – a comparative study of terminal restriction fragment length polymorphism with best culture techniques

M. Lim[1], J. Adams[3], F. M'Zali[2], S. Gonsalves[1], D. Thekkinkattil[1], H. Schuster[2], M. Wilcox[2], P. Sagar[1], P. Finan[1], D. Burke[1]

[1]Department of Colorectal Surgery, The General Infirmary at Leeds, Leeds, [2]Department of Microbiology, The General Infirmary at Leeds, Leeds, [3]Department of Biological Sciences, The University of Hull, Hull

Background: The results from previous studies on dysbiosis and pouchitis that used conventional culture techniques have been disappointing because of inherent limitations associated with the technique. We compared bacterial diversity and counts in patients who had either pouchitis or a healthy pouch using Terminal Restriction Fragment Length *P*olymorphism (a novel molecular method).
Methods: *P*ouch effluent was collected from 20 patients (15 healthy; 5 inflammed). Bacterial diversity and counts in pouch effluent was assessed using two techniques – firstly, with best culture techniques and secondly, with T-RFL*P*. Samples for culture had strict preservation of anaerobia; growth of organisms was maximised using a wide range of media. Cultured organisms underwent enumeration and phenotypic identification followed by genotypic confirmation. For T-RFL*P*, DNA was extracted from faeces and *P*CR was performed using primers (V6-V8 region) that were modified at the 5′ end. Amplicons were digested and the restricted fragments analysed by capillary electrophoresis. The electrophenograms generated were studied by principal component analysis (*P*CA) to identify dominant and important operating taxonomic units (OTUs) in the 20 patients. A p-value of less than 0·05 was significant (Mann Whitney U test).
Results: Diversity indices with T-RFL*P* were significantly higher when compared with culture techniques (12 (IQR 10–18) *versus* 5 (IQR 4–6), p value = 0·001). Using culture techniques, bacterial diversity was similar in patients with pouchitis and patients with healthy pouches (5 (IQR 4-5) *versus* 5 (IQR 4–6), p value = 0·50).
Using T-RFL*P*, bacterial diversity in patients with pouchitis was similar when compared with patients with healthy pouches (16 (11–20) *versus* 12 (9–13), *P*-value = 0·279). However, fifteen OTUs were found to be important on PCA. Bacterial counts of seven dominant organisms were similar in pouchitis and healthy pouch patients (p value > 0·05 respectively). The remaining eight organisms (OTU 100 (desulfosporosinus), 137, 193 (uncultured proteobacteria), 232, 376, 381, 414 and 465) were seen exclusively in patients with pouchitis. (p value < 0·05 respectively).
Conclusion: Bacterial diversity as measured by T-RFLP is significantly higher than with best culture techniques. Using T-RFLP, bacterial diversity and counts of dominant organisms in patients with pouchitis were similar when compared with patients with healthy pouches. T-RFLP identified several candidate organisms that may be responsible for pouchitis.

Basic/applied clinical science 0175

Suppressing Mutant p53 – A novel gene therapy for colorectal cancer

C. R. Prior[1], P. S. Rooney[2], M. T. Boyd[1]

[1]Division of Surgery and Oncology, University of Liverpool, Liverpool, [2]Royal Liverpool University Hospital, Liverpool

Background: Recent evidence suggests that elevated levels of mutant p53 may promote cancer growth as a result of mutant 'gain-of-function'. This is in addition to the loss of p53's normal tumour suppressive functions. p53 mutations are associated with increased mortality in colorectal cancer patients and it is probable that 'gain-of-function' mutations contribute to this. Studies have shown that one outcome of p53 'gain-of-function', may be to reduce the responsiveness of tumour cells to chemotherapeutic agents. We therefore hypothesise that establishing stable suppression of mutant p53 expression may reduce tumour growth and sensitise malignant cells to chemotherapy.
Methods: The mechanism of RNA interference was used to knock down p53 expression in a panel of p53 wild-type and mutant colorectal cancer cell lines. Specific siRNA sequences were designed to target the wild-type gene and the common R273H p53 point mutation. Western blotting and p53 transcriptional activity reporter assays were employed to monitor efficiency of suppression.
Results: Utilising these synthetic siRNA sequences, we achieved transient p53 silencing with a 50–80% reduction in protein expression levels. p53 transcriptional activity reduced concomitantly in wild-type cells. We selected the siRNA with the greatest mutant specificity and inserted it into a DNA delivery vector, allowing expression of siRNA-like molecules over several months. Using this innovative technology we have been able to produce stable clones in which the mutant p53 expression is reduced by 80–90% compared with the parent colorectal cell line.
Conclusion: We have successfully applied a novel gene therapy to significantly and stably reduce mutant p53 expression in colon cancer cells. We anticipate our research may suggest a future role for adjuvant genetic manipulation of mutant p53, utilising RNA interference, in the treatment of colorectal cancer.

Basic/applied clinical science 0213

Rhythms in the bowel: diurnal variation in hexose transporter expression in the intestine

A. Balakrishnan[1], A. Tavakkolizadeh[1], A. Stearns[1], J. Rounds[1], M. Giuffrida[1], J. Irani[1], D. Rhoads[2], S. Ashley[1]

[1]Brigham and Women's Hospital, Boston, Massachusetts, United States, [2]Massachusetts General Hospital, Boston, Massachusetts, United States

Background: Management of intestinal failure e.g. short bowel syndrome and malnutrition, remains insufficient and recent developments have had limited success. Known diurnal changes in intestinal transporter physiology may prove a therapeutic avenue. These rhythms increase transporter expression at times of maximal nutrient delivery, and understanding the mechanisms behind these rhythms may allow modulation of intestinal function. We compared the diurnal changes in hexose transporter expression in jejunum and ileum, and corroborate this rhythmicity at the functional level. Also, we tested whether rhythmic expression of *Sglt1* transcription factors Hepatocyte Nuclear Factors (HNF)1α and β could contribute to the SGLT1 rhythm.
Methods: *Sglt1*, *Glut2*, *Glut5*, and *Hnf1* mRNA levels in jejunal and ileal mucosa of rats killed at ZT3, ZT9, ZT15 and ZT21 (Lights-on is ZT0; $n = 8$ per time) were measured using quantitative PCR and analyzed with ANOVA. Everted sections of jejunum were used to determine glucose uptake.
Results: mRNA levels of *SGLT1*, *GLUT2* and *GLUT5* were significantly higher at ZT9 compared to ZT3 or ZT21 ($P < 0·05$). Glucose uptake was significantly higher at ZT15 ($P < 0·05$ *versus* ZT3). No temporal changes in *Hnf1a* or 1*b* mRNA levels were detected.
Conclusion: Intestinal glucose uptake varies diurnally, peaking during maximal nutrient delivery and preceded by an anticipatory increase mRNA. Absence of changes in *Hnf1a* or 1*b* mRNA suggests the involvement of downstream regulatory mechanisms, e.g., HNF1 heterodimer formation or phosphorylation. Understanding the underlying mechanisms will help identify novel approaches to therapeutic modulation of intestinal function in cases of malnutrition and obesity.

Basic/applied clinical science 0220

Green tea protects the intestinal mucosa of fasting animals by inducing changes in the level of total antioxidants, SOD, GPx and myeloperoxidase: an immunohistochemical and biochemical analyses

S. Asfar, S. Abdeen, M. Thazhumpal, H. Dashti

Department of Surgery, Faculty of Medicine, Kuwait University, Kuwait

Background: Fasting is known to cause intestinal mucosal damage which could breach the intestinal barrier and contribute to migration of micro-organisms. In a previous histological study we showed that drinking green tea for two weeks prior to fasting, protected the intestinal mucosa from fasting-induced damage. The objective is to study the mechanisms involved in the protective effect of green tea on the intestinal mucosa.

Methods: Four groups of male Wister rats were used ($n = 12$ per group):

G1: Normal controls, on rat chow diet and water *ad libitum*.
G2: Animals on rat chow diet and water *ad libitum* were fasting for 3 days (only i.p. 10% glucose 40 ml/day).
G3: 2 weeks of drinking green tea solution *ad libitum* (instead of water) & rat chow then fasted for 3 days.
G4: 2 weeks of drinking Vit. E-containing solution *ad libitum* (instead of water) & rat chow then fasted for 3 days.

On day 4 of fasting, blood was collected for biochemical analysis of total plasma antioxidants following which the animals were euthanized and 2 inches of jejunum was removed for analysis of SOD and GPx by immunohistochemical methods and MPO by biochemical analysis.
Results: Compared to G2 (fasting) group, G3 rats showed: 1. an increase ($P < 0{\cdot}001$) in total plasma anti-oxidants, 2. an increase ($P < 0{\cdot}001$) in SOD, GPx and a decrease ($P < 0{\cdot}001$) in the level of MPO in the intestinal mucosa. Although Vit. E showed an increase the level of total plasma anti-oxidants; it was not effective in inducing changes in the level of SOD, GPx and MPO.
Conclusion: Pretreatment with green tea protects the intestinal mucosa of fasting rats from free radicals-induced damage.

Basic/applied clinical science 0272

Production of adipokines from the gastric fat pad in morbidly obese women

R. Madani, R. Bhome, N. Miheisi, M. Hashemi, V. Mohamed-Ali
Univerisity College London, London

Background: The gastric fat pad (GFP) is distinct and morphologically dissimilar to other visceral adipose tissues depots. Adipokines such as RANTES (Regulated upon Activation Normal T-cell Expressed and Secreted), MCP-1 (Monocyte Chemo-attractant Protein-1), adiponectin, leptin and Interleukin-6(IL-6) are able to modulate susceptibility to obesity associated pathology. We investigated the systemic and *in vitro* release of these adipokines from GFP and compared it to that from omental (Om) and subcutaneous (Sc) in relation to body fat and insulin resistance (IR).
Methods: Obese female patients undergoing surgery ($n = 14$, mean age 44(7) years, BMI 48(14) $kg.m^{-2}$) had their fasting circulating adipokines determined. Sc, Om and GFP *in vitro* adipokine release by organ cultures were measured. IR was assessed by HOMA-R and body fat content by bioelectrical impedance.
Results: There was a significant interaction between % body fat and systemic levels of leptin and IL-6 only. Production rates *in vitro* per gram tissue/hr: RANTES median Sc 31,Om 36,GFP 89 pg/ml; MCP-1 Sc 5,Om 5,GFP 6 ng/ml; leptin Sc 1068,Om 393,GFP 402 pg/ml; adiponectin Sc 20,Om 20,GFP 17 ng/ml and IL-6 Sc 4,Om 4,GFP 4 ng/ml. There was a significant difference ($P < 0{\cdot}05$) between GFP RANTES release to that from Sc and Om.
Conclusion: The GFP does not mimic omental adipokine production and is the primary depot for RANTES production. IR and % body fat differentially regulate systemic and tissue production of adipokines.

Basic/applied clinical science 0446

Identification of a physiological high pressure zone in a modified Brooke Ileostomy – Justification for retaining the ileocolic sphincter

P. Sharma, V. Shumeyko, I. Isabell, M. Speirs, S. McKinlay, A. Macdonald
Department of Surgery, Monklands Hospital, Airdrie

Background: The traditional Brooke ileostomy removed the last 10–15 cm of small bowel in order to prevent the occurrence of terminal ileal Crohn's Disease. However this inevitably led to the removal of the ileocolic sphincter (IC). With improved preoperative diagnosis, it is easier to differentiate between UC and Crohn's allowing retention of all but the last few cm of ileum. Retaining all of the terminal ileum has the potential of retaining the ileocolic sphincter. The aim of this study was to investigate whether or not a high pressure zone existed and also its response to pharmacological stimuli.
Methods: A standard ballon manometry catheter (2mls volume) was introduced into the stoma of 7 patients who had undergone formation of an end ileostomy (IC sphincter retained). Several recordings were made at 1cm intervals from the meatus in order to identify the maximum intra-luminal resting pressure and intra-abdominal pressure. At the point of maximum resting pressure, the response to phenylephrine (10% gel) followed by GTN (0·2% paste) was recorded. Results were recorded using an Ohmeda Oestiva 5 manometry system (Philips) (mmH_g) and data analysed using ANOVA. Results were compared with 8 historical controls (ileocolic sphincter removed).
Results: The resting intra-abdominal pressure was the same in both groups – $9 \pm 3{\cdot}2$. The maximum resting intra-luminal pressure in patients (IC sphincter retained) exceeded that of historical controls $18 \pm 2{\cdot}6$ *versus* $11{\cdot}5 \pm 3{\cdot}4$, $P < 0{\cdot}05$. In response to phenyl ephrine, pressure rose to 25 ± 5, $P < 0{\cdot}05$ where the IC sphincter was retained. In historical controls the pressure remained unchanged, $12 \pm 4{\cdot}7$, P =NS. The subsequent addition of GTN to both groups lowered maximum intraluminal pressure to pre-study values, $14 \pm 4{\cdot}2$ (IC sphincter retained) and $7 \pm 3{\cdot}5$ (IC sphincter removed), P = NS.
Conclusion: These results demonstrate that retention of the ileo-colic sphincter preserves a physiological high pressure zone, the properties of which can be modified by pharmacological agents.

Basic/applied clinical science 0450

Ischaemia reperfusion injury reactive oxygen species and HIF-1

T. Richards[1], J. Stoyanova[2], D. Candinas[2]
[1]Queens Medical Centre, Nottingham, [2]University of Berne, Berne, Switzerland

Background: Ischaemia Reperfusion Injury (IRI) in vascular and transplant surgery results in increased patient morbidity and reduced operative success. IRI results in Reactive Oxygen Species (ROS) release. Under normal conditions intracellular ROS are buffered by metalloenzymes in particular by the transition metal ion copper. In IRI, ROS released activate a molecular response mediated in part by the transcription factor Hypoxia Inducible Factor 1 (HIF-1). We wished to assess a biochemical means to control HIF-1 response to ROS and therefore a potential mechanism to control IRI.
Methods: Copper deficient and copper excess cell cultures were established. Cell viability and intracellular copper concentration were assessed. HIF-1 was assessed at all stages of activation; HIF-1 nuclear protein by Western Blot, HIF-1 mRNA by Northern Blot, HIF-1 transcription activation via VEGF mRNA Northern Blot and also luciferase activity in a reporter construct. *In vivo* analysis by ELIZA for HIF-1 was performed on samples from patients with Wilson's disease.
Results: Cell viability was not affected by altering intracellular copper concentrations. Increased copper resulted in increased HIF-1 nuclear protein. Reduced copper resulted in reduced HIF-1 nuclear protein response to hypoxia and nitric oxide. Increased copper resulted in increased VEGF mRNA. Use of a reporter construct confirmed these findings at the level of HIF-1 transcription activation; increased copper resulted in increased transcription and reduced copper resulted in a reduced transcription in response to hypoxia. Interesting copper toxic biopsies from patients with Wilsons disease showed no effect, this may reflect chronic copper exposure rather than an acute response.
Conclusion: Intracellular copper concentration appears to directly affect the HIF-1 pathway of activation and response. Artificial control of the HIF-1 is feasible by altering intracellular copper and ROS balance. This method may be utilised *in vivo* to biochemically precondition organs and reduce the effect of IRI.

Basic/applied clinical science 0483

Abdominal wall matrix metalloproteinase activity in patients with abdominal aortic aneurysm

P. M. Bevis[1], J. F. Tarlton[2], R. A. J. Windhaber[1], D. C. Mitchell[1]
[1]Southmead Hospital, Bristol, [2]University of Bristol, Bristol

Background: Expression of matrix metalloproteinases (MMP) 2 and 9 (collagenases) is increased in the wall of abdominal aortic aneurysms. The increased incidence of incisional hernia in patients with abdominal aortic aneurysm (AAA) may be associated with increased collagenase activity in abdominal wall tissue. To assess the levels of MMP 2 and 9 in the connective tissue of the abdominal wall in patients with AAA compared to control subjects with no history of AAA.
Methods: Site matched samples of skin and rectus sheath were obtained at operation from patients undergoing open AAA repair and non-aneurysmal controls undergoing laparotomy for non inflammatory conditions. Gelatin zymography was used to assess levels of MMP 2 and 9. Comparisons were made using the unpaired t-test.
Results:

		ProMMP 2 Mean ± SEM	ActMMP 2 Mean ± SEM	ProMMP 9 Mean ± SEM	ActMMP 9 Mean ± SEM
Skin	AAA $n = 19$	84·87 ± 10·09	41·34 ± 9·928	41·25 ± 11·35	84·39 ± 26·25
	Control $n = 14$	123·5 ± 16·12 *	59·67 ± 8·421	58·75 ± 13·16	106·7 ± 32·13
Rectus	AAA $n = 30$	92·26 ± 10·43	13·60 ± 2·821	18·83 ± 7·333	6·115 ± 5·582
	Control $n = 14$	178·5 ± 30·25 *	63·19 ± 35·17 *	20·12 ± 11·57	17·39 ± 15·72

$P < 0{\cdot}05$ AAA *versus* controls.

Conclusion: We found no difference between MMP 9 activity in the skin and rectus sheath of patients with AAA and controls, indicating an absence of inflammation. The upregulation of MMPs previously described in AAA wall was not evident in skin and rectus, with higher activity of Pro- and MMP2 in the control tissues. This suggests that the MMP changes associated with AAA formation cannot account for increased hernia rates in the abdominal wall in patients with abdominal aortic aneurysm.

Basic/applied clinical science 0705

Replication licensing factors mcm2 and geminin are associated with poor prognostic factors in breast cancer

P. G. Roy, C. Purdie, J. J. Blow, A. M. Thompson
Ninewells Hospital and Medical School, Dundee

Background: Mcm2-7 and geminin are two key components of the replication licensing machinery which regulates DNA replication, mcm2-7 being the initiator and geminin being the repressor of DNA replication. Mcm2 is expressed throughout all four phases of the cell cycle, similar to Ki-67, while the inhibitory activity of geminin is seen during S-G2-M phases.
Methods: Expression of mcm2 and geminin and Ki67 was examined in 98 patients with invasive breast cancer using immunohistochemistry and related to clinical and pathological parameters and the Nottingham Prognostic Index (NPI).
Results: Increased expression of Ki-67, mcm2 and geminin was observed with increasing tumour grade ($p < 0{\cdot}05$, ANOVA test) for all the three proteins. Mcm2, Ki-67 and geminin correlated significantly with the NPI, with the strongest correlation for mcm2 score ($p < 0{\cdot}001$, Pearson-Spearman's correlation rank correlation). Mcm2 and geminin correlated inversely with ER status with high labelling indices of these markers in ER negative tumours (student t test, $P < 0{\cdot}0001$).
Conclusion: This study demonstrates that mcm2 and geminin correlate with poorly differentiated (ER-negative and high grade) breast cancers and with NPI. This presents an opportunity for therapeutic intervention in the replication licensing machinery particularly in poor prognostic cancers.

Basic/applied clinical science 0716

Increased insulin production may explain resolution of type 2 diabetes after Roux-en-Y gastric bypass

A. Osborne[1], C. Le Roux[2], S. C. Hawkins[1], M. Ghatei[2], S. Bloom[2], R. Welbourn[1]
[1]*Department Upper Gastrointestinal Surgery, Musgrove Park Hospital, Taunton,* [2]*Department Metabolic Medicine, Imperial College London, London*

Background: The laparoscopic Roux-en-Y gastric bypass (LRYGB) causes long term weight loss in morbidly obese individuals and resolution of type 2 diabetes in 80% of patients independent of weight loss. It is unknown how the operation exerts such profound effects, which are normally seen in the first week after surgery. We aimed to investigate the changes in insulin resistance and insulin production in the first week after LRYGB and to correlate these with the known incretin, glucagon like peptide 1 (GLP-1).
Methods: Sixteen patients undergoing LRYGB were studied preoperatively and at two, four, seven and forty two days postoperatively. After a 12-hour fast a standard 420 kcal meal was consumed and blood samples collected over three hours. Plasma levels of insulin, glucose and GLP-1 were measured. Insulin resistance was measured using the homeostatic model approach (HOMA-IR). Pre-operative and post-operative results were compared in the diabetic and non-diabetic groups.
Results: Five men and 11 women were recruited (mean [SD] age 47·8 [2·0] years; body mass index 49·1 [1·3] kg/m^2); nine had type 2 diabetes. By day 2 both groups showed a significant increase in insulin production ($P < 0{\cdot}05$). GLP-1 production increased in the diabetics by day 2 ($P < 0{\cdot}05$) and in the non-diabetics by day 7 ($P < 0{\cdot}05$). HOMA-IR was high in the diabetic group but fell on day 7 and 42, indicating improvement in insulin resistance ($P < 0{\cdot}05$). Fasting GLP-1 was unchanged.
Conclusion: The significant re-routing of the meal stimuli after LRYGB surgery alters the insulin and GLP-1 response to food and decreases insulin resistance within the first week of the surgery. Changes in insulin resistance appears independent from fasting GLP-1 concentrations. Increased insulin production in the first week after surgery may in part be explained by increased postprandial GLP-1 responses. The altered glycaemic control potentially has a greater impact on morbidity and mortality than weight loss.

Basic/applied clinical science 0812

Overexpression of c-Myc & survivin in invasive breast cancer: in vitro evidence

D. Collins, M. McIlroy, A. D. K Hill, L. Young
Department of Surgery, Royal College of Surgeons, Ireland, Dublin

Background: Variability in breast cancer survival may result from overexpression of different oncogenes. The poorer prognosis associated with the proto-oncogene, c-Myc may be related to an undetermined role in tumour invasion. We compared an estrogen-dependent and poorly invasive adenocarcinoma cell line, MCF-7, with an estrogen-independent and highly invasive derived, LCC1, to determine relative expression of c-Myc and its target protein, survivin, in these differing cell lines.
Methods: MCF-7 and LCC1 lines were treated with standardized physiological doses of EGF (10 nM), the EGFR inhibitor, AG1478 (100 nM) and the Her2/neu receptor inhibitor, trastuzumab (Herceptin^{TM}). Western Blot analysis of c-Myc and survivin was performed and their differential expression was measured by comparative densitometry.
Results: C-Myc and survivin were expressed at elevated levels in the highly invasive LCC1 line as compared to MCF-7. Activation of MAP kinase pathway with EGF treatment led to increased expression. Treatment with AG1478 and Herceptin^{TM}, specific inhibitors of EGFR and Her2 receptors respectively diminished c-Myc and survivin expression.
Conclusion: Transformation to the invasive phenotype may be as a consequence of increased signaling through growth factor pathways. Tyrosine kinase receptor inhibitors may be beneficial in the treatment of locally invasive breast cancer.

Basic/applied clinical science 0825

Hsp27 expression in lymph node positive colorectal cancer is associated with poor prognosis

I. Khattak[1], E. Tweedle[1], W. Greenhalf[1], R. Jenkins[3], B. Azadeh[2], A. Dodson[2], E. Costello[1], P. S. Rooney[2]

[1]Division of Surgery and Oncology, University of Liverpool, Liverpool [2]Royal Liverpool University Hospital, Liverpool, [3]Department of Pharmacology, University of Liverpool, Liverpool

Background: The survival of stage matched colorectal cancer (CRC) patients following curative resection varies considerably. The precise reasons for this are unknown, although the distinct biology of individual tumours is likely to play a role. It was our aim to identify differences in the abundance of proteins that may reflect the unique tumour biology responsible for variability in the clinical outcome of same-stage disease.
Methods: Tumour tissue (Dukes C from the left colon) was sampled from 12 patients (male : female 8 : 4, median age 66 [range 61–80] years). Proteins were extracted, separated by 2-D gel electrophoresis, stained, and analysed for differences in spot intensities. Differentially represented spots were isolated, subjected to in-gel trypsin digestion and resulting peptides analysed by mass spectrometry for protein identification. Protein expression was validated using immunohistochemical staining of a CRC tissue microarray ($n = 122$ patients) and further analysed with respect to clinicopathological factors.
Results: Heat shock protein 27 (Hsp27) was identified as differentially expressed. The expression of Hsp27 did not correlate with survival. Lower survival was seen in node positive patients ($p = 0{\cdot}034$). However, nodal status was much more significantly related to survival in patients positive for Hsp27 staining ($n = 93$, $p = 0{\cdot}008$) but not in patients lacking detectable Hsp27 expression ($n = 29$, $p = 0{\cdot}680$).
Conclusion: Our results confirm that nodal status is a prognostic marker, but surprisingly this seems to be the case only if the tumour expresses Hsp27. These results suggest that tumour cells lacking elevated Hsp27 expression can invade the lymph nodes but may be less aggressive than their Hsp27-positive counterparts. Our finding is novel and may be used to predict more accurately the prognosis of patients with node positive CRC and to hence to guide treatment options.

Basic/applied clinical science 0851

Dyes used in sentinel node biopsy have genotoxic effects on benign breast cells; possible implications for practice

Y. A. Masannat[1], A. M. Hanby[1], J. Olliver[2], K. Horgan[1], L. Hardie[3]

[1]Leeds General Infirmary, Leeds, [2]UK Clinical Research Network, Leeds, [3]Leeds Institute of Genetics, Health and Therapeutics, Leeds

Background: Sentinel lymph node biopsy (SLNB) in breast cancer patients is being widely used to predict the lymph node status of patients who are node negative clinically. This procedure involves injection of dye alone or in combination with radioisotope tracer to localise the Sentinel lymph node or nodes in the affected breast. This study investigates the potential genotoxic effect of dyes commonly used in this procedure namely methylene blue (MB) 1%, patent blue V (PBV) 2·5% and indigo carmine (IDC) 0·4%.
Methods: HB-2 cells (a benign breast cell line) were exposed to the dyes at concentrations comparable to those used for SLNB procedure in clinical practice. The exposure was for 5 minutes under controlled light conditions. DNA damage (single strand breaks) was investigated using the comet assay. The enzyme Fapy-DNA glycosylase was incorporated to enable the detection of additional oxidative damage.
Results: DNA strand break damage, expressed as the median percentage of tail DNA and interquartile range (IQR), was significantly ($P < 0{\cdot}05$) elevated in cells treated with MB (32·91%; IQR 29·32–35·37) and PBV (25·54%; IQR 22·22–26·83) compared with untreated control cells (8·52%; IQR 7·50–11·92). In contrast, IDC treatment (9·76%; IQR 8·63–11·08) did not elevate levels of DNA damage above control values. Addition of Fapy-DNA Glycosylase enzyme to detect further oxidative damage revealed somewhat increased levels of oxidative DNA lesions in both MB and PBV treated cells compared to the negative controls although this increase did not reach statistical significance.
Conclusion: In this study, MB and PBV but not IDC induced significant DNA damage in benign breast epithelial cells *in vitro*. Breast exposure to the dyes following SLNB can be prolonged lasting for months. These data suggest that MB and PBV usage during SLNB has the potential to elevate DNA damage in remaining normal breast tissue contrasting with IDC. Further studies are needed to assess the clinical significance of these *in vitro* observations.

Basic/applied clinical science 0912

N-Acetylcysteine improves the metabolic function of steatotic human Hepatocytes for cell transplantation

F. G. Sagias, R. Mitry, R. Hughes, A. G. Patel, A. Dhawan

King's College School of Medicine at King's College Hospital, Institute of Liver Studies, London

Background: As with all donor organs the supply of liver tissue, which is available to prepare hepatocytes for cell transplantation, is limited. The hepatocytes obtained from tissues which have been rejected for transplantation on the grounds of being steatotic are of low viability and not suitable for clinical use. The **aim** of this study was to improve the metabolic/synthetic function of hepatocytes isolated from rejected fatty donor liver by adding antioxidant agents such as N-acetylcysteine (NAC) during cell isolation. If successful, the treated isolated cells could be used for future hepatocyte transplantation, increasing the donor pool.
Methods: Human hepatocytes were isolated from 10 donor liver tissues (M=7; F=3) rejected for transplantation on the grounds of being severely steatotic (> 50%). The median donor age was 56 years (range: 44–76 y). The left lateral segment of the donor liver was dissected into two equal size pieces. In each experiment the two tissues were randomised either to control or perfused with NAC. The tissues were then digested using a standard collagenase perfusion technique. NAC (5 mM) was added to the first perfusion buffer in the NAC-treated tissue. The isolated hepatocytes were cultured for 24h and then assays of hepatocyte metabolic and synthetic function were performed.
Results: The median liver cold ischaemia time was 19h (11–29). Tissues perfused with NAC compared to control gave a higher median cell viability of 81% (72%–91%) *versus* 66% (38%–-82%), $P < 0{\cdot}01$ (Mann-Whitney U test). There was also an increased median viable cell yield 2·7 million cells/g (0·5–5·6) *versus* 0·5 (0·3–3·6), $P < 0{\cdot}05$. Overall metabolic cell activity (MTT assay) was 109% greater in tissues perfused with NAC ($P < 0{\cdot}05$). Cell attachment (SRB assay) showed a similar pattern with a 100% increase ($P < 0{\cdot}05$). The increase in protein synthesis ([^{14}C]-leucine incorporation assay) was 24% in tissues perfused with NAC, with a median increase of albumin content of 148%. In tissues perfused with NAC there was a 32% decrease of iNOS activity detected by ELISA.
Conclusion: The addition of NAC during isolation of hepatocytes from steatotic donor liver tissue gave improved cell metabolic and synthetic function. These cells could be used for hepatocyte transplantation in children with inherited metabolic liver disease or acute liver failure.

Basic/applied clinical science 0949

Alterations in endothelin-1 and nitric oxide pathways in non-ischaemic muscle of patients with atherosclerosis

J. C. S. Tsui[1], M. R. Dashwood[1], S. G. Shaw[2], D. M. Baker[1]

[1]Royal Free Hospital, London, [2]University of Bern, Bern, Switzerland

Background: Endothelin-1 (ET-1) and nitric oxide (NO) are important in the maintenance of endothelial function. Upregulation of the ET-1 pathway and NO synthase (NOS) isoforms have been shown in ischaemic muscle of patients with peripheral arterial disease (PAD). This study investigated whether changes in ET-1 and NO occur in non-ischaemic skeletal muscle of patients with atherosclerosis.

Methods: Following ethical committee approval and patients' informed consent, muscle biopsies were obtained from 12 patients with no clinically significant atherosclerotic disease undergoing orthopaedic surgery (control) and 12 patients undergoing coronary artery bypass grafting with no clinical evidence of PAD (atherosclerotic). The ET-1 pathway was studied using immunohistochemistry, real-time RT-PCR for ET-1, ET receptor mRNA levels and ET receptor subtype autoradiography. The NO pathway was investigated using NOS immunohistochemistry, real-time RT-PCR and Western blotting and NOS activity was assessed with the citrulline assay. The Mann-Whitney test was used for statistical analyses.
Results: Positive ET-1 immunoreactivity was demonstrated in control and atherosclerotic muscle sections, mainly associated with microvessels. No significant differences in ET-1 and ET_A receptor mRNA expression were found, however ET_B receptor mRNA levels were reduced in atherosclerotic biopsies ($p = 0{\cdot}017$). No difference in ET receptor binding was found between the 2 groups.
All 3 NOS isoforms were found in muscle sections associated with muscle fibres and microvessels. Higher NOS I and III mRNA levels were found in atherosclerotic biopsies compared to controls ($p = 0{\cdot}004$ and $0{\cdot}002$) whilst no change in NOS II mRNA occurred. No changes in NOS protein levels or NOS activity were found.
Conclusion: Downregulation of ET_B receptor mRNA occurs in non-ischaemic muscle from patients with atherosclerosis. Transcriptional activation of NOS I and III was also demonstrated. These results demonstrate that dysfunction of these endothelial pathways occur systemically in atherosclerosis and may eventually lead to clinical disease. Modification of these pathways may alter disease progression.

Basic/applied clinical science 1075

Tumour-Mesothelial cell interactions may potentiate peritoneal metastasis in gastric cancer – the role of Interleukin-6

S. Rekhraj, G. Roberts, S. Prabhudesai, A. Darzi, P. Ziprin
Imperial College London, London

Background: Peritoneal metastasis is a significant occurrence in gastric cancer and is associated with a poor prognosis. Tumour-host interactions have been shown to be important in tumour biology. We have previously demonstrated MMP 2 and 9 upregulation following tumour-mesothelial contact. IL6 has been reported to regulate MMP expression and play a role in cancer cell proliferation. The aims of this study were to investigate changes in cytokine expression in tumour and mesothelial cells following co-culture, and to investigate the possible role of these changes in promoting metastases.
Methods: Human peritoneal mesothelial cells (HPMC) were co-cultured with HGC27 gastric cancer cells for varying periods. Changes in IL6 gene and protein expression were analysed using quantitative RT-PCR and ELISA. The effect of IL6 on MMP expression and cell proliferation was analysed using gelatin zymography and MTS assay respectively. All experiments were performed three times in triplicate. Kruskal-Wallis test was performed for multiple comparisons and differences between each group were analysed using Mann-Whitney *U* test.
Results: *il6* gene expression increased by greater than 10-fold in both cell lines after 3 hours of contact, with near 100-fold upregulation in HPMC following 24 hours contact with HGC27. IL6 protein expression was significantly enhanced in both cell types after 3, 6 or 24 hours of contact ($p < 0{\cdot}001$, HGC27 and IL6 *versus* control; $p < 0{\cdot}01$, HPMC and IL6 *versus* control, at all time points). Exogenous IL6 stimulation did not effect MMP2 and MMP9 activity in either cell type, however, it caused a significant upregulation of HGC27 cell proliferation ($p < 0{\cdot}01$).
Conclusion: Tumour-mesothelial interaction results in upregulation of IL6 expression in both tumour and mesothelial cells. IL6 stimulation of HGC27 cells results in increased proliferation. IL6 upregulation following tumour-mesothelial contact may represent a mechanism by which tumour growth is enhanced following tumour-mesothelial contact.

Basic/applied clinical science 1102

Elevated tgfbeta and VEGF, a mechanism for abnormal extra-cellular matrix turnover in hypoxic skin

S. Dalton[1], D. Mitchell[2], C. Whiting[3], J. Tarlton[3]
[1]Royal United Hospital, Bath, [2]Southmead Hospital, Bristol, [3]University of Bristol, Bristol

Background: Chronic dermal hypoxia results in poor wound healing and ulceration. Extra-cellular matrix metabolism is sensitive to changes in oxygen tension. We have previously demonstrated increased collagen turnover in chronically ischaemic non-injured skin[1]. We hypothesise that the mechanisms of this elevated turnover, found physiologically in the acute wound, may exist in uninjured but ischaemic skin thereby predisposing it to ulceration.
Methods: Full thickness, paired biopsies of uninjured skin were harvested at below knee amputation from twenty patients with peripheral vascular disease (PVD) following quantification of ischaemia. Paired samples were taken from the resection margin and 2 cm proximal to the medial malleolus. Total collagen type I synthesis was measured by immuno-assay and lactate by enzymatic determination. Transforming growth factor (TGF) beta1 and vascular endothelial growth factor (VEGF) by elisa and TGFbeta1 receptors, phospho-smad2 and smad 7 receptors by immunohistochemistry.
Results: A significant elevation of collagen synthesis ($p < 0{\cdot}001$) and lactate ($p < 0{\cdot}001$) was found in the hypoxic samples. Phospho-smad2 and smad7 were elevated indicating increased TGF-beta signaling. TGFbeta1($p < 0{\cdot}05$) and VEGF($p < 0{\cdot}05$) were also elevated in the ischaemic skin.
Conclusion: In the acute wound, local hypoxia secondary to oedema and disrupted microvasculature leads to matrix deposition through the actions of lactate and TGFbeta1. Here we demonstrate that a similar mechanism exist secondary to tissue ischaemia in the uninjured but ischaemic skin of patients with PVD. This altered matrix deposition may predispose to tissue breakdown.
1. J Invest Dermatol. 2005 Aug;125(2):373–9.

Basic/applied clinical science 1137

Mapping of anorectal electrosensitivity by multi-point stimuli

F. Mansoor, L. Irvine, M. A. Thaha, K. L. Campbell
Colorectal Unit, Ninewells Hospital & Medical School, Dundee

Background: Sensorineural function in the anorectal region is increasingly recognised to be important but remains poorly understood. Currently available probes for testing anal electrosensitivity generate a single circumferential or double bilateral value. This study aimed to investigate the degree of electrosensory discrimination in the anorectum to see whether a more rigorous assessment was merited.
Methods: Four quadrant mapping of anorectal electrosensitivity at 1,3 and 6cm from the anal verge was undertaken using a modified St Mark's electrode and a constant current stimulator (Dantec) delivering 200us pulses at 5Hz. Threshold of first sensation was measured in milliamperes. Data were collected prospectively from 410 consecutive referrals to the Anorectal Physiology Lab. Ranked analyses were employed using Friedman repeated measures ANOVA with inter group comparison by Student-Newman-Keuls method. Statistical package was Sigmastat 3·5.
Results: In each quadrant, electrosensory thresholds increased progressively with distance from the anal verge. In each case, the levels differed significantly (Friedman $p < 0{\cdot}001$ and SNK $p < 0{\cdot}05$) allowing ranges of normality to be set. The 4 quadrants differed significantly at 1cm (Friedman $p < 0{\cdot}001$) and at 3cm (Friedman p0·014) but no differences were observed at 6cm. Single segment sensory deficiencies were observed in this symptomatic population.
Conclusion: These data suggest a complex pattern to anorectal sensory function with ability to discriminate between stimuli in 4 separate quadrants in the anal canal which is lost beyond the anorectal junction. Segmental sensory deficits may underlie some functional disorders and would be unrecognized by conventional methodology. Further investigation to ascertain the clinical correlates of segmental deficits is required.

Cancer/surgical oncology

Cancer/surgical oncology 0034

Lymph node status and breast cancer-related lymphoedema

T. M. Bennett Britton, M. B. Klevesath, P. Chou, O. Agbaje, S. Duffy, A. D. Purushotham
King's College London, London

Background: The pathophysiology of breast cancer-related lymphoedema (BCRL) is poorly understood. It has been assumed that one of the factors predisposing to the development of BCRL is nodal positivity, although retrospective studies have shown contradictory findings. As these studies have included treatment regimens known to cause BCRL, such as axillary radiotherapy, any relationship between nodal positivity and the development of BCRL remains speculative. This study examines the association between nodal positivity and the risk of developing BCRL in patients who underwent axillary lymph node dissection (ALND).
Methods: A total of 212 patients who had undergone ALND for invasive breast cancer (in 2 prospective studies) had arm volume measurements pre-operatively, and at intervals post-operatively. No patient received axillary radiotherapy. Arm volumes were obtained by measuring serial arm circumferences every 4 cm up the arm and then calculated by using the formula for the volume of a truncated cone.
Results: In all, 64/212 (30%) patients were node positive. Contrary to previous assumptions, positive node status was significantly inversely associated with arm volume after adjusting for tumour size, time since operation and allowing for correlated observations within subjects. Furthermore, the number of positive nodes also correlated inversely with arm volume.
Conclusion: These results are counterintuitive to the conventional understanding of the pathophysiology of BCRL. A possible explanation for this observation is that patients who develop metastatic disease in axillary lymph nodes and then subsequently undergo ALND have more time and ability to develop lymphatic collaterals, which may provide adequate lymphatic drainage following surgery thereby reducing the risk of developing BCRL.

Cancer/surgical oncology 0050

Management of hilar lymph node during resection of liver metastases from colorectal cancer – A systematic review

C. J. Imber, K. Gurusamy, B. R. Davidson
Royal Free Hospital, London

Background: Colorectal cancer is the third commonest malignancy in the United Kingdom. Liver is the commonest site of recurrence in those who undergo curative resection for colorectal cancer. While some consider involvement of hepatic lymph nodes as a contraindication for resection, others advocate hepatic lymphadenectomy in the presence of macroscopic involvement while yet others advocate hepatic lymphadenectomy routinely. The aim of this review is to determine the prognostic significance of hepatic lymph node metastases in patients undergoing surgery for colorectal cancer liver metastases and to assess the role of lymphadenectomy in resection of liver metastases from colorectal cancer.
Methods: Medline, Embase and Central databases were searched using a formal search strategy. Trials with survival data with a minimum follow-up of 1 year were considered for inclusion. Meta-analysis was performed using Revman.
Results: A total of 4230 references were identified. Ten reports of nine studies including 926 patients qualified for the review. The prevalence of nodal metastases after routine lymphadenectomy was 16·3%. The overall 3-year and 5-year survival rates in node positive patients were 9/151 (11·3%) and 2/137 (1·5%) respectively compared to 3-year and 5-year survival rates of 424/787 (53·9%) and 246/767 (32·1%) in node negative patients. The odds ratios for 3-year and 5-year survival in node positive disease compared to node negative disease were 0·12 (95% CI 0·06 to 0·24) and 0·08 (95% CI 0·03 to 0·22). There was no randomized controlled trial which assessed the survival benefit of routine or selective lymphadenectomy.
Conclusion: (1) Patients with enlarged hilar lymph nodes require histological confirmation of metastatic disease. (2) Patients with confirmed hepatic node-positive status have a poor prognosis in spite of resection with few 3 year survivors (3) Microscopic nodal disease carries the same bad prognosis as macroscopic nodal disease. (4) There is no evidence of survival benefit from routine lymphadenectomy. (5) In patients with macroscopic hilar nodal involvement, there is no evidence to suggest that lymphadenectomy with liver resection is beneficial.

Cancer/surgical oncology 0073

Comparison of morbidity of one-step ALND *versus* two-step axillary treatment (sentinel node biopsy + delayed ALND) in early breast cancer patients

A. Chhabra, A. Goyal, R. E. Mansel
Department of Surgery, Wales College of Medicine, Cardiff University, Cardiff

Background: Approximately, 20–30% of patients undergoing sentinel lymph node biopsy (SLNB) for early breast cancer are node positive and will need delayed completion axillary lymph node dissection (ALND). The second operation may be more difficult due to scarring and edema and may be associated with increased morbidity and psychological trauma. This study compares the morbidity in patients undergoing the two-step procedure (SLNB followed by delayed completion ALND) *versus* those undergoing complete ALND in the first operation (one step procedure).
Methods: A secondary analysis of the ALMANAC randomised trial was performed in which we compared these two groups of patients. Outcome variables were assessed at baseline and at 3, 6 and 12 months after surgery.
Results: 83 patients randomised to SLNB had SLN metastases and were subjected to delayed completion ALND (two-step ALND). These were compared with the patients undergoing ALND as the only axillary procedure (one-step ALND). There was no significant difference in lymphedema, sensory loss, risk of intercostobrachial nerve division rates, impairment of shoulder movement, infection rate and time to resumption of normal day-to-day activities after surgery between the two groups. Median operative time was significantly higher for completion ALND in the two-step group when compared with one-step ALND (33 min *versus* 22 min, $p < 0{\cdot}001$). However, the median hospital stay for the second surgery in the two-step group was similar to one-step ALND. Not surprisingly, the total median axillary operative time and hospital stay ($1^{st} + 2^{nd}$ surgery) were significantly higher for the 2-stage procedure (53 min *versus* 22 min, $p < 0{\cdot}001$; 10d *versus* 6d, $p < 0{\cdot}001$).
Conclusion: Two stage procedure in patients with sentinel node metastases has similar immediate and long term morbidity to one stage ALND. The second surgery in SLN positive patients is associated with increased axillary operative time and total hospital stay. These data suggests that intra-operative assessment of SLN may help to eliminate the need for second surgery and potentially reduce healthcare costs.

Cancer/surgical oncology 0109

Residual disease after excision of ductal carcinoma *in situ* of the breast: a multivariate regression analysis of predictive factors

J. T. Jenkins, J. Mansell, C. R. Wilson, E. A. Mallon, J. C. Doughty, W. D. George
Western Infirmary, Glasgow

Background: Recurrent disease after DCIS treatment may result from outgrowth of the same disease; "residual disease"; or a new primary tumour. The only definitive method of detecting residual disease involves further surgery. Reliably predicting residual disease and the need or avoidance of further surgery to modify the likelihood of recurrence would usefully guide surgical management.
Methods: From a cohort of 712 DCIS patients, 432 consecutive patients with definitive assessment for residual disease were assessed [tumour bed assessment by cavity shavings; re-excision specimen analysis; mastectomy specimen analysis (Mastectomy specimen analysis has not featured in many other studies)]. Patients undergoing mastectomy as the initial surgical procedure were excluded. Multiple clinical factors were prospectively recorded and multiple histopathological features were reassessed by a single pathologist. Univariate predictors of residual disease were submitted to multivariate logistic regression analysis to identify independent predictors of residual disease.
Results: Of 432 patients, 201 (46·5%) had residual disease. 205 (47%) initial excision margins were involved; single margin involvement in 84 specimens, the remainder had two or more involved margins. Significant uni-variate predictors were; margin status (< 1 mm/1–9 mm/> 10 mm; number of involved margins), extensive DCIS, pathological size, comedonecrosis, micropapillary histology, nuclear grade, Van Nuys Pathological Classification, volume of excision, HRT use, and presentation mode. Multivariate logistic regression assessed a suitable model for residual disease prediction. Margin status [OR 2·5 (95%CI 1·16–5·39)], extensive DCIS [OR 2·16 (95%CI 1·49–3·14)], micropapillary [OR 2·29 (95%CI 1·41–3·73)] and comedonecrosis histology [OR 1·66 (95%CI 1·17–2·36)] were independent predictors of residual disease.
Conclusion: Identifying a group of DCIS patients at highest risk of residual disease is worthwhile. Patients with one or more risk factors may benefit from re-excision, mastectomy, or radiotherapy, to reduce recurrence. This study reports a large consecutive series of DCIS patients with consistent pathological reporting.

Cancer/surgical oncology 0110

The influence of UKDCIS Trial participation on outcome compared to eligible non-participants with ductal carcinoma *in situ* of the breast

J. T. Jenkins, J. Mansell, C. R. Wilson, E. A. Mallon, J. C. Doughty, W. D. George
Western Infirmary, Glasgow

Background: Patient selection for randomised trials may significantly affect the applicability of results. Three randomised DCIS trials have attempted to simplify treatment selection. Important parameters in predicting local recurrence (tumour size, margin width, nuclear grade, etc) were not routinely collected. Comparing non-participants with trial participants may give insight into the selection process and therefore the interpretation and application of trial results. Most trials do not record this information.
Methods: A large number of UKDCIS trial participants were recruited from our unit. Demographics, treatment, pathological variables and outcomes were prospectively recorded and consecutive trial patients compared to eligible non-participants. Survival analyses employed Kaplan-Meier methods and the log rank test.
Results: 598 patients were assessable. 335 patients were ineligible due to study protocol or treatment occurring before or after trial start/completion dates. Trial participation was offered in 224 (85·5%) patients; not offered in 31 (11·8%); unrecorded in 7. 103 (39·5%) were recruited. On univariate analysis, only affluence was associated with participation ($x^2 = 7{\cdot}704$, df = 2, $p = 0{\cdot}02$). No significant pathological or clinical associations were identified, although trial participants were more likely to receive adjuvant radiotherapy than eligible non-participants (OR= 2·115 95%CI 1·59–2·81). Outcome differed little between each group in terms of true local recurrences (OR= 0·775 95%CI 0·464–1·297) and for all ipsilateral breast events (OR= 0·739 95%CI 0·464–1·176). Survival analysis found no significant effect of trial participation on ipsilateral breast event rates (log rank-1·93, df=1, $p = 0{\cdot}1653$).
Conclusion: We are reassured that no significant differences exist for the clinicopathological criteria assessed between trial participants and eligible non-participants, though increased radiotherapy rates were identified.

Prospective registration and follow-up of non-randomised patients for evaluating the applicability of trial results is necessary to ensure quality data are obtained. Larger studies may confirm our findings.

Cancer/surgical oncology 0134

Colorectal associations and societies' websites worldwide: Do they provide the enough information for patients and professionals?

A. A-Bahrani, C. Alexakis, A. Bedi, M. Hilmi, A. Amin
Hemel Hempstead Hospital, Hemel Hempstead

Background: The internet has been increasingly used by cancer patients and relatives worldwide in order to obtain health information. The aim of this study is to assess the websites of colorectal associations and societies for information on colorectal cancer.
Methods: The world wide web (www) was searched using Google search engine for two search phrases "association" and "society" with "bowel cancer" and "colorectal cancer", the first 100 websites in each of the four lists were visited. Sites of associations and societies were assessed for information on colorectal cancer using "Discern" instrument.
Results: Google engine identified 1 740 000, 1 670 000, 4 530 000 and 4 180 000 under the terms "association bowel cancer", "society bowel cancer", "association colorectal cancer" and "society colorectal cancer" respectively. Out of 400 sites visited, 22 (6%) sites were association and society websites, which were assessed. The United State (45%) and United Kingdom (18%) were the most common countries of these websites. General information was given in 91% of sites, while treatment information given in 2/3 of sites. The information was directed to patients and general people in 77% and professionals in 64%. The source and date of information was reported in 86% of sites. Additional support was provided in 91% of sites. Risks and side-effects of treatment was reported in only 9% of sites and consequences of no treatment and shared decision were not recorded in any of the sites. Good websites counted for only 23% of the sites assessed, none of them were excellent sites according to "Discern".
Conclusion: Limited information on colorectal cancer was provided in all association and societies of coloproctology. Our recommendations for these associations and societies are to provide comprehensive information on this common cancer for patients and professionals in order to improve patient's knowledge and prospects.

Cancer/surgical oncology 0154

The effect of margin status on local recurrence following breast conservation and radiation therapy for DCIS

C. Dunne[1], C. Canning[1], M. Morrow[2], M. Kell[1]
[1]Mater Misericordiae University Hospital, Dublin, Ireland, [2]Fox Chase Cancer Center, Philadelphia, PA, United States

Background: There is no consensus on what constitutes an adequate surgical margin in patients receiving breast conserving surgery (BCS) and postoperative irradiation (RT) for ductal carcinoma *in situ* (DCIS). Inadequate margins may result in high local recurrence, and excessively large resections may lead to poor cosmetic outcome without oncological benefit.
Methods: A comprehensive search for published trials which examined outcomes after adjuvant RT following BCS for DCIS was performed using medline and cross referencing available data. Reviews of each study were conducted, and data were extracted. Fixed and random effects methods were used to combine data. Primary outcomes were in breast tumour recurrence (IBTR) related to surgical margins.
Results: Analysis of 3606 patients from randomized trials confirms that patients with negative margins are significantly less likely to recur than those with positive margins after RT (RR 0·53, 95% CI = 0·42 to 0·66, $p < 0{\cdot}01$). Combined data from randomized and non randomized trials, of 5500 patients, demonstrates that where the margin status is close or unknown there is significant risk of IBTR compared to a negative margin (RR1·68, 95% CI = 1·22–2·33, $p < 0{\cdot}01$).

When specific margin thresholds are examined a 2 mm margin is superior to less than 2 mm (OR = 0·67, 95% CI 0·51–0·89, $p < 0·01$), however we saw no significant difference in the rate of IBTR between a 2 mm margin and > 5 mm (OR =1·49, 95% CI 0·54 to 4·9, $p > 0·05$).
Conclusion: Surgical margins negative for DCIS should be obtained following BCS for DCIS. A margin threshold of 2 mm appears be as good as a larger margin when BCS for DCIS is combined with RT.

Cancer/surgical oncology 0172

A comparative study of colonic stenting for malignant intra-and extra-luminal bowel obstruction

W. Chua, A. Engledow, D. Raptis, A. Hatfield, A. Obichere
University College Hospital, London

Background: Colonic stenting is becoming widely accepted as either a bridge to surgery or for palliation of large bowel obstruction secondary to colorectal cancer (CRC). Little data exists in the literature examining the role of colonic stents to treat bowel obstruction resulting from malignant extrinsic disease. We compared colonic stenting for palliation of large bowel obstruction arising from intra-and extra-luminal malignancy.
Methods: All patients undergoing colonic stenting for palliation of malignant large bowel obstruction (intra- and extra-luminal), over a five year period (April 20001–April 2006) were included in the study. Recorded data were; patient demographics, type of tumour, site of obstruction, complications (perforation, displacement and re-obstruction) and outcome. Data were recorded prospectively into a database and retrospectively analysed. The primary end point was relief from obstructive symptoms.
Results: There were 21 patients with clinical and radiological diagnosis of large bowel obstruction. 9 were male and 11 females, median age 65 (range 42 to 86) years. Ten patients had a colonic stent (Wallflex) for intra-luminal large bowel obstruction due to CRC. There were no significant demographic differences between the two groups ($p > 0·05$). Left-sided extra-luminal obstruction was from metastatic disease with unknown primary ($n = 4$), uterine cancer ($n = 2$), bladder cancer ($n = 2$), ovarian cancer ($n = 2$) and oesophageal cancer ($n = 1$). All intra-luminal cases of colonic obstruction were also left sided; splenic flexure ($n = 1$), sigmoid ($n = 8$), upper rectum ($n = 1$). Perforation occurred in 6 patients (3 in either group) resulting in 2 deaths (1 in either group). Three stents were expelled (1 intra-, 2 extra-luminal) and 2 patients re-obstructed (1 in either group), but were successfully re-stented with relief of obstruction. Palliation was successful in 10 patients with complete resolution of symptoms (5 in either group). There were no statistical differences in any of these parameters.
Conclusion: The results of colonic stenting to relieve left sided large bowel obstruction from intrinsic and extrinsic malignant disease are comparable. Colonic stents should be considered to palliate bowel obstruction from either intra- or extra-luminal malignancy.

Cancer/surgical oncology 0179

Area-specific tumor budding in T2 colorectal cancer: an independent predictive factor for lymph node metastasis

H. Uchida[1], H. Hirotoshi[1], N. Hideki[1], I. Yoshiyuki[1], E. Tkashi[1], M. Mukai[2], M. KItajima[1]
[1]Keio University School of Medicine,Depertment of Surgery, Tokyo, Shinnjuku-ku, Shinanomachi 35, Japan, [2]Keio University School of Medicine,Depertment of Pathology, Tokyo,Shinnjuku-ku,Shinanomachi 35, Japan

Background: Tumor budding at the invasive front of colorectal cancer is well-known as an important predictive factor for nodal and distant metastasis. Cancer is a heterogeous disease histopathologicaly. The aim of this study was to investigate tumor budding in different specific areas of T2 colorectal cancer, and to clarify an optimal area for prediction of lymph node metastasis.
Methods: In 228 T2 colorectal cancers operated between 1990 and 2001, tumor budding in the submucosal invasive front and proprial muscular invasive front, and other histopathological findings; poor differentiation, lymphatic and vascular invasion were reviewed and predictive significance for lymph node metastasis were evaluated for each factor. High-grade tumor budding was defined as 5 or more foci in a ×200 microscopic field.
Results: Lymph node metastasis was found in 62 (27%) of 228 T2 colorectal cancers. High-grade tumor budding was found in 59 (26%) of the submucosal invasive front and 34 (15%) of proprial muscular invasive front in the 228 T2 colorectal cancers. Among the factors analyzed, tumor budding in the submucosal invasive front and proprial muscural invasive front, and lymphatic invasion were significantly associated with lymph node metastasis ($p < 0·0001$, $p < 0·05$, $p = 0·0001$, respectively) In contrast, poor differentiation and vascular invasion did not have a significant impact on lymph node metastasis. Multivariate analysis showed that tumor budding in the submucosal invasive front was an independent predictive factor for lymph node metastasis (hazard ratio 4·89; 95% confidence interval 2·47–9·46) together with lymphatic invasion (hazard ratio 3·04; 95% confidence interval 1·48–6·22).
Conclusion: Tumor budding in the submucosal invasive front was an optimal predictive histopathologic factor for lymph node metastasis in patients with T2 colorectal cancer.

Cancer/surgical oncology 0206

Rapid microwave processing of breast core biopsies – the future of the one-stop breast clinic

E. Parkin, S. Hindocha, D. Subar, C. Prada-Puentes, J. Howat, J. Walls, A. Gandhi
North Manchester General Hospital, Manchester

Background: The specificity and sensitivity of core biopsy is superior to fine needle aspiration cytology in the diagnosis of breast cancer and also provides information about tumour grade and lymphovascular invasion. However, samples take over 24 hours to process. Use of a rapid microwave histoprocessor enables core biopsy results to be relayed to the patient within 4 hours. Thus, a definitive diagnosis can be obtained at the first outpatient consultation reducing patient anxieties and expediting the treatment process.
Methods: The one-stop diagnostic pathway for breast biopsies processed in the microwave histoprocessor ($n = 26$, mean age 60 y) was compared with biopsies processed using traditional methods of fixation ($n = 42$, mean age 62 y). Time taken between day of biopsy and the day the patient was informed of their diagnosis was recorded, together with number of out-patient clinic appointments prior to surgery, waiting time between biopsy and surgery and correlation of core biopsy results with post-operative histopathology.
Results: In the microwave-processed group 18 patients (69%) were told their diagnosis on the day of biopsy. The remaining patients had their diagnosis delayed by other processes e.g. outstanding radiological investigations. Despite this, the average waiting time from day of biopsy to date of diagnosis for microwave-processed samples was 2·7 days, compared with 9·3 days for biopsies processed using traditional methods ($p < 0·0001$). The mean number of out-patient appointments prior to surgery was significantly less in the microwave group than in the traditional group ($p < 0·01$). The waiting time between date of biopsy and date of surgery was 5 days shorter in the microwave group. No discrepancy was found between malignancy diagnosed on microwave or traditional cores and post-operative pathological findings.
Conclusion: Rapid microwave processing reduces inevitable anxieties associated with waiting for biopsy results. In our study 69% of patients were diagnosed on the day of biopsy. Managing patients in this way and being able to plan surgical treatment at the initial consultation represents an aspirational gold standard and could be implemented in one-stop breast clinics across the country.

Cancer/surgical oncology 0224

Evaluation of the role of laparoscopic ultrasonography in the staging of oesophagogastric cancer

A. Samee, K. Moorthy, A. Eisawi, M. Elhassan, W. Crisp, C. V. N. Cheruvu
University Hospital of North Staffordshire, Stoke On Trent

Background: The role of laparoscopic ultrasound (LUS) during staging laparoscopy for pancreatic cancers is established but remains debatable in evaluating oesophago-gastric cancers.
Methods: The study consists of patients undergoing staging laparoscopy in two centres (Centre A and B) over a 5-year (2000–05) period. Patients in Centre B underwent LUS following laparoscopic assessment using a 7·5 MHz probe. Staging laparoscopy in both centres was performed using a standardised 3-port protocol using a 30-degree laparoscope. All suspicious lesions were sent for histological assessment for confirmation of malignancy.
Results: There were 201 patients in centre A (83-gastric, 138-lower oesophageal/junctional cancers) and 94 in Centre B (51 and 43 respectively). There were no differences between the two centres for patient demographics and tumour site. There was no difference between the two centres for the detection of metastatic disease using laparoscopic assessment alone (A– 13% vs. B– 20%, $p = 0{\cdot}12$). However, there was a significant difference (13% *versus* 28%, $p = 0{\cdot}001$) with the additional use of LUS in Centre B. The findings in the additional 8% ($n = 9$) were para-aortic lymphadenopathy ($n = 7$), liver metastasis ($n = 3$) and local extension ($n = 1$). 5 had gastric and 4 lower oesophageal/junctional cancers. The negative predictive value of the test was 6·4% for centre A and 4·5% for centre B.
Conclusion: The addition of LUS increased the detection rate of metastasis by 8% but there was little impact on the false negative rate. LUS is useful in detecting metastatic lymphadenopathy beyond the limits of curative resection and liver metastasis.

Cancer/surgical oncology 0238

Proteomic identification of serum biomarkers for gastric cancer by multi-dimensional liquid chromatography and 2-D differential gel electrophoresis

W. Liu, B. Liu, Z. Zhu, Y. Zhang, J. Li, X. Chen, Y. Qu, Y. Lin
Shanghai Institute of Digestive Surgery, Department of Surgery, Ruijin Hospital, Shanghai Jiao Tong, Shanghai, China

Background: The early diagnosis and early treatment of gastric cancer patients is the key of better prognosis. However, no serum-based test is currently of sufficient sensitivity or specificity for widespread use. So the purpose of this study was to identify cancer biomarkers in human serum using differential in-gel electrophoresis (DIGE), and characterizing the protein biomarkers using tandem mass spectrometry (MS/MS).
Methods: We compared the proteomic profiles of serum from twenty gastric cancer patients and from ten healthy volunteers. Serum samples were first chromatographed using an immunoaffinity HPLC column, to selectively remove albumin, immunoglobulins, transferrin, haptoglobin, and antitrypsin. Differential protein analysis was performed using DIGE. A total of 17 protein spot-features were found to be significantly increased and 8 significantly decreased in cancer serum samples. These spot features were excised, trypsin digested, and analyzed by MALDI/TOF/TOF and LTQ.
Results: We identified 7 unique proteins that were increased and 5 unique proteins that were decreased in cancer serum samples. The potential candidate serum biomarkers screened in gastric cancer and found to be significantly up-regulated in comparison to normal controls were as follows: plasminogen, apolipoprotein A-IV, Kininogen-1, complex-forming glycoprotein HC, complement component C4A, apolipoprotein J and Clusterin.
Conclusion: These results suggest that the combination of multi-dimensional liquid chromatography and two-dimensional difference gel electrophoresis provides a valuable tool for serum proteomics in gastric cancer.

Cancer/surgical oncology 0249

Breast conserving surgery and no adjuvant radiotherapy – effects on survival?

A. Imkampe, S. Bendall, T. Bates
Breast Unit, William Harvey Hospital, Ashford

Background: To assess the influence of adjuvant radiotherapy on local recurrence and survival in breast cancer patients following Wide Local Excision (WLE).
Methods: A retrospective database review of 458 breast cancer patients who had WLE was carried out. 339 patients had adjuvant radiotherapy (group 1) and 119 patients did not have radiotherapy (group 2). Local recurrence rates were compared between the two groups. Breast Cancer Specific Survival (BCSS) and Overall Survival (OS) were calculated by Kaplan Meier life table analysis.
Results: Median age was 54 years in group 1 and 73 years in group 2 ($p < 0{\cdot}01$). Twenty patients in group 1 (6%) and 19 patients in group 2 (16%) developed local recurrence ($p < 0{\cdot}01$). Eight-year BCSS was 84% in group 1 *versus* 89% in group 2 ($p = 0{\cdot}19$) and OS was 75% *versus* 68% ($p < 0{\cdot}01$).
Conclusion: Patients who had received adjuvant radiotherapy developed less local recurrence but BCSS was similar for patients with and without adjuvant radiotherapy. Patients who had no radiotherapy were generally older and more likely to die from causes other than breast cancer.

Cancer/surgical oncology 0250

Survival trends for patients with recurrent breast cancer in relation to the use of therapeutic chemotherapy

A. Imkampe, S. Bendall, T. Bates
Breast Unit, William Harvey Hospital, Ashford

Background: To determine any improvement of survival in recurrent breast cancer patients between 1989 and 2002.
Methods: A retrospective database review of 491 patients diagnosed with distant breast cancer recurrence was carried out. The patients were divided into two groups according to the year of diagnosis (group 1: 1989–1995 and group 2: 1996–2002). Disease free interval (DFI) and the use of therapeutic chemotherapy were compared between the groups. Breast cancer specific survival (BCSS) and overall survival (OS) was calculated from time of recurrence by Kaplan Meier life table analysis.
Results: There were 200 recurrent breast cancer patients in group 1 and 291 patients in group 2. DFI was comparable (32 *versus* 31 months, $p = 0{\cdot}55$). There was a significant increase in the use of chemotherapy (36% in group 1 *versus* 50% in group 2, $p < 0{\cdot}01$). BCSS extended from 10 to 15 months, $p < 0{\cdot}01$ and overall survival by four months, $p < 0{\cdot}01$.
Conclusion: Increased use of therapeutic chemotherapy is reflected in a significant survival improvement for patients with recurrent breast cancer.

Cancer/surgical oncology 0261

A national questionnaire survey among members of the ACPGBI after the preliminary results of the MRC CR07/NCIC CO16 randomised trial

N. Srinivasaiah, B. Joseph, A. Alabi, A. Suppiah, C. Jonathan, P. Mackey, J. Hartley, J. Monson
Academic Surgical Unit, Castle Hill Hospital, Cottingham

Background: The role of neoadjuvant therapy (NAT) in the management of rectal cancers has not reached a consensus in colorectal surgical practice. In the light of the preliminary results of the CRO7 trial, we undertook a national questionnaire survey to assess the current pattern of practice in the UK. The aim of this study was to assess the correlation between CRO7 trial results and current practice amongst Consultant members of the ACPGBI.
Methods: A 14 item questionnaire was designed to inquire into the current management strategy of operable rectal cancers and the possible role of neoadjuvent radiotherapy. The postal questionnaire survey was sent to all the 400 active consultant members of the ACPGBI.
Results: Of 400 questionnaires, 200 (50%) were returned fully completed. 166(83%) of surgeons did not routinely use neoadjuvant Short Course Radiotherapy (NASCRT) in clinically operable rectal cancers (T1/T2) < 15 cm from anal verge with no metastases (The CR07 eligible cohort). 64(32%) used NASCRT for T3 cancers routinely whereas 76(38%) used neoadjuvant long course radiotherapy instead. 156 (78%) of the surgeons felt the height of the

tumour from the anal verge influenced their decision on NASCRT, while 104(52%) felt position was important (Anterior/Posterior). Positive CRM on MRI was a deciding factor for 185(92·5%) of surgeons in favour of NAT. Post-operatively in patients who have not had pre-operative radiotherapy, 154(77%) recommended radiotherapy and 155(77·5%) recommended chemotherapy if the CRM was +ve on final pathology. 78 (39%) of the surgeons have changed their practice after the preliminary results of the CRO7.

Conclusion: Despite previous evidence supporting the use of NASCRT for operable rectal cancer, nearly 2/3rd of consultant surgeons in the UK have not routinely used this treatment. Even though the CR07 data has yet to be published in full paper format, 39% of surgeons have already altered their treatment policies. RCT data of sufficient quality does influence surgical practice. CR07 is likely to result in fundamental changes to the management of rectal cancer in the UK.

Cancer/surgical oncology 0262

Measuring the effectiveness of multidisciplinary team meetings – an objective analysis tool

M. J. Metcalfe, S. F. Neong, R. Glynne-Jones, M. L. Train, K. Lotzof, H. Reid, I. C. Mitchell, R. A. Harrison, C. Elton, P. Mathur

Departments of Colorectal Surgery, Oncology, Radiology and Histopathology, Barnet Hospital

Background: The multidisciplinary team (MDT) enables management to be tailored to patients' individual needs using the combined expertise and knowledge of different specialists. Evaluating MDT effectiveness has proved difficult with little measurable objective evidence. A positive (≤ 1 mm) histological circumferential resection margin (CRM) was used as a surrogate marker of inappropriate patient selection for curative resection of low and mid-rectal cancers. We retrospectively analysed our MDT management using this marker.

Methods: Curative surgical resection of mid and low rectal cancers requires a negative histological CRM of ≥ 1 mm. Patients discussed at our MDT meetings underwent pre-operative staging pelvic MRI scans and on this basis were selected for neo-adjuvant therapy, surgery or palliation based on the predicted CRM status.

Results: Between 2005 and 2006, 46 patients (29 male, 17 female) with a mean age of 72± 13 yrs were included.

24 patients underwent surgery (10 abdominoperineal resections, 8 anterior resections, 4 Hartmann's procedures, 1 panproctocolectomy and 1 transanal excision). 11 patients were treated with palliative therapy for metastatic disease, 1 patient received radio-chemotherapy alone, whilst 10 refused, were anaesthetically unfit or died prior to their required surgery.

7 (non palliative) patients with positive predicted CRM received neo-adjuvant therapy. 6 of these patients subsequently underwent surgery of which 5 had negative histological CRM. One tumour that preoperatively abutted the right levator ani had a positive histological CRM.

18 patients with negative predicted CRM underwent surgery. 7 received neo-adjuvant therapy. 17 had negative histological CRM. One tumour, following pre-operative radiotherapy, had a positive right lateral histological CRM.

Conclusion: Using a positive histological CRM as a surrogate marker for low and mid rectal cancers, this small study shows a surgical success rate of 92% thus demonstrating an effective MDT outcome. Evaluating the effectiveness of MDT meetings allows Trusts to monitor their practice. This has implications on clinical governance thereby improving the quality of care to patients.

Cancer/surgical oncology 0285

Mucinous carcinoma is not a poor prognostic factor in the survival outcome of colorectal cancer patients

O. Harryman, F. Braddon, T. Dixon, A. Pullyblank

North Bristol NHS Trust, Bristol

Background: Previous studies have suggested that mucinous colorectal carcinoma has a poorer prognosis than non-mucinous colorectal carcinoma. Mucinous carcinoma is characterised by $\geq 50\%$ mucin content. Our aim was to evaluate whether carcinomas of the mucinous histological type was a factor that adversely influenced the survival outcome of colorectal cancer patients.

Methods: We retrospectively reviewed our colorectal cancer database from 1997 to 2006. We identified 91 cases of mucinous carcinoma and 1053 cases of non-mucinous carcinoma. Dukes stage at diagnosis and survival were compared between mucinous and non-mucinous groups. Statistical analysis using the Chi square and Mantle Cox Log Rank test were performed.

Results: Mucinous colorectal cancer made up 8·6% cases of colorectal carcinoma. There was a significant difference in the proportions of patients presenting at Dukes Stages A and B between the mucinous and non-mucinous groups.

	Dukes A	Dukes B	Dukes C	Dukes D
Mucinous	4·4%	56·0%	36·3%	3·3%
Nonmucinous	16·2%	40·8%	36·3%	6·6%
P values	0·003	0·005	1	1

However, there was no statistical difference in the overall survival outcomes for mucinous *versus* non-mucinous carcinoma 5·9 *versus* 7·3 yrs ($P = 0{\cdot}57$).

Conclusion: Mucinous carcinomas were more likely to present at a more locally advanced stage. However, contrary to previous studies, we found no significant difference in the overall survival outcome for patients with mucinous *versus* non-mucinous colorectal carcinoma. We conclude that patients with mucinous tumours do not have a poorer outcome.

Cancer/surgical oncology 0301

Delay in presentation of women with invasive breast cancer: Cause and effect

J. Mansell, S. Radzwonik, D. J. Hole, D. B. Kingsmore, W. D. George

Western Infirmary, Glasgow

Background: Considerable emphasis is placed on reducing delay to presentation in breast cancer. It is therefore important to understand the causes of delay in presentation and the subsequent effects. The aim of this study was to determine the factors associated with delay in presentation and the effect on prognostic variables and survival.

Methods: Data was analysed from a geographically defined cohort (population ~1·5 million) of all women < 75yrs with operable breast cancer during the time period 1986–1991. Data included: sociodemographic characteristics, pathology, treatment, recurrence and death. Women were grouped by the time elapsed between onset of initial symptoms to consultation with a clinician. Cross-tabulation of socio-demographic characterstics and prognostic variables with delay groups was performed. Logistic regression analysis was used to identify factors associated with increased delay. Ten-year disease specific survival (DSS) was studied using Kaplan-Meier and Cox regression analysis.

Results: Of 1768 women, 1504 (85%) patients presented within 3 months, 111 (6%) within 3–6 months and 153 (9%)> 6 months. Post menopausal status (OR 1·44, 1·043–1·967, $P = 0{\cdot}02$), obesity (OR 1·36, 1·034–1·793, $P = 0{\cdot}03$), concurrent co-morbidity (OR 1·55, 1·19–2·03, $P = 0{\cdot}001$) and central tumour site (OR 2·71, 1·62–4·56, $P < 0{\cdot}001$) were associated with a significant delay to presentation. A delay in presentation of over 6 months was associated with a significantly poorer 10yr DSS (HR 1·43, 95% CI 1·18–1·75, $P < 0{\cdot}001$). After adjusting for standard clinico-pathological variables delay in presentation was not a significant predictor of survival. Increasing delay was significantly associated with larger tumour size ($P < 0{\cdot}001$) and more advanced nodal status ($P < 0{\cdot}001$) but not higher grade ($P = 0{\cdot}887$).

Conclusion: Susceptible patients (elderly, post-menopausal of other co-morbidity) and difficult to detect tumours (obese, central location) are associated with delay to presentation indicating the need for vigilance in these patients. Patients who delayed consultation with a clinician for over 6 months from the onset of symptoms were shown to have a significantly poorer survival, due to a more advanced stage of breast cancer at diagnosis.

Cancer/surgical oncology 0308

Factors predicting non-sentinel lymph node metastases in breast cancer patients with positive sentinel lymph nodes

H. Jinno, S. Asaga, M. Sakata, M. Kitajima, M. Mukai, A. Kubo
Keio University School of Medicine, Shinjuku Tokyo, Japan

Background: As sentinel lymph node biopsy (SLNB) has become a potential alternative procedure to conventional axillary lymph node dissection (ALND) in clinically node-negative breast cancer, the next step is to determine which patients need an ALND following a positive SLNB.
Methods: A prospective database of 239 patients who underwent SLNB followed by complete ALND from January 2001 to June 2005 was reviewed. A total of 131 patients with one or more positive sentinel lymph nodes (SLN) were further analyzed.
Results: In 46 (35·1%) of 131 patients, at least one non-sentinel lymph node (non-SLN) was involved. A univariate analysis showed a significant correlation between non-SLN involvement and lymphatic invasion, vascular invasion, number of tumor-involved SLNs, radioactivity of SLNs, and size of SLN metastasis ($p = 0·0002$, $p = 0·004$, $p = 0·006$, $p = 0·04$, $p = 0·03$, respectively). By multivariate analysis, lymphatic invasion and the number of tumor-involved SLNs remained significant predictors of non-SLN involvement ($p = 0·03$, $p = 0·01$, respectively).
Conclusion: In breast cancer patients with a positive SLN, lymphatic invasion and the number of tumor-involved SLNs were both independent predictors of non-SLN involvement. Therefore, ALND may be necessary for these patients. Prospective studies with larger series and longer follow-up are necessary to confirm these data.

Cancer/surgical oncology 0310

The place of laparoscopic resection for colorectal cancer

G. Buchanan, A. Malik, A. Parvaiz, J. Sheffield, R. Kennedy
Yeovil Hospital, Somerset

Background: This study examined totality of surgical practice to determine the place of laparoscopic colorectal cancer surgery.
Methods: 365 patients undergoing elective colorectal resection by one surgeon (219 colonic, 146 rectal) were prospectively studied. Early (1994–7; $n = 104$), middle (1998–2001; $n = 112$) and late (2002–05; $n = 149$) cohorts were analysed with respect to suitability for laparoscopic surgery, conversion and outcome.
Results: Forty-six of 135 patients undergoing open resection were suitable for laparoscopic surgery but were randomised to open surgery. Laparoscopic resection and cases thought suitable for laparoscopic resection, increased over time to > 90% ($p = 0·001$). Conversion decreased in the last 4 years ($p = 0·054$), but occurred in all 5 patients with a preoperative MRI-predicted threatened margin and when BMI was >/ == to 28 ($p = 0·01$). Exclusion of these patients results in a late cohort conversion rate of 9% (10/115: colonic 6/72 – 8%; rectal 4/43 – 9%). During the same period inclusion of the 20 cases suitable for laparoscopic, but randomised to open, resection results in 135/149 (91%) patients actually being suitable for laparoscopic resection.
Conclusion: With experience, laparoscopic surgery is applicable in over 90% of elective colorectal cancer resections. Increased BMI and an MRI-predicted threatened margin increase conversion even with considerable laparoscopic experience.

Cancer/surgical oncology 0312

Impact of deprivation on prognostic factors and outcome in postmenopausal women with ER+ early stage breast cancer

J. Mansell, I. J. Monypenny, A. I. Skene, P. Abram, J. Gattuso, A. Abdel-Rahman, W. A. Angerson, C. R. Wilson, J. C. Doughty
Western Infirmary, Glasgow

Background: Current literature suggests that increasing deprivation is associated with adverse prognostic factors and poorer survival in women with breast cancer. We aim to determine if this evidence is reproducible in postmenopausal women with ER+ breast cancer and assess the degree with which this impacts on outcome.
Methods: Data from a geographically defined cohort of consecutive postmenopausal patients diagnosed with ER+ early stage breast cancer between 1995 and 2004, were examined. Deprivation category was based on the Carstairs & Morris deprivation scoring system. Categories 1–2 were classed as affluent (A), categories 3–5 as intermediate (I) and categories 6–7 as deprived (D). Association of deprivation categories with prognostic variables was assessed using the X^2 test for trend. 5yr disease free survival (DFS) and disease specific survival (DSS) was calculated using Kaplan-Meier survival analysis with the log rank test.
Results: A total of 1536 patients were included. A significantly higher proportion of patients in the deprived category group had larger tumours (Size > 2cm: A = 24·4%; I = 27·3%; D = 35·9%; $p < 0·001$), higher grade tumours (Grade III: A = 16·4%; I = 15·3%; D = 24·1%; $p = 0·01$) and regional lymph node involvement (A = 32·4%; I = 35·7%; D = 40·7%; $p = 0·02$). No significant difference in 5 yr DFS and DSS was seen between the deprivation groups although women in the affluent group tended towards improved survival (5 yr DFS: A = 91·1%; I = 87·3%; D = 87·9%; $p = 0·5$. 5 yr DSS: A = 94·0%; I = 90·7%; D = 90·6%; $p = 0·3$).
Conclusion: Deprived women have more adverse prognostic factors at diagnosis. The increased frequency of large tumours seen in this group could be related to lower attendance rates of the national breast screening programme. Longer follow up is required to determine if there is a significant survival difference.

Cancer/surgical oncology 0331

Poor sensitivity of faecal occult blood test in colorectal cancer

P. J. Swan, K. Darcy, A. D. Clarke, R. Talbot, G. F. Nash
Poole General Hospital, Poole

Background: The implementation of a national screening program for colorectal cancer (CRC) in the UK is imminent using the faecal occult blood test. A positive test will initiate a full colonoscopic examination. Three large population-based randomised controlled trials have suggested a benefit of screening for CRC in terms of improved survival and earlier stage at diagnosis. We aim to demonstrate the sensitivity of the FOB test and investigate whether those with positive results are from predominantly left or right sided colorectal cancers.
Methods: Local ethics committee approval obtained. Patients with biopsy proven CRC are prospectively identified. At their pre-admission visit they are given the Hemocheck™ FOB test, and instructed how to use the test. Each patient provided three consecutive stool samples. The test was analysed in the biochemistry lab by the same technician. The testing process was exactly as described by the national screening program i.e. there is no dietary restriction and no re-hydration of the sample, with the exception of the test itself: the screening program test kit, Haemoccult 2™ performs worse in quality assurance tests than the Hemocheck™ test used in our study.
Results: 60 suitable subjects were recruited to the study. 59 subjects returned three consecutive stool samples for analysis. 13 patients had a strong positive result (all three stools positive), 6 patients had a weakly positive result (1–2 positive stools). The remaining 40, had negative results for all three stools. For our population of colorectal cancer patients the FOB test was positive in 32%, this is the sensitivity of the test. With regard to the patients with positive FOB, 14 were left sided cancers (distal to mid-transverse colon) and 5 were right sided.
Conclusion: Sensitivity of the FOB has not previously been directly measured in colorectal cancer patients however it was estimated to be 50%. We have demonstrated a sensitivity of 32%, therefore 68% of colorectal cancers would have been missed using this screening tool. Furthermore 74% of those positive results were detected in left sided cancer patients suggesting the role of flexible sigmoidoscopy has perhaps been underestimated in endoscopic evaluation of positive FOBs. We plan to present our completed study with further subset

analysis of right compared to left sided cancer sensitivity and more subjects to ensure statistical significance.

Cancer/surgical oncology 0375

The role and analysis of osteogenic cells in breast cancer metastases

A. Molloy, R. Dwyer, M. Kerin
Department of Surgery, UCHG, Galway

Background: Although breast cancer mortality rates are in decline the incidence of the disease continues to rise. In those with advanced disease > 80% will develop bone metastases for which there is no cure (median survival 2 years). There is an urgent need for improved therapy for this cohort of patients. Although it is thought to involve a complex cascade of cell-cell interactions, the mechanisms of bone metastases are still largely unknown. Understanding the pathways involved in metastases to bone is fundamental to the development of new therapies. To elucidate the potential role of osteoblasts in controlling breast cancer migration and proliferation.
Methods: Primary culture of commercially available osteoblasts(NHOst) and breast cell lines was performed, with NHOst cellscultured in both undifferentiated and differentiated states. Migration of breast cancer cells in response to osteogenic cells and their conditioned medium was measured using transwell inserts. ChemiArray protein arrays & ELISAs were used to detect angiogenic factors secreted by the NHOst cells. A luminometer based Vialight assay was used to measure breast cancer cell proliferation.
Results: There was a significant increase in migration of both breast cancer cell lines in response to NHOst cells(MDA-MB-231: 4 fold increase, SK-BR-3: 2 fold increase). ChemiArray analysis revealed secretion of MCP-1, IL-6 & 8, TIMP 1 & 2, with the level of MCP-1 secreted quantified at 2240 pg/ml using ELISA. The inclusion of an antibody to MCP-1 in NHOst cell medium resulted in a significant inhibition of breast cancer cell migration. MCP-1 levels also decreased as cells differentiated. Vialight proliferation assay revealed an increase in proliferation of SK-BR-3 cells in response to NHOst conditioned medium.
Conclusion: These preliminary results show that secretion of various cytokines,such as MCP-1, by NHOst cells may create an environment that encourages breast cancer cell homing and proliferation. Increased understanding of the specific mediators of these cellular interactions may provide new therapeutic targets to inhibit development and progression of bone metastases.

Cancer/surgical oncology 0382

Accelerated care pathways in oncoplastic breast surgery

Z. Martin[1], C. Canning[1], M. Kerin[2], M. Kell[1]
[1] *Breastcheck, Eccles Unit, Mater Misericordiae University Hospital, Dublin,* [2] *University College Hospital Galway, Galway, Ireland*

Background: The optimal management of breast cancer dictates not only the adherence to sound surgical oncology principles but also consideration to the aesthetic outcome of treatment. Oncoplastic breast surgery has evolved to embrace this, though as a consequence there are increased demands on inpatient resources. To address this we have establish accelerated care pathways for oncoplastic breast surgical patients.
Methods: We have introduced a care pathway program to reduce morbidity and hospital stay. This consists of increased patient education, early post-operative mobilization, the use of peri-operative above knee compression boots, early discharge with drains in-situ as necessary and the avoidance of low molecular weight heparin (LMWH) use. We studied patient outcome over a 12 month period.
Results: We managed 86 patients with breast cancer and performed 107 oncoplastic breast procedures on these patients. There were 41 cases of mastectomy and immediate reconstruction and 45 breast conservation with local flap reconstruction. Post mastectomy reconstruction included expander based, latissimus dorsi and pedicle TRAM flap. The mean hospital stay for this cohort of patients was 4·8 days *versus* 10·6 days ($p < 0·05$) for those managed using matched historical data. The overall morbidity was 7% and no patients suffered symptomatic venous thrombosis.
Conclusion: Accelerated care pathways for oncoplastic breast surgery appear to be safe. Early discharge and the avoidance LMWH appears to be prudent in this cohort of patients.

Cancer/surgical oncology 0393

The management of concurrent colorectal malignancy and aorto-iiliac aneurysmal disease

J. Shalhoub, N. Lau, P. A. Paraskeva, N. J. W. Cheshire, A. W. Darzi, P. Ziprin
St. Mary's Hospital, Paddington, London

Background: The synchronous presentation of colorectal carcinoma (CRC) and abdominal aortic aneurysm (AAA) is increasingly being recognised. There is no clear consensus from the surgical literature on the optimal management of these patients. The aim of this study is to review a single unit's experience.
Methods: Patients with concurrent CRC and AAA were identified from a single unit's colorectal cancer database. Patient demographics, aneurysm classification, site of primary CRC and stage, type of repair and outcomes were recorded.
Results: Seventeen patients, of whom thirteen were male, with a median age of 80 years (range 68–94) presented over a five year period. The AAA types were: infra-renal ($N = 10$); juxta-renal ($N = 2$); supra-renal ($N = 3$); and thoraco-abdominal ($N = 2$). The CRC stages diagnosed were: Duke's A ($N = 1$); Duke's B ($N = 9$); Duke's C ($N = 5$); and Duke's D ($N = 2$). Intervention for both malignancy and aneurysm was indicated in six patients. In five patients, cancer resection was performed initially, followed by open aneurysm repair in two patients and endovascular aortic repair in three. A combined procedure was attempted in one patient with a type IV thoraco-abdominal AAA and descending colon carcinoma, but due to bleeding only the AAA was repaired. This patient underwent left hemicolectomy 6 weeks later. Six patients required potentially curative resection of their tumour alone. Five patients with advanced malignancy ($N = 2$) or severe co-morbidities ($N = 3$) received palliative care only. There were no interval aneurysm ruptures, no in-hospital mortality and no incidence of aortic graft sepsis.
Conclusion: The coexistence of abdominal malignancy and aorto-iliac aneurysmal disease is not uncommon. In this series, following colonic resection no aneurysm ruptures were observed and as such staged management may be considered a safe approach.

Cancer/surgical oncology 0426

Post-operative surveillance for colorectal cancer

T. D. Reid, A. L. Dodds, P. Jones, A. Woodward
Royal Glamorgan Hospital, Llantrisant

Background: Early detection of recurrent colorectal cancer post-operatively may improve survival. Many different surveillance protocols have been suggested, with published data consisting of only relatively small trials. There is currently no consensus regarding best practice. The aim of this study was to evaluate one surgeon's surveillance protocol over an 8 year period, and to develop a program that would minimise follow-up whilst still identifying potentially curable recurrent disease.
Methods: All patients who underwent a curative resection for colorectal cancer by one consultant were identified from pathology records and operation notes. A total of 127 patients were identified and studied retrospectively. Data was collected by case note analysis using a standard proforma. Follow up was by means of a protocol consisting of an initial clinic appointment at 6 weeks, followed by colonoscopy at 12–18 months, then 3–5 yearly. A CT liver scan was also performed at 12–18 months.
Results: A total of 24 patients developed recurrent disease. Of these 5 had local recurrence whilst 19 had metastatic recurrence. Of the 5 local recurrences, none were found on planned follow-up colonoscopy or CT, with all 5 diagnosed by methods that were not part of the follow-up protocol. Of the 19 metastatic

recurrences, 10 were found by the follow-up protocol CT scans, whilst 9 were found by other sources. Only 3 patients with recurrence went on to have further curative surgery (1 had an AP resection for local recurrence, 1 liver resection and 1 pulmonary resection). In addition a patient with local recurrence after AP resection had radiotherapy. The remaining 20 patients were treated palliatively.
Conclusion: Colonoscopy is of little benefit in the early follow-up of colorectal cancer. CT detected a significant number of liver metastases but these were usually too advanced for curative treatment. Earlier use of CT scanning and delayed colonoscopy may provide more effective follow up.

Cancer/surgical oncology 0433

Uptake of haem iron in oesophageal adenocarcinoma: a possible mechanism of carcinogenesis

K. Roberts[1], M. Brookes[1], J. Boult[1], A. McKie[2], R. Spychal[1], T. Iqbal[1], C. Tselepis[1]

[1]*CRUK Institute for Cancer Studies, University of Birmingham, Birmingham*
[2]*Division of Nutritional Sciences, Kings College London, London*

Background: As with other cancers, oesophageal adenocarcinoma (ADC) is influenced by diet and in particular red meat has been linked to increased risk. One mechanism to explain this could involve haem, which is found in red meat and transported into enterocytes via Haem carrier protein 1 (HCP1). The aims of this study were i) to determine HCP1 expression in human oesophagus and in the malignant progression to ADC ii) to investigate if haem loading of ADC cell lines modulates cell behaviour and iron transport protein expression.
Methods: Immunohistochemistry and Real-Time PCR were employed to examine protein and mRNA expression in Barrett's metaplasia (BM) matched with ADC and BM without ADC. The ADC cell lines OE33 and SEG1 were exposed to hemin. Effects upon proliferation and migration were assessed with BrdU and wound healing assays and changes in expression of the iron transport proteins determined by Real-Time PCR and western blotting.
Results: ADC with matched BM demonstrated an 8 fold increase in HCP-1 mRNA expression. However, comparing BM with matched gastric mucosa revealed no difference in HCP1 mRNA expression. Localisation studies demonstrated HCP1 in BM where it was localised on the surface epithelium whilst in ADC HCP1 was cytoplasmic. Utilising a tissue microarray HCP1 expression was statistically increased by 1·4 fold in ADC associated with vascular invasion compared to ADC with no vascular invasion ($P < 0{\cdot}02$). Culturing OE33 and SEG1 cells with hemin for 24 hrs resulted in increased cellular iron which induced cellular proliferation and migration. Additionally hemin loading resulted in decreased TfR1 and DMT1 mRNA expression and increased ferritin protein expression. Hemin loading did not change HCP1 mRNA or protein expression levels but did increase haem oxygenase mRNA.
Conclusion: Our data suggests that from BM to ADC there is an over expression of HCP1 and that this is associated with vascular invasion. We also provide evidence that HCP1 is expressed in oesophageal lines and that culture with hemin caused increased cellular proliferation and migration. We thus conclude that HCP-1 and haem are likely to have a role in oesophageal carcinogenesis.

Cancer/surgical oncology 0434

A role for iron in oesophageal adenocarcinoma

K. Roberts[1], M. Brookes[1], J. Boult[1], G. Anderson[2], R. Spychal[1], T. Iqbal[1], C. Tselepis[1]

[1]*CRUK Institute for Cancer Studies, University of Birmingham, Birmingham*
[2]*Iron Metabolism Laboratory, Queensland Institute of Medical Research, Brisbane, Queensland, Australia*

Background: Increasing epidemiological and biochemical evidence links iron with oesophageal adenocarcinoma (ADC). However, how iron mediates carcinogenesis at the cellular and molecular level remain unclear. The aims of this study were to investigate in human oesophagus the expression of the iron transport proteins implicated in cellular iron import; duodenal cytochrome C (DCYTB), divalent metal-ion transporter 1 (DMT1) and transferrin receptor 1 (TfR1), iron export; hephaestin (HEPH) and ferroportin (FPN) and storage (ferritin) in the pre-malignant lesion Barrett's metaplasia (BM) and in ADC.
Methods: Perls staining and Real Time PCR were used to examine iron deposition and mRNA expression in samples of BM matched with ADC ($n = 11$) and BM without ADC ($n = 13$). A microarray of 76 ADC was used to associate protein expression and prognostic markers such as T and N stage. The effect of iron loading on cell proliferation, wound healing, anchorage independent growth and expression on iron transport proteins was determined in ADC cell lines OE33 and SEG-1 utilising BrdU, wound healing and colony forming assays and Real-Time PCR respectively.
Results: In the progression of BM to ADC there was an overexpression of DMT1, TfR1, DCYTB, FPN and ferritin at both mRNA and protein levels. This was associated with increased iron deposition. Overexpression of DMT1, TfR1, ferritin and a repression in HEPH was further associated with ADC with positive nodal involvement. Challenging OE33 and SEG-1 cells with iron increased cellular proliferation, wound invasion and migration. This was associated with decreased expression in TfR1 and DMT1 mRNA and increased ferritin protein expression.
Conclusion: Progression to oesophageal adenocarcinoma is associated with increased expression in iron import proteins and iron deposition. A repression in the iron export protein HEPH was only associated with nodal metastasis. These events culminate in increased intracellular iron, which mediates cellular proliferation and represents a further mechanism of carcinogenesis.

Cancer/surgical oncology 0439

High resolution MR imaging improves patient selection for surgical resection in oesophageal cancer

A. M. Riddell, G. Brown, A. C. Wotherspoon, J. N. Thompson, W. H. Allum

The Royal Marsden Hospital NHS Foundation Trust, London

Background: Patient selection for surgery is currently based on computed tomography (CT) and Endoscopic Ultrasound (EUS) however postoperative survival for patients remains poor, highlighting limitations in selection using these techniques. The aim of this prospective study was to establish whether the addition of High Resolution Magnetic Resonance Imaging (MRI), can refine patient selection for surgery and to measure the impact on post operative survival.
Methods: Two radiologists, blinded to pathology results & patient outcome, independently evaluated High Resolution MR images for 40 consecutive patients with biopsy proven adenocarcinoma and were considered operable by conventional staging (CT & EUS). The MRI criteria for operable disease were: identification of a clear resection margin, and absence of metastatic disease (ie: equivalent to an R0 resection). MRI prediction of an R0 resection was compared with pathological resection margin status. Differences in survival according to whether MRI predicted an R0 resection or not and according to the pathological resection margin status were estimated with the Kaplan-Meier method.
Results: At operation six patients (6/40, 15%) were found to have unresectable disease due to the presence of peritoneal disease ($n = 3$) or liver metastases ($n = 3$). MRI predicted 5/6 patients to be unresectable due to extensive local infiltration ($n = 3$) & liver metastases ($n = 2$). There were 4 false positive and 4 false negative predictions of an R0 resection. Extensive tumour within the perioesophageal tissues close to the diaphragm at the level of the gastro-oesophageal junction was seen in 3/4 false positive predictions. 2/4 false negative predictions were in patients with infiltrative disease with little mass. There was good agreement between radiologists for prediction of resection margin status on MRI, with a kappa score of 0·61. There was a significant difference in survival for patients predicted to have an R0 resection by MRI, with 77% surviving at least 2 years compared with 21% deemed inoperable ($p = 0{\cdot}003$).
Conclusion: The use of High Resolution MRI can improve patient selection for oesophagectomy and consequently post operative survival.

Cancer/surgical oncology 0441

An audit of 127 consecutive trans-thoracic oesophageal resections

A. Kirwadi, J. Gilmour, K. Venigalla, S. Davies, J. McK Manson
Singleton Hospital, Swansea

Background: To evaluate the outcome of a single consultant surgeon's consecutive series of oesophageal resections over a 13 year period.
Methods: Prospectively collected data from hospital case notes supplemented by information obtained from patient GPs was entered onto a database and analysed. All patients were staged by CT and since 1995 by EUS. Since 2004 selected patients received pre-op chemotherapy following results of OEO2 trial. The same surgical technique, which included almost exclusively a modified Ivor Lewis approach, no intervention at the pylorus and a hand-sewn anastomosis, was employed. All patients recieved thoracic epidural, were extubated at the end of the procedure and kept nil by mouth until a contrast swallow at 6 days post-op.
Results: There were 127 patients. Age range 31–82 yrs (mean 64). M : F ratio 4 : 1. 40·2% of tumours were junctional (Siewert II), 47·5% lower (Siewert I) and 12·3% were mid-oesophageal; 81% adenocarcinoma, 14% squamous carcinoma and 5% others (5 HGD in Barrett's, 1 primary melanoma, 1 anaplastic small cell).
Median length of hospital stay was 14 days (range 10–165). 62% of tumours were T3, 19% T2 and 12% T1; 65% were node positive. 18 patients (16%) had positive circumferential resection margins. All longitudinal margins were clear. Six patients (4·7%) needed re-operation. One patient (0·8%) had a clinical or radiological anastomotic leak, which was successfully managed non-surgically. Five patients (3·9%) died within thirty days or during their hospital admission, one patient with gastric perforation being the only one in which post-mortem demonstrated any surgical problem. 3 patients required dilatation for benign fibrous stricture.
Actuarial 5-year survival was 28·4%.
Conclusion: 'Traditional' trans-thoracic oesophageal resection can be carried out with low morbidity and mortality. This intervention should not be lightly discarded in favour of apparently less invasive alternatives.

Cancer/surgical oncology 0470

Self expanding wall stents in obstructing colorectal cancer – radiological success does not always lead to relief of symptoms

B. Page, G. Stenouse, A. Rowan, C. McKenzie, A. Macdonald
Lanarkshire Colorectal Study Group, Lanarkshire

Background: Self-expanding wall stents have been used increasingly in the management of obstructing colorectal cancers for both palliation and as a bridge to surgery. Successful placement of a stent (technical success) does not always relieve symptoms (clinical failure). Technical failures have previously been associated with complete clinical obstruction and complete block to the retrograde flow of gastrograffin is considered by some to be a contraindication to the procedure. We report the technical/clinical success rates of self-expanding wall stents in a prospective series of malignant colorectal obstructions.
Methods: Radiological obstruction was described as high grade (no retrograde flow of gastrograffin) or low grade (partially obstructing lesion with retrograde flow of gastrograffin). Stents were placed using a combined endoscopic/fluoroscopic approach under minimal sedation. Technical success was determined by plain abdominal film at 48 hours. Clinical success was determined by resolution of symptoms within 48 hours without further intervention.
Results: 73 patients, mean age 71·6, range 49–95 underwent insertion of a wall stent. In patients with a high-grade radiological obstruction, the technical success rate was 87·5%: clinical success rate was 68·1%. By comparison, in low grade obstruction the technical success rate was 94·2%: clinical success rate was 75·7%, $p < 0{\cdot}323$ and $p < 0{\cdot}375$ respectively, Fishers Exact test. Although placed correctly in 87·8% of patients with complete clinical obstruction, relief of symptoms occurred in only 64·5%. There was one procedure-related death in the series and 2 colonic perforations.
Conclusion: Placement of self-expanding wall stents in obstructing colorectal cancer is technically successful in a high proportion of cases. High-grade radiological obstruction is not a contra-indication to stent placement. Patients with obstructive symptoms did not always have radiological obstruction. The relief of obstructive symptoms following the successful placement of a wall stent was less predictable.

Cancer/surgical oncology 0471

Oncoplastic breast conservation surgery – A DGH perspective

P. A. Buxton, P. Matey, K. Mcardle
New Cross Hospital, Wolverhampton

Background: Successful resection of breast tumours with a good cosmetic end point is increasingly important. We present our experience of providing an oncoplastic option to women with large ptotic breasts.
Methods: Over 4 yr period 2002–2006 19 consecutive female underwent therapeutic reduction mammoplasties, axillary staging and adjuvant radiotherapy +/− chemotherapy/hormonal manipulation. All patients were followed up.
Results: $N = 19$, Mean age at presentation was 48 years (range 32–63 years). Mean hospital stay was 2·8 days (range 2–5).

Table 1 Type of oncoplastic procedure

Mammoplasty	Unilateral		Bilateral	
Pedicle type	Inferior	Superior	Inferior	Sup. & Inf.
Number	2	1	15	1

Table 2 Specimen weights and size of tumour

	Specimen weight (grams)		
	Cancer side	Contralateral side	Diameter of tumour (mm)
Mean	372.6	426.8	29.8
Range	86–840	96–820	17–53

In all cases margins were clear histologically. Mean sternal notch to nipple distance preoperatively was 30·2 cm and postoperatively was 21·9 cm. Post operative complications were minimal. During follow up 1 developed a local recurrence and 1 was found to have bony metastasis.
Conclusion: A DGH oncoplastic service can provide enhanced cosmetic outcomes without compromising the oncological result in a one stage procedure. The patients tolerate these procedures well, and the complication rate is low and no delay is caused in providing adjuvant therapies. These oncoplastic techniques are suitable for those women with large ptotic breasts allowing greater potential for larger cancers to be resected and still provide clear margins, thus reducing the mastectomy rate in this group. With long term follow up we will be sure of the local recurrence rates. We propose that an oncoplastic approach enables wider margins to be achieved allowing breast conservation surgery with good cosmetic outcomes in this group of patients.

Cancer/surgical oncology 0504

Pathology review of the "MAGIC" trial with reference to site of disease and extent of lymphadenectomy

H. Dowson[3], S. Stenning[2], R. Langley[2], D. Cunningham[1], B. Allum[1]
[1]Royal Marsden Hospital, London [2]MRC Clinical Trials Unit, London [3]Royal Surrey County Hospital, Guildford

Background: The MAGIC trial of perioperative chemotherapy in gastro-oesophageal cancer demonstrated a 13% 5 year survival advantage for patients treated with chemotherapy and surgery. Commentators

on the trial have expressed concerns with regards to the inclusion of junctional cancers and whether chemotherapy was compensating for limited surgery. Our aim was to review the pathology of the MAGIC trial with reference to site of disease and extent of lymphadenectomy.
Methods: The original pathology reports have been reviewed to determine: the site of the primary tumour; the type of junctional tumours included; and the extent of lymphadenectomy that was performed.
Results: Original pathology reports have been reviewed for 250 patients, 120 from the treatment arm (CSC) and 130 from the control arm (S). The site of disease documented at original randomisation was 192 (77%) gastric, 33 (13%) junctional and 25 (10%) lower oesophageal. Pathology review has shown that 157 (63%) were gastric and 41 (17%) type III lesions, 31 (12%) type II, 17 (8%) type I, and in 4 the specific site was not determined. The extent of nodal dissection was evaluated in 218 patients who underwent gastrectomy and compared with the original surgical description of the type of lymphadenectomy. The median number of lymph nodes excised after a D1 was 12 (range 0–32) and after a D2 was 19 (range 3–63) ($p < 0{\cdot}001$, Mann Whitney test). In 104 cases less than 15 nodes were dissected; in 47, 15–20 nodes were dissected; in 24, 21–25 nodes were removed; and in 43 cases more than 25 nodes were removed. The median number of nodes removed in the CSC arm was 15 (range 0–63) and in the S arm 16 (range 0–91) (2 sample Mann-Whitney test $p = 0{\cdot}88$).
Conclusion: This pathology review has shown that 80% of the tumours reviewed so far were gastric or type III junctional cancers. The extent of lymphadenectomy was similarly distributed between the two treatment groups. D2 resections had a more extensive lymph node yield, although only 28% of D2 resections actually had more than 25 nodes resected.

Cancer/surgical oncology 0514

Keeping on the right side of it: Delays in treatment of proximal colonic cancers

R. Betton, A. Brigic, M. D. Silavant, M. E. Lucarotti, A. L. Fowler, T. A. Cook
Department of Colorectal Surgery, Gloucestershire Royal Hospital, Gloucester

Background: Iron deficiency anaemia (IDA) is a criterion for fast-track referral but many patients with proximal colonic cancers have more nebulous symptoms. We were concerned that patients with right-sided cancers experienced delays in diagnosis and treatment if referred outside the two-week rule (2WR). This study assessed the time taken to initiate treatment depending on referral route and presenting symptoms.
Methods: Patients presenting with a bowel cancer proximal to the splenic flexure over a three-year period were identified. Referral route, principal presenting symptom, diagnostic investigation performed and time taken to initiate treatment were recorded.
Results: There were 162 patients, (80 men, median age 73 years). 28% presented as an emergency and 25% were referred via the 2WR. 15% presented to surgical outpatients and 13% as medical emergencies. The rest were referred directly to endoscopy or to medical outpatients. 37% presented with IDA, 29% with abdominal pain and 13% with a change in bowel habit. Only 7% had a palpable mass. IDA was more common in 2WR referrals than in those presenting to medical or surgical outpatients (50% *versus* 36%) and an abdominal mass was also more common in 2WR patients (23% *versus* 0%). Abdominal pain was less common (5% *versus* 29%). Despite similar presenting complaints for medical and surgical outpatient referrals, initiation of treatment took 35 days longer in the medical group. 2WR referrals were treated quickest. An increasing number of diagnostic investigations delayed treatment (one test = 28 days, 3 tests = 89 days). Patients referred to endoscopy or medical outpatients were less likely to have full colonic imaging as part of their initial investigation.
Conclusion: A significant proportion of patients with proximal bowel cancers present with symptoms that are outside the 2WR criteria. The principal delays in diagnosis were due to incomplete colonic imaging. This study has highlighted the need for patients presenting with signs and symptoms of proximal cancers to undergo complete colonic assessment as the initial investigation. Clinicians should be aware that many patients have non-specific symptoms and urgent assessment of all patients with potential bowel cancers would avoid unnecessary delays.

Cancer/surgical oncology 0583

Routine follow-up of breast cancer does not aid in the detection of recurrent disease

J. Hillan, C. Magee, S. Kirk, R. Kennedy
Ulster Hospital, Dundonald

Background: To determine the effectiveness of a stratified follow-up programme aimed at detecting disease relapse in patients with breast cancer.
Methods: Since January 2000, data from all patients treated for breast cancer was prospectively recorded on a BASO database. Surgical oncology follow-up was determined on the basis of relative risk of relapse, as assessed by the Nottingham Prognostic Index (NPI.) Patients were designated High, Moderate (Mod) or Low risk. Data regarding relapse rate, site of recurrence, presentation and mechanism of detection was analysed.
Results: 1004 women were treated surgically for primary breast cancer between January 2000 and December 2004. Median follow-up was 49 months. Disease-free survival was 93%, (98% Low, 92% Mod, 82% High.) Overall survival rate over the follow-up period was 96%, (99% Low, 96% Mod, 88% High.) Recurrence was 2·4% Local, 1·4% Regional, and 3·3% Distant. 65% of patients were symptomatic at time of detection (Table 1). 78% of recurrences were detected outside the scheduled follow-up program (Table 2).

Table 1

	Local	Regional	Distant	Total
Symptomatic	13	6	27	46 (65%)
Asymptomatic	11	8	6	25 (35%)
Total	24	14	33	71

Table 2

Risk	No.	No. Rec (%)	Sched	Unsched	% 0f Rec
High	191 (19%)	35 (3.5%)	50%	50%	49%
Mod	360 (36%)	26 (2.6%)	31%	69%	37%
Low	453 (45%)	10 (1%)	11%	89%	14%
Total	1004	71 (7.1%)	22%	78%	100%

Conclusion: NPI correlates with risk of disease relapse. These findings demonstrate that in relation to relapse detection, even in patients deemed High risk, routine follow-up appointments may confer little advantage.

Cancer/surgical oncology 0587

Major bowel resection in the elderly: 10 year results

J. D. Arbuckle, J. Crosbie, C. Dawson, P. Dawson, S. Ramesh, J. Smith
West Middlesex University Hospital, London

Background: The aim was to examine the outcomes of patients over the age of 80 undergoing a major bowel resection of bowel cancer compared to younger patients in terms of complications and mortality rates.
Methods: A prospective ongoing study of all patients undergoing major bowel resection for cancer between January 1994 and October 2003. Patients over 80 years old were compared with patients under 80.
Results: 479 patients were included in the study, 112 in Group 1 (over 80) and 367 in Group 2 (under 80). Mean follow up was 20 months in Group 1 and 29 months in Group 2. There was a significant difference between the groups in terms of tumour site (colon : rectum, more colonic tumours in Group 1, $p = 0{\cdot}017$). There was no significant difference in the stage (Dukes or TNM) between the groups, nor any significant difference in the surgeon's assessment of curative resection. There was no significant difference in leak rates between the groups, although major complications (particularly MI and pneumonia) were significantly higher in Group 1 ($p = 0{\cdot}0001$). In hospital mortality is higher in Group 1 ($p = 0{\cdot}007$), but 5 year survival and cancer related survival is similar.

Not surprisingly, 10 year survival is poor in Group 1. 10 year (Kaplan-Meier) curves are given showing all cause mortality. Odds ratios of factors predicting overall survival are given.

Conclusion: Major colorectal bowel resection should not be denied to patients over 80 years.

Cancer/surgical oncology 0588

Comparison of health care delivery systems for colorectal cancer in two adjacent Welsh trusts

P. R. Shah[1], M. E. Foster[2], P. N. Haray[1]

[1]Prince Charles Hospital, Merthyr Tydfil [2]Royal Glamorgan Hospital, Llantrisant

Background: To assess the impact of different secondary care mechanisms for managing referrals from primary care for patients suspected to have colorectal cancer on the stage of tumour at diagnosis.

Methods: All patients with colorectal cancer diagnosed in the two DGH's from January 2001 to December 2003 were included. Patients who did not have pre-operative staging were excluded. In Trust A, patients are seen predominantly in a designated one stop Rapid Access Colorectal Clinic (RACRC) whereas; in Trust B patients are seen in general surgical clinics as well as in a designated Nurse led Open Access Flexible sigmoidoscopy service.

Results: Overall, 187 patients in Trust A & 217 patients in Trust B were included in this study. 95% of cases in Trust A were referred & seen as urgent as compared to 82% in Trust B ($p = 0{\cdot}00004$).

The number of cancers seen as an emergency (same/next day of referral) was also higher in Trust A (46% *versus* 33·6%, $p = 0{\cdot}013$). In Trust A, nearly 40% of patients were diagnosed via RACRC, another 35% via inter departmental referrals. Whereas in Trust B, 50% were seen in the conventional general surgical clinics with 25% inter departmental referrals. There was a significant difference in the modified Dukes' Stage C and D in the two Trusts.

On further analysis & considering only urgent & non-emergency referrals (via designated referral routes), the percentage of Dukes' A cancers (via RACRC) was 19% in Trust A compared with 13% in Trust B (via General Surgical Clinics) [p = NS]. The mean waiting time for the 1st clinic appointment for cancers diagnosed via urgent referral in the RACRC in the Trust A was 14 days as compared to13 days in the General Surgical Clinics in the Trust B.

Conclusion: Our study shows that different secondary care mechanisms for managing referrals from primary care work equally well in diagnosing colorectal cancers. The presence of a dedicated specialist multidisciplinary team with clear referral pathways is probably more important than any specific type of assessment facility in the early diagnosis of colorectal cancers.

Cancer/surgical oncology 0595

IL-10 and IL-12 expression in breast cancer patients and effect of therapy

V. Rao, A. Alabi, T. Mahapatra, J. Greenman, P. Drew

Academic Surgical Unit, University Of Hull, Hull

Background: Immune system impairment manifested by increased IL-10 and reduced IL-12 levels have been reported in cancer. We investigated whether similar phenomena occur in breast cancer and determined the effect of therapy on these cytokine levels.

Methods: Blood samples were collected prospectively from primary breast cancer patients before surgery, post-operatively and after completion of adjuvant therapy and healthy controls. Serum was separated, aliquoted and stored at −80°C until use. PBMC isolated by the Ficoll-Hypaque density gradient purification technique, was incubated with S.*aureus* Cowan's strain I *in vitro* for 24 hours to assess IL-12 expression after stimulation. IL-10 and IL-12 levels in tumour specimens were ascertained by immunohistochemistry. Serum IL-10 and IL-12 levels and IL-12 level in supernatants from stimulated PBMC were measured by quantitative ELISA.

Results: No significant difference in IL-10 and IL-12 levels between patients ($n = 91$) and controls ($n = 31$) was detected. Comparison of prognostic factors did not show any significant association except for grade, which was inversely related to serum IL-12 levels ($P = 0{\cdot}045$). No difference in IL-12 production capacity of PBMC was detected between patients ($n = 73$) and controls ($n = 10$). Immunohistochemistry revealed appreciable staining for IL-10, but was inconclusive for IL-12. Following surgery, serum IL-12 levels were significantly elevated ($P = 0{\cdot}001$). After completion of adjuvant radiotherapy and or chemotherapy, there was a trend towards a fall in serum IL-12 levels ($P = 0{\cdot}06$).

Conclusion: Skewing of the immune system towards Th2 cytokine profile has not been demonstrated in this study. Tumour grade was the only prognostic factor, which influenced IL-12 levels, suggesting a degree of immune impairment. The rise in serum IL-12 following surgery may indicate a partial skewing of the Th1/Th2 balance. The fall in serum IL-12 after completion of adjuvant therapy may be reflective of the immuno-suppressive effect of these treatment regimens.

Cancer/surgical oncology 0614

GP referrals to a symptomatic breast clinic in 2006: non-compliance with national guidelines

Y. Tang, S. Heys, S. Chaturvedi

Aberdeen Royal Infirmary, Aberdeen

Background: Breast cancer is the commonest malignancy in women. Recently published BASO and SIGN guidelines have outlined breast conditions that require a referral to a specialist clinic. This study has evaluated the appropriateness of referrals from the general practitioners (GPs) and compared it with similar study undertaken in 2003 to see whether there has been any impact on GPs referral pattern.

Methods: This is a prospective observational audit of consecutive referrals from GPs to a specialist clinic over a period of six week. The number and type of referrals, reason for referrals, clinical findings and outcome was recorded and analysed with SPSS10. These results were compared with BASO/SIGN guidelines and also compared our previously published analysis of referrals in 2004.

Results: There were a total of 411 patients (mean age = 44 yrs, range 13 to 87) compared with 318 in similar period 3 years ago. 15·6% ($n = 64$) of referrals were designated as "urgent" by GPs, which was similar to previously. The remaining 318 patients were referred to be seen as either "routine" or "soon". Examination of referral letters by a consultant breast surgeon classed 27 (6·6%) as meeting the guidelines for an "urgent" appointment. Of the other 318 patients referred then 109 (34·3%) of these did not meet the criterion for referral according to the guidelines. A total of 151 (47·5%) were compliant and the remaining 68 (19·2%) patients were categorised as "possibly" meeting criteria for referral. The commonest reason for referral was breast lump in 156 patients (38%). The consultant breast surgeon classified 27 patients as "urgent" according to what was stated in the referral letter and of these 15 had breast cancer. There were 3 cancers detected in the 318 patients for whom "urgent" referrals had not been requested. Importantly, only 4·4% of patients referred to a specialist breast clinic had breast cancer.

Conclusion: Despite well publicised and established guidelines for referral to a symptomatic breast clinic, less than 1 in 20 have breast cancer. Furthermore, at least 34% of referrals still do not meet the national guidelines and the overall numbers of patients being referred appears to be increasing.

Cancer/surgical oncology 0618

Audit of resection margins in totally laparoscopic Ivor Lewis oesophagectomy

Y. Abdulaal, A. Nisar, H. Ali

Maidstone and Tunbridge Wells NHS trust, Maidstone

Background: Totally laparoscopic Ivor Lewis oesophagectomy (TLO) is a relatively new technique. Oncological safety regarding resection margin is still in doubt. The reported positive resection margins vary from 10% to 25% particularly when looking at circumferential margins.

Methods: 28 consecutive TLOs were performed between February and august 2006. Standard histology data was collected prospectively based on the royal college of pathologists data set.
Results: There were 28 patients who under went TLOs, There were nine patients (32%) with T1/T2 patients that were N0. There were seventeen patients (61%) who were T2/T3 and N1. and another 2 (7%) patients who had M1a disease, Positive proximal resection margin was found in one case (4%) and the same number of patients had distal resection margin. Positive circumferential margins were found in 3 cases (11%). All cases had at least 22 lymph nodes resected.
Conclusion: The rate of positive resection margins is lower than most published results. Therefore it's possible that totally laparoscopic Ivor Lewis oesophagectomy is oncologically at least as safe as an open procedure if not better. More numbers are needed in a multi cantered randomised trial where the technique is standardised.

Cancer/surgical oncology 0647

Response rates in locally advanced rectal cancers treated with preoperative Neoadjuvant Chemoradiotherapy and surgery

T. Kulkarni, S. Gollins, A. Maw
Glan Clwyd Hospital

Background: Residual disease after surgery for locally advanced rectal cancers results in local recurrence and distant metastases. Neoadjuvant treatment is recommended to improve rates of negative CRM and survival. This study aims to look at the effects of neoadjuvant chemoradiotherapy (naCRT) in such tumours with respect to T and N downstaging, CRM negativity rates, recurrence rates and overall and disease free survival rates.
Methods: 110 consecutive patients with CT or MRI diagnosed locally advanced or low (< 5 cm from anal verge) rectal cancer were subjected to preoperative radiotherapy (45–50·4 Gy in fractions of 1·8 Gy) over a 5 week period with concurrent administration of 5FU chemotherapy. Eligible patients (93) underwent surgical resection after 6–8 weeks and the histology report was compared with staging tumour scans to determine changes in T and N stage and CRM involvement. The patients were followed up for diagnosis of local and distant disease and survival times determined.
Results: Downstaging of tumours by at least one T and N stage was seen in patients treated with naCRT (Wilcoxon test $p < 0{\cdot}0001$). CRM negativity was seen in 79 (85%) of the 93 operated patients (Mann Whitney $p < 0{\cdot}0001$). There were 6 local and 14 distant metastases diagnosed after operation and the overall and disease free survival at 48 months were 60% and 70% respectively.
Conclusion: Significant T and N downstaging and reduction in CRM positivity was seen in locally advanced and low rectal cancers treated with naCRT and surgery.

Cancer/surgical oncology 0649

Tumour bed assessment by cavity shavings in patients with ductal carcinoma *in situ* of the breast

J. T. Jenkins, J. Mansell, C. R. Wilson, E. A. Mallon, J. C. Doughty, W. D. George
Western Infirmary, Glasgow

Background: Cavity shavings [CS] may be used to assess the tumour bed after excision. It is unclear whether such an approach optimises margin assessment and not shown that this approach is better than careful histological evaluation of a well-taken wide local excision. Few studies assess CS in patients treated for primary DCIS.
We assessed CS effectiveness in detecting disease in the tumour bed and determined whether the timing of tumour bed assessment altered disease detection comparing immediate CS and delayed but directed re-excision after initial biopsy.
Methods: 598 consecutive patients and specimen pathology were assessed. Cavity shavings were taken after wide excision of the lesion. Shavings were orientated as superior, inferior, medial, lateral. Outcomes were compared using Kaplan-Meier analysis and log rank test.
Results: Disease was found in cavity shavings in 33·3%. The median number of CS blocks was 12 (IQR 8–15). Clear shavings reassured no further disease on re-excision [OR 4·29 95%CI 1·30–14·18); $p = 0{\cdot}007$]. A higher ipsilateral breast event rate was found in the group without shavings, [OR= 1·313 95%CI 1·13–1·53; $p = 0{\cdot}005$].
A single stage procedure was more likely with CS (OR = 1·75 95%CI 1·40–2·19). CS involvement was related to Van Nuys Pathological classification ($p = 0{\cdot}001$), high nuclear grade ($p = 0{\cdot}003$) & comedonecrosis (OR = 1·62 95%CI 1·12–2·35). No differences in residual disease identification between immediate and delayed assessment were found even when data were stratified by initial excision margins. In the subgroup with involved shavings with no further surgery, a significant difference in disease-free survival was found compared to those with clear CS (log rank 6·5, df=1, $p = 0{\cdot}0108$). After re-excision, this survival difference disappeared.
Conclusion: Tumour bed analysis by cavity shaving is useful in assessing the completeness of excision. A selective re-excision policy for cavity shaving positivity results in a low local recurrence rate and is more likely to result in a single stage procedure.

Cancer/surgical oncology 0651

Multiple re-excisions or mastectomy in patients with persistent residual disease following initial breast conservation surgery for ductal carcinoma in situ

J. T. Jenkins, J. Mansell, C. R. Wilson, E. A. Mallon, J. C. Doughty, W. D. George
Western Infirmary, Glasgow

Background: Persistent residual disease in re-excision specimens creates a diagnostic dilemma for surgeons regarding the most appropriate further surgical management. Strategies are not clear as to whether the next operation should be re-excision of margins or mastectomy. Little evidence is currently available in relation to this aspect of DCIS management.
Methods: All patients included in the study had undergone initial breast conservation and at least one additional surgical procedure to attempt re-excision for involved or close margins. Patients were stratified by the number and types of procedures performed and whether residual disease was present in re-excision specimens.
Results: Two or more surgical procedures were identified in 286 DCIS patients for 217 involved margins [95 single margin (44·2%): 122 two or more margins (55·8%)]. Data were absent in 6 patients. 118 (41·7%) had clear re-excision specimens.
The mastectomy rate after initial excision was 36·1%. Of 280 patients, 128 underwent re-excision as the second procedure (45·7%), with 25 mastectomies as the third procedure (19·5% of re-excisions). 3 patients underwent repeat re-excision as a third procedure with one subsequent mastectomy (4^{th} procedure). Ultimately 127 women underwent mastectomy (45·4%) after initial involved or close surgical margins. Where re-excision was attempted as the second procedure only 26 (20%) women required subsequent mastectomy.
Conclusion: Approximately half of women with initial involved or close margins will eventually undergo mastectomy. Where re-excision of margins is attempted the likelihood of subsequent mastectomy is significantly less. This information may be of use to women undergoing breast conservation with re-excision in assessing the likelihood of definitive resection.

Cancer/surgical oncology 0668

The relationship of family history and outcome after conservation treatment for ductal carcinoma *in situ* of the breast

J. T. Jenkins, J. Mansell, C. R. Wilson, E. A. Mallon, J. C. Doughty, W. D. George
Western Infirmary, Glasgow

Background: In the absence of wide-ranging genetic testing, family history [FH] is a surrogate marker of a patients risk category. We aimed to evaluate the relationship between a FH of breast cancer and outcome after breast conservation for ductal carcinoma *in situ* to determine whether management alterations are required. We aimed to assess associations with a positive FH for breast cancer and recognised prognostic pathological factors.
Methods: Family history (FH) was recorded prospectively and revalidated retrospectively. FH was positive or negative and further stratified; a) breast cancer in first degree relative (mother/sister/daughter); b) breast cancer in any other relative and c) no history of breast cancer. Only cancer diagnoses prior to DCIS diagnosis in the patient were considered. Actuarial survival and failure time distributions were estimated using Kaplan-Meier methods stratified by FH and only patients treated by breast conservation were included.
Results: 681 DCIS patients were assessed. FH was positive in 112 patients (16·4%); 99 (14·5%) first degree relatives and 13 (16·4%) from the any other relative group. The ipsilateral breast event/disease-free survival for each category was no different (log rank =5·29, df=2, $p = 0·07$). Disease-free survival for each group at five and ten years was 80% and 70% [no family history]; 80% and 80% [any other relative] and 95% and 90% [first degree relative], though this was not significant. No significant findings for contralateral and overall survival were made (log rank = 0·635; df = 2; $p = 0·728$; 2·55, df = 2; $p = 0·279$). No significant associations with any histopathological features and FH were identified.
Conclusion: A family history of breast cancer is not associated with adverse outcomes for women treated by breast conservation therapy for DCIS. Local recurrence and disease-free survival were comparable to that of similarly treated women with negative family histories. Therefore, a positive family history of breast cancer is not a contraindication for breast conservation therapy in women diagnosed with DCIS.

Cancer/surgical oncology 0675

Large Hepatocellular Carcinomas: Time to stop preoperative biopsy

A. Young, H. Malik, M. Abu-Hilal, R. Prasad, G. Toogood, P. Lodge
Hepatobiliary Unit, St James's University Hospital, Leeds

Background: In Western countries Hepatocellular Carcinoma (HCC) often presents at a large size, which is seen as a contraindication to transplantation and often resection. Although diagnosis by imaging and alpha fetoprotein is usually straightforward, non-specialist units and oncologists continue to use biopsy to prove that diagnosis before transfer for specialist surgical opinion. We have looked at the impact of this on our practice.
Methods: We retrospectively analysed all large HCC's resected in our unit over the last 12 years. Survival data was calculated according to size and univariate and multivariate analyses was carried out to determine impact of preoperative, operative and histological factors affecting outcome.
Results: We identified 82 large HCC's (> 3 cm) and classified 41 as giant (> 10 cm). Overall survival at 1, 3 and 5 years was 76%, 54% and 51%. Size did not influence survival, although more complex surgical techniques were required for giant tumours. Predictors of poorer disease free survival were positive resection margin ($p < 0·001$), multiple tumours ($p = 0·003$), macroscopic vascular invasion ($p = 0·015$) and pre-operative lesion biopsy ($p = 0·027$).
Conclusion: Our data shows excellent outcomes after resection for large/giant HCC. This supports the management of such patients in large volume units, which are fully equipped and experienced in the management of these patients. Pre-operative biopsy must be avoided as this unnecessary manoeuvre has severely compromised our operative results.

Cancer/surgical oncology 0690

A comparative study of pathological prognostic features, treatment and outcomes in women diagnosed with ductal carcinoma *in situ* of the breast from affluent and deprived areas

J. T. Jenkins, J. Mansell, C. R. Wilson, E. A. Mallon, J. C. Doughty, W. D. George
Western Infirmary, Glasgow

Background: Few data exist that report the effect of deprivation in relation to DCIS management and pathological variations. Whether deprivation plays a role in final surgical outcomes for DCIS is not clear. We assessed whether disparity existed in relation to management of ductal carcinoma *in situ* between affluent and deprived groups and whether differences existed between clinical and pathological factors.
Methods: All patients treated for DCIS between 1988 and 2001 were assessed. Outcomes measured were: mode of detection, tumour size, histological grade, surgical procedure, adjuvant therapy and recurrence in relation to deprivation category of area of residence. Deprivation was categorised using Carstairs Index and affluent and deprived groups compared. The intermediate group was not assessed. A full and accurate assessment of comorbidity was not possible in this study.
Results: 686 patients were diagnosed with DCIS; 164 (24·7%) lived in affluent areas and 161 (24%) in deprived areas. No difference in mode of detection (screening/symptomatic) between deprivation categories was found (OR 1·35 (95%CI 0·831–2·197); $p = 0·224$). No differences in the initial surgical procedure or eventual surgical treatment existed between groups. Affluent patients were more likely to receive adjuvant radiotherapy (OR = 1·94 (95%CI 1·095–3·432); $p = 0·022$) but less likely to receive tamoxifen than deprived groups (OR = 0·539 (95%CI 0·294–0·986); $p = 0·043$). None of the pathological factors assessed showed significant association with socio-economic status. No significant effect of deprivation was noted in terms of disease-free survival after DCIS treatment in all patients after univariate survival analysis (log rank 1·559, df = 1. $p = 0·212$).
Conclusion: Socio-economic deprivation had no significant association with clinical or histopathological variables in DCIS patients. No previous studies have attempted to address this issue specifically relating to DCIS. The reasons for differences in adjuvant therapies were not apparent in the study.

Cancer/surgical oncology 0692

Failed colonoscopy: the radiological solution to achieving colorectal cancer targets

K. Flood[1], S. Jagger[1], R. Lowe[2], L. Juby[3], J. Griffith[1], J. Davies[1]
[1]Department General Surgery, [2]Department Radiology, [3]Department Gastroenterolgy, Bradford Royal Infirmary, Bradford

Background: Introduction of the 31 and 62 day targets in Colorectal Surgery has increased pressure on colonoscopic resources. Even in expert hands, incomplete colonoscopy occurs in approximately 10% cases. This introduces delay and the need for further investigations whilst the "clock is ticking". The aim was to achieve a system that would allow complete radiological imaging for at least 80% of patients who underwent incomplete colonoscopy. This imaging should be provided on the original bowel preparation and therefore within a suitable time period.
Methods: All patients undergoing colonoscopy over a three month period were observed. Those having failed colonoscopy were assigned to further bowel imaging (either barium enema or CT colonoscopy (CTC), according to protocol.) CTC was indicated if a stricture prevented colonoscopic completion. Patients intolerant to endoscopy underwent barium enema.
Results: Out of 470 attempted colonoscopies: 34 failed (5 M, 29 F), mean age 61 years (range 22–86), hence a completion rate of 93%. 14(41%) of the failures were due to poor bowel preparation, making them inappropriate to undergo another bowel study on the protocol. 20(59%) were appropriate to have a further study and 12(60%) underwent a further test. 2 had a CTC and 10 had barium enemas (7 same day, 2 following day, 1 after weekend). 2 of the barium enema reports stated poor coating of the bowel. 8(40%) didn't follow the study's protocol for individual reasons. In 3 patients colonoscopy revealed a tumour and CT staging was required. 1 patient refused further investigation, and imaging for another was not arranged. 2 had a looping/fixed sigmoid and 1 had a sigmoid stricture with no lesion discovered on water soluble study.
Conclusion: A 7% incomplete colonoscopy rate resulted in a practical ability to provide a service for same day preparation imaging. 65% patients undergoing incomplete colonoscopy were able to receive same preparation imaging of the colon, thus saving diagnostic time and preventing repetitive bowel preparations.

With continuing use of this protocol, complete bowel imaging could be achieved in close to 100%.

Cancer/surgical oncology 0704

A prospective evaluation of the systemic inflammatory response as a prognostic indicator in resectable pancreatic malignancy

J. A. Logue, S. M. Denley, J. Edwards, D. C. McMillan, C. W. Imrie, C. R. Carter, C. J. McKay
Glasgow Royal Infirmary, Glasgow

Background: We have previously reported an association between the systemic inflammatory response and survival following potentially curative resection for ductal adenocarcinoma of the pancreas. The aim of this study was to prospectively evaluate the role of C-reactive protein (CRP) as a prognostic indicator in resectable pancreatic cancer in addition to examining for any association between serum levels of the regulatory cytokines interleukin-6 and interleukin-8.
Methods: Pre-operative serum samples were collected prospectively from all patients undergoing Whipple resection between 2003 and 2006. Routine laboratory measurements of CRP were performed the day prior to surgery and recorded. Serum interleukin-6 and interleukin-8 levels were measured by enzyme-linked immunosorbent assay (ELISA). Triplicate analysis was performed and the mean value was used as the final concentration.
Results: Sixty-four patients underwent Whipple resection for pancreatic or peri-ampullary tumours. Thirty-six patients had completed a minimum of 14 months of follow-up at the time of analysis. On follow-up, 20 patients had died of their disease. Elevated pre-operative CRP was confirmed as a predictor of poor survival ($p < 0{\cdot}05$). Furthermore, Cox regression survival analysis demonstrated that those patients with elevated serum interleukin-6 levels had significantly worse survival ($p < 0{\cdot}01$). Serum interleukin-8 levels were not associated with survival differences. There was a significant correlation between serum interleukin-6 levels and CRP ($r = 0{\cdot}46$, $p < 0{\cdot}01$).
Conclusion: The results of this prospective study demonstrate that elevated pre-operative CRP predicts poor survival in patients undergoing Whipple resection. This is associated with elevated interleukin-6 levels and suggests a relationship between dysregulation of the innate immune response and an adverse prognosis with pancreatic cancer. Confirmation in a larger cohort of patients may enable pre-operative CRP to aid in the selection of patients for potentially curative resection.

Cancer/surgical oncology 0708

The role of Src kinase in oestrogen receptor positive breast cancer

E. J. Campbell, E. MacDuff, S. Tovey, J. Bartlett, T. G. Cooke, J. Edwards
Glasgow Royal Infirmary, Glasgow

Background: Elevated cSrc protein expression has previously been demonstrated in human breast cancer, in addition in vitro studies have suggested that cSrc promotes tamoxifen resistance in breast cancer cells. In order to further investigate whether cSrc is involved in endocrine resistance, we examined the expression of both total and activated cSrc in human breast cancer specimens from a cohort of oestrogen receptor (ER) positive tamoxifen treated breast cancer patients.
Methods: Tissue microarray technology was used to analyze 262 ER positive tamoxifen treated patients from specimens taken at time of surgical resection. Immunohistochemistry using total cSrc and activated cSrc (phosphorylated Y416, SrcpY^{416}) antibodies was performed. Kaplan-Meier survival curves were constructed and logrank test were performed.
Results: Elevated total Src was not associated with any known clinical parameters. In contrast high level of activated Src (Src pY^{416}) was significantly associated with improved overall survival ($p = 0{\cdot}005$) and lower recurrence rates on tamoxifen ($p = 0{\cdot}02$). Interestingly, improved patient outcome was only seen with activated Src in the nucleus. Cytoplasmic Src pY^{416} was demonstrated but did not predict outcome, almost no activated Src was demonstrated at the cell membrane. Activated Src at the nucleus was also significantly associated with node negative disease and a lower NPI ($p < 0{\cdot}05$).
Conclusion: These data demonstrate that cSrc activity is increased in human breast cancer and that activated Src within the nucleus of ER positive tumours predicts an improved outcome. In ER positive patients Src Kinase does not appear to be involved in endocrine resistance. Further work is required in ER negative human breast cancer, as this may represent a patient population in which Src Kinase is associated with poor outcome.

Cancer/surgical oncology 0724

Type 2 oesophagogastric junctional tumours are effectively treated by transhiatal oesophagectomy

A. R. Davies, M. J. Forshaw, D. C. Strauss, A. A. Khan, A. S. Noorani, V. Patel, R. C. Mason
St Thomas' Hospital, London

Background: The optimal operative approach for type 2 oesophagogastric junctional tumours remains controversial. The aim of this study was to assess whether transhiatal oesophagectomy could effectively treat both type 1 and 2 tumours of the oesophageogastric junction.
Methods: Between January 2000 and November 2006, 215 patients underwent transhiatal oesophagectomy; 166 of these patients were treated for adenocarcinoma of the oesophagogastric junction. Prospective data was obtained for these patients and cross-referenced with cancer registry survival data.
Results: 92 patients with type 1 tumours and 68 patients with type 2 tumours underwent resection. There was no difference in patient demographics or preoperative staging between these groups. Overall in-hospital mortality was 1·3%. Major complications included: pneumonia in 30 patients (18%), cardiovascular complications in 23 patients (14%) and anastomotic leak in 7 patients (4%). A Cox's proportional hazards model identified T stage, lymph node involvement and lymphovascular invasion to be independent predictors of overall survival. Type of junctional tumour was not associated with any survival difference; overall median survival following surgery was similar (Type 1 = 818 days; Type 2 = 830 days). Recurrent disease developed in 35 patients (39%) with type 1 tumours and 29 patients with type 2 tumours (43%). The pattern of recurrence varied according to tumour type with locoregional disease recurrence in type 2 tumours occurring predominantly in association with systemic relapse.
Conclusion: Transhiatal oesophagectomy is effective for both type 1 and 2 tumours of the oesophagogastric junction and is associated with low mortality and morbidity. We were unable to detect any survival disadvantage when performing a transhiatal oesophagectomy for type 2 tumours.

Cancer/surgical oncology 0732

Accuracy of digital rectal examination (DRE) in the estimation of height of rectal lesion

M. Iqbal, V. Thumbe, S. Bhalerao
City Hospital, Birmingham

Background: In order to plan appropriate treatment for rectal cancer, knowledge of distance of tumour from the anal verge is important as lower rectal cancers behave differently from the upper cancers. Rigid sigmoidoscopy is the accepted standard for knowing the distance from the anal verge. Because of fast tracking of suspected cancer patients, not all will have had rigid sigmoidoscopy by the time treatment planning is discussed in a multidisciplinary setting. Digital rectal examination is a simple procedure and can be performed by any member of the multidisciplinary team. We undertook this study to assess the accuracy of DRE for assessing low and mid rectal tumours.
Methods: One hundred doctors of variable levels of experience and from different specialties performed digital rectal examination (DRE) on a pelvic model with two fixed buttons at different levels simulating the lesions in the rectum. They were asked to estimate the level of the lesions in centimetres from the anal verge.

Results: 15 house officers, 41 senior house officers (SHO), 30 registrars and 14 consultants took part in the study. Twenty-four doctors were from medical specialities and rest from surgical specialities. 48·3% could estimate the distance of upper lesion accurately (7·5 cms or with in 1 cm of the correct distance) where as 64% of the doctors could estimate the distance of lower lesion accurately (3 cms or with in 1 cm of correct distance). Mean, median and range of measurement of lower lesion is 2 cms, 2 cms and 0·5 to 5·5 cms respectively. Mean, median and range of measurement of upper lesion is 6·5 cms, 6 cms and 3·5 to 12 cms respectively. Accuracy of assessing the lower rectal lesion (distance from the anal verge) is statistically significant compared to mid rectal lesion ($p < 0{\cdot}05$, x^2 test). 93% of doctors classified mid rectal lesion correctly and 99% of the doctors classified the lower rectal lesion correctly. Even though greater proportions of doctors broadly classified the lesions correctly, correct classification of lower rectal lesion was more accurate ($p < 0{\cdot}05$). There is no significant difference between seniors (Registrars and consultants) and juniors (House officers and senior house officers) in either assessing the mid and low rectal lesions or classifying them as mid or low rectal lesions ($p =$ or > 1). House Officers and Senior House Officers were as likely to be correct as registrars and consultants.
Conclusion: It is time to re-emphasise this art, which is in danger of fading in obscurity in the face of technology. Overall though digital rectal examination has low accuracy in estimating exact distance; it has high accuracy in classifying lower and mid rectal lesions, assessment of low rectal lesions and therefore in conjunction with rigid sigmoidoscopy it is a valuable tool in assessment of rectal lesion.

Cancer/surgical oncology 0742

Breast cancer patients present with identical symptoms in the urgent 2 week stream and the routine stream

R. Saif, M. Mangan, I. Richardson, T. W. J. Lennard, C. D. M. Griffith
Department of Breast Surgery, Royal Victoria Infirmary, Newcastle-Upon-Tyne

Background: A British Association of Surgical Oncology (BASO) study of "symptomatic" breast cancer patients [1] in the UK has shown that up to 30% of breast cancer patients presented in the non-urgent or routine stream and had not been referred as a suspected breast cancer from primary health care. The objective of this study was to look at the presentation of all breast cancer patients to one unit in the urgent (suspected breast cancer) and non-urgent (routine) stream.
Methods: A retrospective study was done over a 4 year period from December 2002 to November 2006. Data for 758 patients with breast cancer was analysed regarding their presenting symptoms.
Results:

	Urgent 2 week referrals $n = 527$	Non-urgent referrals $n = 231$
Lump	487 (92%)	193 (83%)
Nipple pathology	69 (13%)	41 (17%)
Pain	43 (8%)	36 (15%)
Deformity	32 (6%)	11 (4%)

There were 231 patients (30%) with symptomatic breast cancer who presented in the non-urgent stream to our unit. Their presenting symptoms were identical to those patients in the urgent (suspected breast cancer) stream.
Conclusion: This finding supports the concept that all patients with significant breast symptoms should be seen within 2 weeks since GPs are unable to discriminate accurately in primary care between benign breast disease and cancer. The criteria used by GPs for selection to the urgent and routine stream are not correct and inaccurate criteria or guidelines are being used to select the urgent stream.

Cancer/surgical oncology 0744

The role of neo-adjuvant chemotherapy and radical surgery in the treatment of oesophageal cancer

N. Jennings, J. Sultan, K. Wynne, D. Karat, N. Hayes, M. Griffin, S. Preston
Royal Victoria Infirmary, Newcastle – Upon-Tyne

Background: Since publication of the OEO2 trial in 2002 neo-adjuvant chemotherapy (NACTx) followed by surgery has been the gold standard treatment for oesophageal cancer in the UK. Critics of the OEO2 trial have pointed out that there was no quality control for the surgical resection and all stages of oesophageal cancer were included in the study with minimal accurate staging. To date only limited data is available looking at the role of NACTx followed by radical surgery. Therefore our aim was to compare results for NACTx and radical surgery *versus* radical surgery alone from a historical surgery alone cohort, as NACTx was the gold standard treatment for oesophageal cancer in the NOGCU since the publication of the OEO2 trail.
Methods: All patients given cisplatin and 5-FU between May 2002 and December 2005 on a neo-adjuvant basis were included in the NACTx group. A historical surgical cohort from Jan 1998 to June 2001 was analysed for results from surgery alone. The same standardised radical dissection was performed in both cohorts. The groups were matched for age, sex, pre-operative stage of disease and histology. Survival, disease free survival, RO resection rate and complication rate were analysed.
Results: The NACTx demonstrated a trend towards increased survival at 2 years but this did not reach statistical significance. Median survival was 931 days (95% CI 667,1195) compared to 650 days (95%CI 461,839). There was a 14% survival advantage at 2 years in the NACTx cohort 58% compared to 44% ($P = 0{\cdot}22$). No difference was seen for disease free survival, RO resection rate or complication rate.
Conclusion: This demonstrated a trend towards improved survival at two years with addition of NACTx. No difference was observed in disease free survival, RO resection rates or complication rates between the two groups. At present long term results are awaited on the influence of NACTx and standardised surgery on oesophageal carcinoma.

Cancer/surgical oncology 0755

Inter observer consistency in grading colorectal cancers

M. Kabeer, J. Mathew
Royal Cornwall Hospitals NHS Trust, Truro

Background: The management of colorectal cancers (CRC's) is dependant on tumour grade and stage. These two factors are dependant on the pathologists' interpretation. Previous studies have shown lack of consistency between pathologists.
Methods: As part of an ethically approved study, slides from 235 CRC's were retrieved from the histopathology archives and were blindly and independently assessed by the Lead CRC Pathologist against previously documented tumour grade, based on WHO Classification of tumours: Pathology and Genetics: Tumours of the Digestive System 2000. 137 of these had previously been graded as well to moderately and 98 as poorly differentiated adenocarcinomas. Kappa score was calculated to define the degree of agreement between these assessments.
Results: The agreement on well to moderate differentiation was 127/137. The disagreement on well to moderate differentiation was 10/137. The agreement on poor differentiation was 94/98. The disagreement on poor differentiation was 4/98. Thus the percentage of agreement was 94%. And the Kappa (κ) score was 0·88.
Conclusion: The above results indicate a very strong agreement on CRC grading. Such an agreement is necessary for appropriate patient management. Histopathology departments should audit their consistency in grading to prevent diagnostic drift, ensure consistency, allow accurate evaluation of therapeutic options and maximise prognosis. We also recommend that all colorectal cancer resection slides are reviewed by the Lead Pathologist to ensure consistency.

Cancer/surgical oncology 0759

Efficacy of long course neo-adjuvant chemoradiation in downstaging of locally advanced rectal cancer

A. Suppiah, A. Hunter, Y. Lim, V. Garimella, J. E. Hartley, J. R. T. Monson
Academic Surgical Unit, Castle Hill Hospital, Cottingham

Background: We aim to report the effectiveness of long course neo-adjuvant chemoradiotherapy in the locally advanced rectal carcinomas in a series of patients treated at a dedicated coloproctology unit between 1998 and 2006.
Methods: Data was collected retrospectively from the case notes of 51 patients receiving neo-adjuvant chemoradiotherapy for rectal cancer. All patients were radiologically staged with MRI prior to discussion at a multidisciplinary oncology meeting. Patients receiving palliative long course chemoradiotherapy were excluded form the analysis.
Results: 16%, 76% and 8% of patients were initially staged with stage II, II and IV disease by MRI respectively. 45 patients completed a 5 week course of 45 Gy in 25 fractions in combination with 5FU administration. On examination of the resection specimen 10% of patients demonstrated a complete response to therapy as compared to the pre-neo-adjuvant therapy MRI staging. 63% of patients were downstaged, 5% remained unchanged and 22% had evidence of tumour progression. The frequency of T4 tumours was decreased from 27% to 4% following neo-adjuvant treatment. Of the 41 patients who had surgical resections only one was found to have a microscopically positive circumferential resection margin. The chemoradiotherapy was generally well tolerated. However, 2 episodes of critical leg ischaemia occurred and one patient died from overwhelming sepsis during the treatment period. The median post-operative follow up period was 22 months, during which time 14% and 16% of patients developed local or systemic tumour recurrence respectively. 60% of patients remained tumour free at 24 months following resection.
Conclusion: Long course neo-adjuvant therapy is a well tolerated and effective method of downsizing locally advanced rectal cancers.

Cancer/surgical oncology 0763

SRC-1 and the transcription factor HOXc11 in breast cancer

S. Early, M. McIlroy, A. Stafford, A. Hill, L. Young
Royal College of Surgeon in Ireland, Dublin

Background: In breast cancer we have previously demonstrated that the estrogen receptor(ER) co-activator SRC-1 strongly associates with reduced disease free survival on endocrine treatment. Studies from our laboratory have established a pivotal role for the development of resistance to endocrine therapy. Recently we have demonstrated that SRC-1 can also interact with non-steroidal receptor transcription factors, including the MAP kinase effecter, ETs-2. The aim of this study was to identify other new transcription factor hosts for SRC-1 which are significant in the development of endocrine resistance.
Methods: Isogenic breast cancer cell lines, sensitive (MCF-7) and resistant (LY2) to endocrine treatments were analysed by MALI-TOF mass spectrometry, western blot, immunoprecipitation and immunocytochemistry in the presence and absence of ER modulators tamoxifen and faslodex.
Results: Proteins that differentially interacted with SRC-1 in endocrine resistant *versus* endocrine sensitive cells were analysed by mass spectrometry. Analysis revealed that the developmental protein HOXc11 was a novel transcription factor host for SRC-1. In endocrine resistant cells treatment with estrogen, tamoxifen and faslodex all induced translocation of HOXc11 to the nucleus and drove interactions between the transcription factor and the coactivator SRC-1.
Conclusion: These data indicate that HOXc11 is a possible transcription factor host for SRC-1. Novel transcription factor coactivator interactions may elucidate novel pathways dominant in steroid independent/endocrine resistant breast cancer.

Cancer/surgical oncology 0774

In patients with Indian ethnic background; single gallbladder polypoid lesion is likely to be malignant

A. Aldouri, W. Cross, J. Wyatt, S. Khan, S. Chigullapalli, K. Ranganathan, R. Chalmers, S. Fraser, W. Hamilton, S. Dexter, N. Ahmed, K. Menon, S. Pollard, J. P. Lodge, K. R. Prasad, G. Toogood
HPB & Transplantation Unit St. James's University Hospital, Leeds

Background: Gallbladder polypoid lesions (GBP) are relatively common findings on US examinations (4%), in the majority of cases they are benign; however gallbladder cancer (GBC) could present as GBP or arise from adenomatous GBP, especial in high-risk patients. Researchers from Mayo clinic advocated cholecystectomy for GBP in patients with primary sclerosing cholangitis. We retrospectively analysed all patients who had US examinations in our NHS Trust aiming to find whether GBP in patients with Indian background are more likely to be malignant compared to that in White people.
Methods: Between January 1998 and July 2006, 137655 abdominal US examinations performed in our NHS Trust. All reports of these US have been retrieved from our radiology department database and reviewed retrospectively. After exclusion of follow-up that and US performed for renal or pelvic organs, 71431 US reports were included in this analysis. All pathology reports of gallbladders removed during the same period (5780) have been retrieved from the pathology database and included in the analysis. Patients in whom the diagnosis of GBC has been made without histology have been identified from the database of Northern and Yorkshire Cancer Registry.
Results: Single GBP detected in 2% (No.1431) of all examined patients, stratification of data according to ethnic background revealed that 1·9% (1341) of white patients had single GBP, 2·2% (26) of Indian and 1·8% (64) of others ethnic subgroups. GBC diagnosed in 28 patients, four had GBP diagnosed by US. The prevalence of GBC in White patients with GBP was 0·1% (2/1341) compared to 7·6% (2/26) among patients with Indian background. Regression analysis revealed that age > 60 years, Indian ethnic background, GB wall thickness, single GBP and GBP > 10 mm in size are significant risk factor for GBC.
Conclusion: This analysis suggests that solitary GBP in patients with Indian background should be considered to be highly suspicious for cancer and cholecystectomy with tissue diagnosis may be advisable.

Cancer/surgical oncology 0780

Long term follow up of total parathyroidectomy for multiple endocrine neoplasia (MEN) related hyperparathyroidism

S. G. Fisher, H. L. Simpson, V. K. K. Chatterjee, G. C. Wishart
Addenbrookes Hospital, Cambridge

Background: To examine the cure rate and need for calcium (Ca) and vitamin D (Vit D) supplementation following total parathyroidectomy for MEN-related hyperparathyroidism.
Methods: Patients that underwent total parathyroidectomy for MEN related hyperparathyroidism from 2000 to 2001 were reviewed. Post-operative, 4-week and most recent Ca levels were recorded, together with pre- and post-operative parathyroid hormone (PTH). All patients were discharged on Vit D and/or Ca supplements. Long term need for Ca and Vit D was recorded.
Results: 7 patients (5 female, 2 males) with a mean age of 50 (range 31–69) were included. The mean follow up was 61 months (range 57–69). At most recent follow up 6 patients were normocalcaemic. 1 patient with a high Ca (2·54) had his Ca supplements reduced. 3/7 continued on Ca but all required Vit D support (mean = 1·57 mcg/day, range 1–3 mcg/day).

	Pre op	Discharge	4-week	Most recent
Calcium (mmol/L)	2·75 (2.51–2·96)		2·36 (2.01–2·57)	2·26 (2.17–2·54)
PTH	82·86 (63–131)		1·43 (0–3)	
Calcium (g/24h)		2·43 (1–4)		0·57 (0–2)
Alfacalcidol (mcg/24h)		1·1 (0–2)		1·57 (1–3)

Values are mean (range)

Conclusion: Total parathyroidectomy is an effective treatment for MEN related hyperparathyroidism with a high long term cure rate. Patients require on going Vitamin D support but the need for oral Ca decreases with time.

Cancer/surgical oncology 0834

Sirt6 expression is associated with survival in breast cancer

S. Zino[1], N. Ashraf[1], K. S. Stevenson[1], D. B. Kingsmore[4], A. P. Payne[2], W. D. George[3], P. G. Shiels[1]

[1]Division of Cancer Sciences and Molecular Pathology, Dept of Surgery and [2]Faculty of Biomedical and Life Sciences, University of Glasgow, Glasgow, [3]Glasgow Western Infirmary, Glasgow, [4]Gartnavel General Hospital, Glasgow

Background: Identifying the biological changes associated with breast cancer can improve our understanding of the disease and may result in new prognostic markers or therapeutic targets. Sirtuins belong to a family of genes that are involved in cell processes including DNA repair, cell-cycle regulation and ageing. Recently, altered sirtuins expression has been linked with lung cancer, gliomas and thyroid cancer. *SIRT6* is particularly involved in DNA repair and the suppression of genomic instability, aberrations of which are key features of cancer cells. This study aimed to investigate whether *SIRT6* is implicated in breast cancer pathogenesis and to determine any association between *SIRT6* expression and prognosis.
Methods: The transcriptional expression of *SIRT6* was determined using real-time PCR in an archival sample of breast biopsies (73 non-malignant and 65 malignant). *SIRT6* expression relative to *HPRT* (house keeping gene) was then analysed with respect to histopathology, disease recurrence and survival.
Results: We observed a significant decrease in the relative transcriptional expression of *SIRT6* in breast cancer biopsies (median = 0·79) when compared with non-malignant tissue (median = 1·72) (Mann-Whitney test, $p < 0·001$). There was a significant association between *SIRT6* expression and tumour grade (Kruskal Wallis Test, $p < 0·05$). Kaplan-Meier survival analysis showed that mean survival was significantly shorter ($p = 0· <0·05$) in patients with lower *SIRT6* expression (7·38 yrs, 95% C.I. 4·8–9·9) when compared with those with higher *SIRT6* expression (14·9 yrs, 95% C.I. 12·5–17·35, $p < 0·05$). Indeed, *SIRT6* was an independent predictor of survival (Cox-regression analysis, $p < 0·05$).
Conclusion: These results demonstrate an association between *SIRT6* expression and breast cancer and suggest that *SIRT6* may be implicated in breast cancer pathogenesis. Furthermore, the association between *SIRT6* and both tumour grade and survival, indicates that *SIRT6* may be a good biological marker of disease prognosis.

Cancer/surgical oncology 0843

The effect of referral to treatment interval on survival in patients with colorectal cancer

B. Bharathan[1], D. Borowski[1], S. Mills[2], N. Steen[3], M. Welfare[1], S. B. Kelly[1]

[1]Northumbria Healthcare NHS Trust, North Shields, Newcastle upon Tyne [2]NORCCAG, Newcastle upon Tyne, [3]University Of Newcastle, Newcastle upon Tyne

Background: The aim of this study was to assess the impact of the referral to treatment interval (RTI) on outcomes for patients with colorectal cancer.
Methods: This is an observational study based on the Northern Region Colorectal Cancer Audit Group (NORCCAG) for the period 1998–2002. Patients who had an elective referral only were included. Patients who had a histological diagnosis prior to referral were excluded. Patients were categorised based on whether they had elective (ET) or unplanned (emergency/urgent) treatment (UT). Comparisons were made between those who had RTI ≤ 62 days and those who exceeded it. Multivariate models were built for predicting the risk of advanced stage (Dukes' C&D), curative resection and survival at 3 years (Cox proportional hazard model-CPHM).
Results: 4891 patients had an ET while 798 patients had UT. 3256 (66·6%) patients in the ET group and 326 (41%) in the UT group waited for more than 62 days. On multivariate models, after adjusting for case mix, RTI was not predictive of stage, curative resection or cancer specific survival (Table 1).

Table 1 Multivariate models for predicting advanced Dukes' stage, curative resection and survival

Multivariate modelling for predicting risk	ET Odds ratios & p values		UT Odds ratios & p values	
	≤ 62 days ($n = 1635$)	> 62 days ($n = 3256$)	≤ 62 days ($n = 472$)	> 62 days ($n = 326$)
Dukes' stage (C&D)	1	0·92; $p = 0·21$	1	0·77; $p = 0·12$
Curative resections	1	1·17; $p = 0·14$	1	1·16; $p = 0·60$
Survival at 3 years	1	0·91; $p = 0·06$	1	0·98; $p = 0·88$

For patients who have an elective referral (both ET&UT combined), RTI was not predictive of survival (H.R=0·92; $p = 0·09$). However, unplanned treatment when compared to elective treatment had an unfavourable impact on overall survival (H.R = 1·34; $p < 0·001$).
Conclusion: The time from referral to treatment, was not predictive of stage, curative resection or survival. Unplanned treatment had an adverse impact on overall survival. If 326 patients (5·7% of elective referrals) had not waited beyond 62 days, it may have resulted in an elective treatment and better survival for some patients in the group. Reducing RTI could potentially reduce the number of unplanned treatments and improve survival.

Cancer/surgical oncology 0878

The role of axillary ultrasound and fine needle aspiration in the selection of axillary staging procedure in patients with operable breast cancer

T. Rattay, L. S. Smyth, R. Singhal, H. K. Al-Omishy, J. L. Taylor, M. R. J. Lee, S. J. Parker

University Hospitals Coventry & Warwickshire, Coventry

Background: Sentinel Lymph Node Biopsy (SLNB) is the axillary staging procedure of choice in patients with operable breast cancer. However, patients with positive sentinel lymph nodes require further treatment by either axillary node clearance (ANC) or radiotherapy. The role of axillary ultrasound (US) and fine needle aspiration cytology (FNAC) in selecting patients for SLNB or ANC remains unclear.
Methods: A prospective cohort study was undertaken to assess the role of axillary US and FNAC in patients with operable breast cancer. Between October 2005 and September 2006, 100 patients with operable breast tumours and no clinically palpable axillary nodes were examined by axillary US. 24 patients with enlarged or 'malignant' nodes also underwent axillary FNAC.
Results: Overall, 44 patients had US and/or FNAC evidence of axillary nodal involvement. Only one patient with definite US evidence of nodal involvement had a negative ANC. The sensitivity and specificity of US and

FNAC in determining nodal involvement were 64% and 70%; 77% and 100% respectively. In the absence of pre-operative US and FNAC, SLNB would have been inappropriate in 32% of patients. With the help of axillary US and FNAC, only 11% of SLNB procedures yielded positive nodes.
Conclusion: Axillary US and FNAC of suspicious nodes should be included in investigation of patients with operable breast cancer. It assists in the selection of the most appropriate axillary staging procedure and may reduce the rate of positive sentinel nodes.

Cancer/surgical oncology 0897

A single centre experience in surgical management of retro-peritoneal sarcoma

R. Lochan, D. Chattopadhyay, B. Jaques, S. Balupuri, D. Manas
Department of Hepato-pancreato-biliary and Transplant Surgery, Freeman Hospital, Newcastle-Upon-Tyne

Background: Retroperitoneal soft-tissue sarcomas demand a multidisciplinary approach to their management. Surgery is a prime treatment modality. We sought to evaluate the experience in our regional centre with regards to the surgical management of retro-peritoneal soft tissue sarcoma, with subset analysis of the factors responsible for local recurrence of disease and their influence on survival.
Methods: Collection of data was retrospective, on patients undergoing surgery for intra-abdominal soft tissue sarcoma between 1996 and 2005 at a single centre. A database was created using Microsoft Access and irecorded particulars included patient demographics, staging investigative modalities, peri-operative details, treatment, outcome, pathological details and subsequent complications. Finally, disease free survival was collated and analysed. Statistical analysis was performed on SPSS 12·0. Appropriate tests were used for the comparison of continuous and categorical variables. Standard methods of regression and Kaplan-Meier Survival analysis was performed
Results: 69 patients (M : F=40 : 29) underwent surgery as part of the management of retroperitoneal soft-tissue sarcoma. A total of 110 resectional procedures were carried out, this included 65 primary resections and 45 resections for recurrence. We have had 10 major complications in 8 patients, giving a procedure related morbidity of 10% and patient specific morbidity of 12%. There were no early post resection deaths (30-day mortality). Follow-up ranged from 6–121 months. Mean (95% CI) disease free survival was 69 (59–78) months. Logistic regression revealed that the most important factor influencing survival was the presence of recurrent disease ($p = 0{\cdot}03$). On univariate regression analysis significant factors influencing recurrence were high grade of tumour ($p = 0{\cdot}001$, 20/34), non-liposarcoma histology ($p = 0{\cdot}01$, 26/34), large (> 10 cms) size of primary tumour ($p = 0{\cdot}04$, 20/34) and R1 resection ($p = 0{\cdot}05$, 21/34).
Conclusion: Extensive resectional surgery with minimal morbidity, devoid of mortality is feasible in the treatment of retroperitoneal sarcoma. Development of recurrent disease is (the) significant factor influencing survival.

Cancer/surgical oncology 0899

Aggressive resection of localised recurrence in retro-peritoneal soft-tissue sarcoma

R. Lochan, D. Chattopadhyay, S. Balupuri, D. Manas
Department of Hepato-pancreato-biliary and Transplant Surgery, Freeman Hospital, Newcastle-Upon-Tyne

Background: Retroperitoneal soft-tissue sarcomas pose a treatment challenge. With few histological exceptions they are relatively chemo-resistant and do not respond to radiotherapy. For most of these neoplasms microscopically complete surgical excision is the best means of achieving long-term survival and this is technically demanding. In the absence of disseminated disease aggressive resection of localised recurrences can improve outcome.
Results: Between 1996 and 2005, 69 patients have undergone 110 surgical procedures for this neoplasm at our hospital. En bloc resection of the soft-tissue sarcoma with macroscopically clear margin was achieved in 96 out of 110 procedures. This necessitated 31 nephrectomies, 30 small bowel resections, 23 large bowel resections, 12 hepatectomies, 8 urinary bladder resections, 4 gastric resections, 1 distal pancreatectomy and 8 major vascular resections inclusive of three IVC resections, one aortic resection and a further four cases of external iliac artery resection. Of the initial 69 resections: 40 were R0, 29 were R1and 34 have developed recurrence. In 20, the disease was localised to the abdomen and they have undergone further surgery in an aggressive manner; one patient – 8 further resections, two patients – 4 resections each, three patients – 3 further resections each, 8 patients – 2 further resections each and 6 patients – single further resection each. 20 patients have died of progressive disease, 28 are disease free, 12 are alive with residual disease (5 with progressive disease and 7 with stable disease) and nine patients have been lost to follow-up. Of the 40 patients who are now alive, 15 have undergone at least one repeat resection of disease. Mean (95% CI) disease free survival was 69 (59–78) months. Long-term survival with disease is possible with a mean (95% CI) survival of 53 (30–76) months. However this difference was statistically significant with a log rank $p = 0{\cdot}0149$.
Conclusion: Aggressive re-resection of localised recurrence in retroperitoneal sarcoma is possible and appears to improve outcome.

Cancer/surgical oncology 0908

Management of the axilla in patients with clinically node-negative T1 invasive breast cancer: A nationwide survey of the current practices amongst UK breast surgeons

L. Mansfield, I. Sosa, R. Dionello, A. Subramanian, H. Devalia, K. Mokbel
St George's Hospital, London

Background: Precise knowledge of axillary lymph node status is essential in the treatment of operable carcinoma of the breast. For many years, axillary nodal clearance (ANC) has been an integral part of the conventional management of early-stage breast cancer. During the last few decades the trend of these surgical procedures has been one of decreasing invasiveness in order to try and achieve a much lower level of morbidity. To help reach this improved level of treatment the concept of the sentinel lymph node (SLN) was utilized. Recent studies have shown that SNB can provide an accurate assessment of the axillary nodal status in clinically node negative patients, negating the need to remove the majority of the axillary contents and thus reducing morbidity. A recent meta-analysis of all the literature to date appears to reveal that the dual technique (blue dye and technetium-labelled sulfur) is the gold-standard for successful identification of the SLN in the context of early-stage breast cancer. We aim to highlight the on-going wide range of differing methods employed, and compare this to the gold-standard recommended guidelines.
Methods: A questionnaire was devised to provide a snapshot overview of the current management of the axilla in patients with clinically node-negative T1 invasive breast cancer amongst UK beast surgeons in August 2006.
Results: Of the 271 UK surgeons, 74 (27·3%) performed ANC as the initial management of the axilla in patients with clinically node negative T1 invasive breast cancer, 56 (20·7%) used axillary node sampling (not directed by sentinel node mapping) and a total of 141 (52·0%) used the technique of SNB, of which 50 (18·5%) used blue dye alone and 91 (33·6%) used a combination of blue dye and radioisotope.
Conclusion: Despite the obvious advantages, our survey has revealed that the procedure is only used by 52% of British breast surgeons in this subgroup of patients. The reasons for this include limited hospital resources and lack of surgeons' training and accreditation.

Cancer/surgical oncology 0910

Methotrexate induces intestinal inflammation and mucosal barrier dysfunction which is not ameliorated by Mesna

K. C. Mulholland, C. McGalie, S. J. Kirk, K. R. Gardiner
Department of Surgery, Queen's University Belfast, Belfast

Background: Methotrexate (MTX) is a chemotherapeutic agent which when administered parenterally induces acute intestinal injury. Mesna is an antioxidant which has demonstrated protective effects in a number of *in vivo* models of oxidative injury. The aim of this study was to investigate the effects of enteral Mesna in an animal model of methotrexate-induced mucositis.
Methods: Adult male Sprague-Dawley rats were randomised to one of five groups ($n = 10$); group 1- saline only (sham chemotherapy); group 2- MTX plus water (treatment control); group 3- MTX plus 5mg/kg Mesna; group 4- MTX plus 10 mg/kg Mesna; and group 5- MTX plus 20 mg/kg Mesna. Mucositis was induced by the administration of 5 mg/kg MTX daily by subcutaneous injection for three consecutive days. Treatment was administered enterally for the same time period. The experiment was ended on day five when the following parameters were assessed; intestinal permeability to ^{14}C-labelled polyethylene glycol 4000, small bowel histological injury score, mucosal myeloperoxidase activity and serum endotoxaemia (using EndoCAb assay).
Results: Rats treated with methotrexate demonstrated significantly increased gut permeability ($p = 0{\cdot}027$), increased histological injury score ($p < 0{\cdot}0001$), increased mucosal myeloperoxidase activity ($p < 0{\cdot}0001$) and decreased serum EndoCAb concentrations ($p < 0{\cdot}0001$) when compared to the sham chemotherapy group. The enteral administration of 10mg/kg Mesna reduces small bowel myeloperoxidase activity ($p = 0{\cdot}007$) Compared with controls, the treatment of rats with Mesna did not significantly ameliorate the intestinal hyperpermeability, histological injury and the consumption of EndoCAb.
Conclusion: Methotrexate induces small bowel mucositis which is not ameliorated by the administration of Mesna in this in this particular model of methotrexate-induced mucositis model.

Cancer/surgical oncology 0915

Have referrals for patients with suspected colorectal carcinoma become more compliant to the guidelines, since their introduction in 2000?

J. Skipworth, A. Srilekha, N. Picardo, S. Williams, L. Meleagros, R. Navaratnam
North Middlesex University Hospital, London

Background: Guidelines were introduced in 2000 to facilitate the referral of patients with suspected Colorectal Carcinoma. Initial studies suggested that the guidelines were often not adhered to and not an efficient method of identifying Cancer patients. We evaluated the referrals to assess guideline compliance, their effectiveness at diagnosis and whether this has changed since their introduction.
Methods: All GP target referrals, over a 20-month period (2005-Oct, 2006), to a colorectal outpatient department at 1 London Hospital were collated and assessed. The number of patients, guideline compliance, investigations performed and diagnoses reached were measured.
Results: All 294 target referrals were seen within 2-weeks. 175 (59·5%) of the referrals adhered to the guidelines. 134 (45·58%) referrals were men with the age range being 21–94 yrs (mean 65·71 yrs). 94 patients (31·97%) had Colonoscopy/Flexible Sigmoidoscopy and 105 patients (35·7%) had a Barium enema. 14 (4·8% of total) patients were diagnosed with Cancer (13 Colorectal (4·4% of total) and 1 HPB (0·3% of total)). All 13 Colorectal Cancer patients were referred appropriately. The patient with Non-Colorectal Cancer was referred inappropriately. These 13 patients represented 7·42% of the patients referred appropriately, with 7 (53·85%) males and a mean age of 70·15 yrs. All 13 were T3/4 upon staging and all were treated within a 31-day period.
Conclusion: The requirements of the target system can be met but the pick-up rate of Cancer is very low, with the commonest diagnoses being benign conditions eg Haemorrhoids/Diverticular disease. The pick up rate is higher if the referrals are appropriate, but the diagnosis of early Cancer was low, with no T1/T2 tumours seen. Those with Cancer were more likely to be Male and older than the average patient referred. These findings are compatible with studies made after the guidelines were introduced, hence supporting the conclusion that they have not led to any significant increase in diagnosis rate and that moreover that this has not changed over the last 6 years. Already a large number of investigations are performed following target referrals and new schemes such as direct access Colonoscopy may lead to further inappropriate investigations being performed and hence a large burden on the NHS.

Cancer/surgical oncology 0932

Biomarkers of hyperplastic polyps in familial colorectal cancer

D. Speake, G. Evans, J. O'Sullivan, F. Lalloo, R. McMahon, J. Hill
Manchester Royal Infirmary, Manchester

Background: Epigenetics describes the silencing of key tumour suppressor genes through methylation of cytosine residues in the promoter regions of DNA. Methylation occurs in up to 30% of colorectal cancers (CRC) and has been linked to hyperplastic polyps (HPs) through a pathway independent of the adenoma-carcinoma sequence. The aim was to compare protein expression, methylation status and Microsatellite Instability (MSI) of HPs that occur sporadically and in a familial setting.
Methods: Patients were recruited via the Manchester Royal Infirmary Endoscopy unit (sporadic) and the regional genetics service HNPCC database (familial). IHC (Immunohistochemistry) was performed to detect Ki67, CK20, hMLH-1, hMSH-2 and hMSH-6 protein expression. Methylation status of p16, MGMT, hMLH-1, MINT 1 and MINT 31 was determined.
Results: IHC did not demonstrate loss of mismatch repair protein expression in any of the HPs. Weak staining was encountered with all Mismatch repair antibodies, particularly MSH-6. Hypermaturation was frequently encountered with Serrated Adenomas. MSI-low was encountered in 4 HPs. 124 hyperplastic polyps were identified for methylation analysis. The difference between the sporadic and familial group was significant for MLH-1 and MINT 31 methylation ($p = 0{\cdot}029$ and $0{\cdot}001$, Fisher's exact). The difference between the sporadic and familial group did not reach significance for MGMT ($p = 0{\cdot}064$ Chi^2), p16($p = 0{\cdot}207$ Chi^2) and MINT 1 ($0{\cdot}865$ Chi^2).
Conclusion: Methylation did not knock out MMR protein expression in this cohort of HPs. However significant differences between methylation status in sporadic and familial HPs have been demonstrated. Within the group of patients with familial polyps there are individuals without mismatch repair mutations at increased risk of CRC. It is appealing to consider methylation as a factor increasing this cohorts risk of CRC, our results appear to refute this possibility.

Cancer/surgical oncology 0955

Three-dimensional anatomy of ducts and vasculature in the nipple: Implications for nipple-sparing mastectomy

J. E. Rusby, E. F. Brachtel, J. S. Michaelson, F. C. Koerner, B. L. Smith
Massachusetts General Hospital, Boston, Massachusetts, United States

Background: There is increasing surgical interest in nipple-sparing mastectomy for patients with breast cancer or undergoing prophylactic mastectomy. Since this is an evolving procedure, techniques are not standardised and oncologic safety is weighed against nipple viability in deciding whether to excise the nipple core.
Ductal and arterial anatomy have been examined independently in the past. This study aimed to elucidate the spatial relationship between the nipple ducts and vasculature in three dimensions, to assist in optimisation of surgical techniques for nipple-sparing mastectomy.
Methods: Nipple specimens were taken from 50 consecutive non-nipple-sparing mastectomy specimens, fixed and cut into blocks. Neurovascular bundles were counted in one section from each specimen. One nipple was step-sectioned at 50 μm intervals. Sections were stained with haematoxylin and eosin or with factor VIII (an immunostain for vascular endothelium). Slides were scanned at high resolution to create digital images. Features of interest were traced in two dimensions and "Reconstruct" software was used to generate a 3D reconstruction.
Results: In the 50 specimens, a median of 7 neurovascular bundles (range 4–12) were noted in a concentric circle surrounding the central duct bundle. Many smaller vessels were also present. The three dimensional reconstruction suggested that the nipple has a dual blood supply. Some vessels arose in the breast parenchyma deep to the nipple-areola complex and others reached the nipple in a plane parallel to, and approximately 2·5 mm beneath, the skin surface. Within the papilla, vessels ran parallel to the ducts until they became too small to trace, 5–6 mm from the nipple tip.

Conclusion: This study establishes important anatomical relationships in the nipple that are now clinically relevant because of evolving surgical techniques. Excision of the nipple core during nipple-sparing mastectomy leaves the nipple reliant on supply via the dermal and subdermal vessels. However, preservation of the nipple core and a pad of glandular tissue beneath the nipple may not contribute to post-operative viability since the deep vessels would still be divided.

Cancer/surgical oncology 0973

HER2, PI3K and PTEN prognostic and therapeutic potential in breast cancer

S. Hadad, S. Fleming, K. Robertson, L. Baker, A. Thompson
Ninewells Hospital and Medical School, Dundee

Background: Over expression of epidermal growth factor receptor HER2 is identified in up to a third of breast cancers and is associated with poor outcome. HER2 may activate downstream signalling of the PI3kinase/Akt/mTOR pathway, and PTEN may exert its role as a tumour suppressor by negatively regulating this pathway. The aim of this study was to examine the interrelationships between these markers and with clinical outcome
Methods: Immunohistochemistry was performed on a tissue micro-array (TMA) of 117 primary breast cancers (104 ductal cancers) from patients aged 34–76 years (mean 51). Antibodies to Ki67, HER2/neu, PTEN, PI3-kinase, PDK1 total, Akt, phospho-mTOR, phospho-S6 ser235/236 and S6 ribosomal protein (S6pt) with appropriate positive and negative controls were scored using the quick-score method. Patterns of protein expression were compared with clinical data including minimum 5 years follow up
Results: HER2 was over-expressed in 15/117 (12%) and was significantly associated with PDK1 ($p = 0{\cdot}030$) and S6pt ($p = 0{\cdot}044$) expression. A positive trend was also seen between Her2 and PTEN expression ($p = 0{\cdot}051$). PI3-kinase was positively associated with PDK1 ($p = 0{\cdot}023$), Akt ($p < 0{\cdot}001$) and mTOR ($p < 0{\cdot}001$). Akt and mTOR were each associated with oestrogen receptor positive cancers ($p = 0{\cdot}035$ and $0{\cdot}038$ respectively). 5 year survival was lower (40%) in HER2 2+ and HER2 3+ patients compared with 75% in the remainder. No statistically significant association seen between PTEN and survival.
Conclusion: These data confirm the putative link between Her2 expression and PI3K/Akt/mTOR pathway in breast cancer. It suggests that targeting these downstream components may have clinical benefits in breast cancer. It also indicates the possible role of this pathway activation in Her2-mediated breast cancer progression and associated poor prognosis. However, it argues against the possible role of PTEN as an upstream regulator of the pathway in breast cancer

Cancer/surgical oncology 0980

Has improving outcomes guidance improved outcome for upper gastrointestinal cancers?

W. H. Allum[1], B. Cottier[2], S. Knights[2]
[1]Royal Marsden NHS Foundation Trust, London [2]Cancer Action Team, Department of Health, London

Background: Improving Outcomes Guidance (IOG) was developed from a thorough review of all available evidence to identify "characteristics of a service likely to have a significant impact on health outcomes." In Upper Gastrointestinal Cancer, the manual of cancer standards has set criteria against which service delivery in Cancer Units and Centres within a Cancer Network can be assessed. This review evaluates the early effect of IOG on upper GI cancer in England and Wales
Methods: Hospital Episode Statistics (HES) have been analysed to determine the effect of centralisation of major upper GI cancer surgery. Data from the Peer Review process has been examined to evaluate the level of compliance with IOG standards at Cancer Network, Unit and Centre level.
Results: IOG was published in 2002 and action plans for implementation were required by the end of 2006. Twenty two cancer networks have implemented their plans, 4 are set to implement by the end of 2007 and 7 Networks remain to agree their plans. There has been a steady overall decline in gastric cancer resection (2957 in 1997–98; 1894 in 2004–05). Oesophageal resections have also decreased (1901 in 1997–98; 1528 in 2004–05). Pancreatic resections have steadily increased (1001 in 1997–98; 1222 in 2004–05). Activity in designated Centres has remained constant with a steady reduction in Cancer Units for all resections combined. Detailed analysis shows that there has been a decrease in gastric resection in Centres with a corresponding increase in pancreatectomy and hence the constancy of activity. Peer Review has been completed in 32 Networks. It has shown greater compliance with Multidisciplinary Team working in Centres (85%) than in Units (55%) as well as higher compliance with indicators of patient experience. Clinical Nurse Specialist and Palliative Care input are variable across the country and are particularly limited in Unit teams.
Conclusion: Centralisation has occurred with a steady state of major resectional activity. Activity in Cancer Units is correspondingly decreasing. Centres are more compliant with IOG standards. Longitudinal study will be required to determine if IOG has affected the key indicators of disease free and overall survival.

Cancer/surgical oncology 0991

Cosmetic outcome after breast reconstruction, comparing the effects of operation type, adjuvant therapies and time

H. J. Thomson[1], S. J. Cawthorn[2], A. Bahl[3], Z. E. Winters[1]
[1]University of Bristol, Bristol [2]Breast Care Centre, Frenchay Hospital, Bristol [3]Bristol Haematology and Oncology Centre, Bristol

Background: Breast cancer is the commonest female cancer in the Western world requiring a mastectomy in 40% of patients. Increasingly there is a demand for immediate breast reconstruction (BR) with its potential for a single operation that lends to improved aesthetic and psychological outcomes. Irradiation of Latissimus dorsi (LD) implant procedures is likely to be synonymous with capsular contracture with the potential to influence cosmetic outcome whilst autogenous procedures may be associated with increasing donor site morbidity. There is a paucity of, as well as conflicting evidence of aesthetic preservation following irradiation of autogenous tissues.
This study compares the cosmetic outcomes of different types of BR and how they are affected by adjuvant treatments (radiotherapy (RT), chemotherapy) as well as how the cosmetic result develops with time. This study may also provide information to allow better decision making in selecting operation type when adjuvant therapies are anticipated.
Methods: Prospective collection of clinical photographs and measurements has been carried out on all patients undergoing BR under the care of a single surgeon since December 2000. Patients eligible for this study are those having undergone LD-based BR and having at least 1 full data set including clinical photographs and measurements. Photographic assessment was carried out independently by 3 clinicians, assigning scores 1 (very poor) to 5 (excellent) for various factors, including overall cosmesis.
Results: 81/88 eligible patients (92%) consented to participate in the study. (RT group = LD Implant (LDI) 23, Autogenous LD 13; No RT group = LDI 36, Autogenous LD 7). Mean score for overall cosmesis was better in the non-RT groups. In the RT groups, overall cosmesis scores decreased steadily from 6 months post-operatively, although the autogenous LD group scored slightly better than the LDI group. Analysis of clinical measurements is ongoing.
Conclusion: The use of adjuvant RT may be detrimental to cosmetic outcome for both autogenous and implant based LD procedures, but the effect may be less extreme in autogenous reconstructions. This effect may increase with time.

Cancer/surgical oncology 1004

The incremental value of CT-PET in staging oesophagogastric cancers

K. Ramkumar, P. S. Jambulingam, J. Nath, M. T. Hallissey, D. Alderson
University Hospital Birmingham NHS Trust, Queen Elizabeth Hospital, Birmingham

Background: CT-PET may identify unsuspected malignant disease in patients with operable oesophagogastric cancer on conventional staging. The extent to whichCT-PET influences treatment is unknown. The aim was to examine the incremental value of CT-PET in a group of patients selected for surgery by conventional staging.
Methods: 56 patients with operable oesophagogastric cancers who had undergone multislice CT, staging laparoscopy with peritoneal cytology and/or EUS underwent CT-PET. Patients underwent surgical exploration or had further confirmatory imaging or biopsy if the MDT decision was that surgery was inappropriate following CT-PET.
Results: In 27 patients (48%), CT-PET was concordant with other imaging. In 13 patients (23%) discordance did not affect decision making (where CT-PET correctly (12) or incorrectly (1) predicted less disease). CT-PET influenced management in 16 (29%) of patients. CT-PET upstaged 9 patients correctly (16%) preventing an unnecessary operation, but at the expense of depriving 7 patients (13%) of an operation by potential upstaging. All of these 7 patients underwent surgery after further investigation and MDT review.
Conclusion: CT-PET prevents unnecessary surgery in 16% of patients with 'operable' oesophagogastric cancer. CT-PET overstaging occurs in 13% of patients resulting in further tests and potential delays in treatment.

Cancer/surgical oncology 1008

A prospective randomized trial investigating the use of drains following breast conservation surgery

R. R. Kallam, R. B. Sowdi, M. M. Rao, K. Grover, J. Macfie
Combined Gastroenterology Research Unit Scarborough General Hospital, Scarborough

Background: We have previously shown that the use of drains in patients following mastectomy is associated with prolonged hospital stays and no clinical benefit. The aim of this study was to evaluate the effect of drains in patients with breast cancer undergoing breast conservation surgery.
Methods: Consecutive patients undergoing breast conservation surgery who required axillary dissection for staging were randomised to a drain or no drain group. Closed suction drainage Redivac® drains were used. Outcome measures included incidence and volume of seroma formation, length of hospital stay in days and postoperative pain scores. Results were expressed as median (interquartile range).
Results: A total of 116 patients were randomized (59 to receive drain and 57, no drain) the groups were similar with regards to age, tumour size and number of lymph nodes removed. There was no significant difference between the groups in seroma formation (9/59 drain group cf 11/57 no drain group, $p = 0{\cdot}207$). There were significant differences between the groups with respect to length of hospital stay (3(3–3) cf 1(1–1), $p < 0{\cdot}001$) and postoperative pain scores on day 1 (5(4–6) *versus* 2(2–3), $p < 0{\cdot}001$) and at 48 hours (4(4–5) *versus* 2(1–2), $p < 0{\cdot}001$).
Conclusion: Use of closed suction drains following breast conservation surgery does not prevent seroma formation, but significantly increases postoperative pain and hospital stay.

Cancer/surgical oncology 1010

Outcome of patients with inoperable metastatic colorectal carcinoma

H. Thomas, S. M. Sleeba, S. Kapur
Norfolk and Norwich University Hospital, Norwich

Background: In this study we have analysed the treatment of patients with incurable (non-resectable) metastatic colorectal cancer. We assessed the percentage of patients initially managed by non-surgical methods (chemotherapy, stent and palliation) who required surgery at some point in their management.
Methods: List of patients with metastatic colorectal cancer at presentation for the 3-year period from 2000 to 2002 was obtained from the colorectal department database and their notes analysed. Patients who had resectable liver metastasis and patients who were in their extremis on admission were excluded from the study. The data recorded included the date of first diagnosis, primary site of cancer, symptoms at presentation, site and number of metastasis, the initial treatment received, complications and mortality after surgery and the survival. The primary end point was either death or the need for further surgery or stent.
Results: 95 patients presented with metastatic colorectal cancer during the 3-year period from 2000 to 2002 inclusive. 46 patients were suitable for our audit. Of these 24 patients (52%) had surgery and 22 patients (48%) had non-surgical management (2 stent, 13 chemotherapy and 7 for palliation only). 2 patients out of the 22(9%) who had initial non-operative management developed bowel obstruction later, one requiring surgery and one was stented. Of the 24 patients who were operated, 3 died in the postoperative period (12·5%) and 2 patients (8%) required further surgery for complications. When patients were analysed depending on the symptoms at presentation, 19 patients presented with symptoms of bowel obstruction of which 16 patients had surgery, 2 were for palliative treatment and 1 had chemotherapy but no patients were stented. The mean survival of patients in the surgery group was 13·1 months and in the non-surgery group was 11·2 months.
Conclusion: Need for surgery is low in patients initially managed with non-operative methods. Initial treatment with stent needs to be explored further. Palliative surgery is associated with high mortality and complications. There is no major difference in survival between the two groups.

Cancer/surgical oncology 1013

Positive peritoneal cytology alone as a marker of poor outcome in gastroesophageal cancer

J. Nath, J. Turnbull, C. Wigley, K. Moorthy, R. Nijjar, M. Hallissey, D. Alderson
Upper Gastrointestinal Unit, University Hospital Birmingham NHS Trust, Birmingham

Background: Gastroesophageal cancer patients with overt peritoneal metastases have a poor prognosis. The survival of patients with positive peritoneal cytology alone is less clear. The aim of this study was to compare the survival of patients with no macroscopic peritoneal disease and positive cytology (P−C+) to those with macroscopic peritoneal disease and positive cytology (P+C+).
Methods: All patients with resectable gastroesophageal cancer on spiral CT and/or EUS underwent staging laparoscopy with pelvic peritoneal lavage using a standardised technique in the period between Jan 2003 – Nov 2006. Lavage fluid was sent for cytological examination. Patients with positive cytology at staging laparoscopy were divided into two groups. Those with macroscopic peritoneal disease and positive cytology (P+C+) and those with positive cytology alone (P−C+). These two groups were treated with palliative chemotherapy or best supportive care based upon performance status and patient wishes.
Results: 255 staging laparoscopy procedures were performed. 55 had positive cytology of which 40 were P+C+ and the remaining 15 were P−C+. Both groups were comparable for age, sex, radiological nodal status and proportion receiving chemotherapy. The median survival for P+C+ was 9 months (95%CI 7·4–10·6) *versus* 13 months for P−C+ (95%CI 3·1–22·9), $p = 0{\cdot}52$.
Conclusion: Patients with positive peritoneal cytology alone without macroscopic peritoneal disease do not have a better survival than those with positive cytology and overt peritoneal metastases.

Cancer/surgical oncology 1024

Is staging accuracy by MRI affected following neoadjuvant chemoradiotherapy for rectal cancer?

S. Wilkie, A. Lyall, C. Bolln, T. McAdam, S. Yule, M. Loudon
Aberdeen Royal Infirmary, Aberdeen

Background: Magnetic Resonance Imaging (MRI) accurately predicts rectal cancer staging. The effect of neoadjuvant chemoradiotherapy (CRT) on accuracy of post-CRT MRI is controversial. This study assessed the effect

of neoadjuvant CRT on the ability of MRI to predict histological staging, margin involvement and response to treatment.
Methods: Patients under the care of a single colorectal surgeon in a tertiary referral centre who received neoadjuvant CRT and MRI were identified from a database. The MRI reporting proforma and the histopathological specimen results were compared.
Results: Thirty five patients received neoadjuvant CRT during the study period of which, 23 patients had pre-treatment MRI. Thirteen of these patients had a post neoadjuvant CRT MRI. The assessment of post treatment regression (complete or incomplete) was accurately described in 10/13 (76·9%) patients. T stage was correctly predicted in 4/12 (33·3%). Seven patients were overstaged by MRI and 1 understaged. One patient was unassessable due to fibrosis. Nodal stage was accurate in 9/13 (69·2%) and over and understaged in 2 patients respectively. In all patients there was no case of margin involvement which was not predicted on MRI.
Conclusion: MRI provides an accurate prediction of response and margin involvement following neoadjuvant CRT for rectal cancer. There is a close correlation with pathological lymph node staging; however residual disease appears to be overstaged.

Cancer/surgical oncology 1028

Fibroblast growth factor-2 (FGF-2) reduces cytotoxic effects of chemotherapy on SW620 colonic cancer cell line

S. G. Prabhudesai, S. Rekhraj, G. Roberts, M. J. Seckl, A. W. Darzi
Imperial College, St. Mary's Hospital, London

Background: Only 50% of patients with advanced colorectal cancer respond to chemotherapy and many will eventually progress due to chemoresistance. Both *in vitro* and *in vivo* studies have demonstrated that FGF-2 reduces chemosensitivity in a variety of tumour groups. Our hypothesis is that FGF-2 offers chemoprotection in colorectal cancers and this study explores potential mechanisms that may mediate this effect.
Methods: Proliferation assays assessed the mitogenic effect of FGF-2 at different concentrations on a colon cancer cell line, SW620. To examine if FGF-2 offers any chemoprotection, SW620 cells were exposed to Oxaliplatin or 5-Fluorouracil (5FU) with or without FGF-2 pre-treatment. Cell survival was assessed using trypan blue exclusion assay at 96 hours. Caspase 3 activity assay was used to investigate the influence of FGF-2 on chemotherapy induced apoptosis.
Changes in expression of anti-apoptotic proteins such as Bcl-2 and Bcl-X_L were assessed at a gene and protein level using RT-PCR and Western blot technique respectively.
Results: FGF-2 at a concentration of 0·25 ng/ml did not effect cell proliferation in SW620 cells. Pre-treating SW620 cells with 0·25 ng/ml FGF-2 offered significant cell survival advantage when exposed to oxaliplatin (82% *versus* 58%, FGF-2 *versus* control, $p = 0{\cdot}018$) or 5FU (82% *versus* 58%, FGF-2 *versus* control, $p = 0{\cdot}015$) compared to cells exposed to chemotherapy alone. This FGF-2 mediated improved survival in cells exposed to chemotherapy was associated with attenuation of chemotherapy induced cellular apoptosis as measured by caspase-3 activity ($p = 0{\cdot}04$). There was no observed difference in the gene and protein expression of anti-apoptotic proteins, Bcl-2 & Bcl-X_L in cells treated with chemotherapy with or without FGF-2 for 4 and 24 hours respectively.
Conclusion: FGF-2 offers significant protection to SW620 colonic cancer cell line exposed to oxaliplatin or 5FU. The molecular mechanisms by which FGF-2 confers chemoresistance in SW620 colonic cancer cell line needs to be investigated further.

Cancer/surgical oncology 1038

Pre-treatment with doxycycline enhances cytotoxicity of cisplatin and oxaliplatin in colorectal cancer

J. Sagar, K. Sales, S. Dijk, J. Taanman, A. Seifalian, M. Winslet
Royal Free Hospital and University College London, London

Background: Doxycycline, long-acting semi-synthetic tetracycline is used widely as antibiotic. Recently, it is shown to have antiproliferative, anti-invasive and cytotoxic properties. The anti-invasive and anti-proliferative actions have been suggested to be due to inhibition of matrix- metalloproteinase and of mitochondrial protein synthesis (restricting oxidative-phosphorylation and reducing ATP synthesis) respectively. We aim to establish whether pre-treatment with doxycycline enhances cytotoxicity of cisplatin and oxaliplatin in HT-29-colorectal cancer cells.
Methods: 2×10^4 HT-29 cells/ml were seeded on 22-mm glass cover-slips in 6-well-plates, cultured for 24hours and treated with 10 μg/ml of doxycycline over 4days. The cells were histochemically stained for cytochrome c oxidase activity and were inspected under microscope at different time points. 2×10^4 HT-29 cells/ml were cultured in 6-well-plates for 24hours and treated with 10 μg/ml of doxycycline for 3days, followed by treatment with cisplatin and oxaliplatin for 24hours. The cytotoxicity assay was performed with Alamar-blue-assay-kit in triplicates.
Results: Cytochrome c oxidase staining revealed clear reduction in enzyme activity following 3days of doxycycline treatment. Therefore, we decided to pre-treat HT-29-colorectal cancer cells for 3days before cisplatin or oxaliplatin treatment. Pre-treatment with doxycycline for 3days showed statistically significant increase in cytotoxicity of cisplatin and oxaliplatin (t test).
Conclusion: Three days of pre-treatment of doxycycline enhances cytotoxicity of cisplatin and oxaliplatin. This action of doxycycline may have potential role in combination chemotherapy for colorectal cancer in future. Mechanism(s) by which doxycycline increases cell death is subject to further study.

Cancer/surgical oncology 1041

Antibody microarrays reveal proteins associated with doxorubicin resistance in human breast cancer cells

L. Smith, S. L. O'Kane, M. B. Watson, P. J. Drew, M. J. Lind, L. Cawkwell
University of Hull, Hull

Background: Doxorubicin is an effective agent in the treatment of breast cancer. However, resistance to this agent is common and represents a major obstacle to successful treatment. The identification of novel biomarkers that are able to predict treatment response would allow treatment to be tailored on an individual patient basis. The antibody microarray is a powerful new technique, which allows the global analysis of many proteins simultaneously and could identify a panel of proteins to discriminate between different phenotypes.
Methods: The Panorama™ Cell Signalling Antibody Microarray Kit (Sigma-Aldrich) was exploited in order to analyse the MDA-MB-231 breast cancer cell line and a novel derivative (MDA-MB-231DR) displaying significant resistance to doxorubicin. The microarray comprised 224 different antibodies selected from a wide variety of pathways, including apoptotic and cell signalling pathways. A standard ≥ 2·0 fold cut-off value was used to determine differentially expressed proteins.
Results: A decrease in the expression of MAP-Kinase activated monophosphotyrosine (*p*-ERK; 2·8 fold decrease), cyclin D2 (2·5 fold decrease), cytokeratin 18 (2·5 fold decrease), cyclin B1 (2·4 fold decrease) and heterogeneous nuclear ribonucleoprotein m3-m4 (2·0 fold decrease) was associated with doxorubicin resistance. Western blotting was exploited to confirm results from the antibody microarray experiment.
Conclusion: These data suggest that antibody microarrays can identify novel biomarkers which may discriminate between drug-sensitive and drug-resistant samples. This may point to novel mechanisms of resistance and identify potential therapeutic targets.

Cancer/surgical oncology 1044

Attitudes of healthcare professionals towards treatment options for women over 70 years with breast cancer – A qualitative study

L. Husain, L. Wyld, M. Reed, K. Collins
University of Sheffield, Academic Surgical Oncology Unit, Royal Hallamshire Hospital, Sheffield

Background: A third of women with breast cancer in the UK are over 70 years old. 40% of over 70s are treated with primary endocrine therapy (PET) for their primary operable breast cancer rather than with surgery, which is the gold standard treatment. It is not known whether healthcare professionals (HCPs) offer informed choice to the elderly. There has been no research on how the elderly are counselled and what factors determine the treatment options offered to them. This study aimed to answer these questions.
Methods: In depth qualitative interviews were undertaken to explore the views of a group of nine purposively selected HCPs. The group included 4 surgeons, 2 oncologists, 2 breast care nurses and 1 GP. The interviews were transcribed verbatim and analysed using framework analysis.
Results: All HCPs offered the elderly the choice of surgery. Age was not a factor for deciding treatment options. The main factor that prevented surgery as a feasible option was a poor pre-morbid state. HCPs valued patients as individuals. They recognized that the elderly often requested non-surgical treatment options, as they wanted little disruption to their lives. They felt that the role played by patients in their treatment decision making was related to personalities rather than age.
Conclusion: HCPs are not ageist towards women over 70 years with primary operable breast cancer. They rely heavily on MDT decisions to tailor individualized treatment options to all their elderly patients. They valve and seek patient involvement in treatment decision making. They shape each treatment consultation in response to their patient's needs.

Cancer/surgical oncology 1071

Detection of faecal proteins in colorectal cancer patients using seldi-tof ms

N. Henderson, R. Steele
University of Dundee, Dundee

Background: Screening for colorectal cancer is based on the faecal occult blood test (FOB) and has been shown to reduce mortality. However, it is an imperfect test and large numbers of negative colonoscopies are carried out. We have identified possible novel biomarkers for colorectal cancer in faeces using surface-enhanced laser desorption/ionization time-of-flight mass spectrometry (SELDI-TOF MS).
Methods: Stool samples from 100 patients proven to be normal following colonoscopy were collected and 46 cancer stool samples were collected pre-operatively from colorectal cancer patients. Stool (in PBS) was mixed with U9 (Urea Chaps (1×PBS, 9 mol/L urea, 1% CHAPS) buffer (3 : 2, Stool : U9) and vortexed (30 minutes at 4 C). This was profiled on the CM10 ProteinChip at pH 4·0. Laser settings were optimized for the detection of low and high molecular weight proteins.
Results: Average spectra were generated for cancer and for normal and after further analysis was performed, a subset of 12 protein peaks was discovered to yield the highest separation of groups. Statistical analysis showed that the group of 12 proteins (between 2·8kDa and 9kDa) was far more accurate than any single peak. There were lager amounts of these proteins present in rectal cancer stool samples than right sided cancers. Using one of the peaks (6334Da) we were able to detect 90% of the rectal cancers and had a specificity of 100%.
Conclusion: Proteins in stool can detect colorectal cancer and although these proteins are yet to be identified, this has implications for the development of a new diagnostic test for colorectal cancer.

Cancer/surgical oncology 1072

Aspirin as an effective chemopreventive agent in HT-29 colorectal cancer-cell line

K. K. Varadhan, G. Radhakrishnan, A. M. Amin, K. M. Sales, M. C. Winslet
Academic Division of Surgery and Interventional Sciences, Royal Free and University College Medical School, University College London, London

Background: The role of Aspirin in causing growth inhibition of colorectal cancer cells is thought to be mediated mainly via inhibition of cyclooxygenase enzymes. We investigated the efficacy of aspirin in causing anti-proliferative and apoptotic activity in HT-29 cell lines using different assay methods and also to establish possible COX-independent mechanisms.
Methods: Alamar blue assay was used for cell viability and picogreen assay for anti-proloferative effects of aspirin. To determine the apoptotic activity of aspirin, we used Annexin-V staining and caspase activity assays for caspases 3, 8 and 9. Prostaglandin (PGE2) assay was performed to assess the COX-dependent apoptotic activity of Aspirin.
Results: Alamar blue assay showed a reduction in viability of 22%, 29% and 30% following treatment with aspirin at 24, 48 and 72 hours respectively. The anti-proliferative effect of aspirin, as measured by picogreen assay was 5%, 10% and 15% at 24, 48 and 72 hours treatment, respectively. Annexin-V staining also showed an apoptotic activity of 10% and 15% at 48 and 72 hours respectively following treatment with 1 mM aspirin. Caspase activities measured at regular intervals showed a marked caspase-9 activity throughout the duration of treatment and maximal at 52 hours activity suggesting activation of intrinsic mechanism of apoptosis. There was less than 50% activation of caspase-8 compared to caspase-9. There was a 4-fold increase in caspase-3 activity compared to controls. There was a concentration dependent reduction in PGE2 levels following aspirin treatment.
Conclusion: Aspirin showed evidence of anti-proliferative and apoptotic activity in a dose and concentration-dependent manner. We conclude that cox-independent mechanisms may also co-exist in the apoptotic pathways induced by aspirin and could be mainly via the intrinsic pathway. Further studies should explore the role of aspirin as a chemotherapeutic agent in tumors expressing COX-2.

Cancer/surgical oncology 1073

The synergistic use of Argon Plasma Coagulation (APC) and Self-expanding metallic stents (SEMS) for the palliation of malignant dysphagia

P. T. Cherian, H. Ahmed, S. Cherian, M. M. Ahmed
Good Hope Hospital, Birmingham

Background: Malignancies of the oesophagus or gastro-oesophageal junction are often inoperable at presentation and the resulting dysphagia often requires endoscopic palliation. We describe a prospective study of the synergistic use of APC and SEMS for the palliation of malignant dysphagia covering a 7-year period.
Methods: Between Jan 2000 and Dec 2006, 127 consecutive patients with inoperable malignant dysphagia (66% adenocarcinoma, 23% squamous, 11% Miscellaneous) were referred for palliation. Depending on patient's frailty and tumour characteristics, patients either had SEMS insertion (group 1: frail patient with long/schirrous tumor) or were entered into an APC programme (group 2: less frail, with short/exophytic tumour) in a non-randomized fashion. In group 1, Flamingo stents or Esophageal Wallstents II (Boston Scientific) were used. In group 2, APC (70 W, Erbe) was repeated every 2–6 weeks until symptom control.
Results: Group 1: $N = 57$ (37 M : 20 F, mean age 72·4 yr). All patients were stented successfully. 26 required pre-stent oesophageal dilatation with the Savary-Gillard dilator. Improvement in dysphagia occurred in over 90% (mean reduction of dysphagia score = 1·5). There was 1 bleed but no perforation or death. 5 patients developed dysphagia due to tumour overgrowth requiring secondary APC while 3 others had gastroduodenal stent placement for pyloric obstruction. Group 2: $N = 70$ (41 M : 29 F, mean age 76·1 yr). 45 were successfully palliated with repeated APC sessions (mean reduction of dysphagia score = 1·5, mean number of sessions per patient = 2·6, range 1–6). The remaining 25 either became too frail to continue with APC or dysphagia progressed despite APC. In these patients, SEMS were inserted after 1–6 sessions of APC. In 5 stented patients, tumour overgrowth occurred requiring further APC. There was no complication from APC. Overall, 102(80%) had died at the time of the study (mean survival 145 days).
Conclusion: With careful patient selection, APC and SEMS can be used in co-operation to provide effective palliation of malignant dysphagia. Use of the two modalities of endoscopic palliation ensures effective use of hospital

resources and optimal symptom control, which might not be possible with a single modality approach.

Cancer/surgical oncology 1076

Early experience of prone abdominoperineal excision (aper) of the rectum and gluteal flap to cover perineal wound

J. M. Mathias, C. Liyanage, A. Kimble, N. Cripps, G. Harris, J. N. L. Simson
St. Richards Hospital, Chichester

Background: Results of APER compared to sphincter saving surgery in rectal cancer is significantly worse in the best of hands. This has been attributed to coning or waisting of the total meso rectal excision(TME)specimen at the level of the levators. With the prone APER a much wider excision of the pelvic floor can be performed under vision and this should improve overall results. In addition a gluteal flap which involves mobilizing the gluteus maximus into the perineal wound is meant to facilitate better wound healing.
Methods: After conventional total meso rectal excision of the rectum on the abdominal side of the operation, a permanent end colostomy was done. The abdomen was then closed and the patient moved to the prone Jack knife position. It is important that mobilization of the rectum does not proceed beyond the level of the coccyx in the abdominal part of the operation. A wide elliptical incision is made around the anus and the coccyx divided. Wide excision of the pelvic floor is done under vision. The gluteal flap is then mobilized to lie over the perineum to enable better wound healing. A prospective analysis of 16 patients done over a period of 3 years (Oct 2003 to Oct 2006) has been analysed.
Results: Sixteen patients had prone APER and gluteal flap reconstruction to the perineum. There were 5 females and 11 males. 3 patients had shortcourse pre-operative radiotherapy and10 had long course chemo/radiotherapy. There was one peri operative death following a post op myocardial infarction. Mean operating time was 4hours and 40 minutes. Post operative complications include four perioperative myocardial infarctions and 7 perineal wound infections which were managed conservatively. Circumferential resection margin was not involved in any of the patients. There were 3 Dukes A, 7 Dukes B, 5 Dukes C, and one Dukes C1. Mean stay in hospital was 17 days.
Conclusion: Although wider excision of the pelvic floor can be achieved under vision thereby avoiding waisting of the TME specimen, there is no clear consensus regarding the perineal end of the operation. Randomized controlled trials are necessary to check the efficacy of this procedure.

Cancer/surgical oncology 1112

Targets and delays in the treatment of upper gastrointestinal cancer

N. A. Stephens, J. K. Apollos, C. D. Auld
Dumfries and Galloway Royal Infirmary, Dumfries

Background: In 2005, the Scottish Executive implemented the 62 day waiting target from GP referral to commencement of treatment for all cancers. We reviewed the upper gastrointestinal (UGI) cancers in our unit to see if we were meeting these targets and what led to potential delays.
Methods: Data was analyzed from a prospectively collected database of all UGI cancers diagnosed in our hospital between January 2000 and December 2005. Information relating to dates of referral, diagnosis, investigations and treatment were noted. Patients were divided into five groups according to the first treatment initiated: palliative medicine(65 patients), chemotherapy(44), radiotherapy(7), surgery(75) and endoscopic palliation(60). Due to small numbers, the radiotherapy group was excluded. Statistical analysis was done using Fishers exact test.
Results: There were 251 patients with UGI cancers; 147 oesophageal, 83 gastric and 21 at the oesophago-gastric junction. 139 patients were male and 112 female. Age range was 35–97 years old (median 73). Median time from GP referral to diagnosis was 23 days. Referral to treatment target of 62 days was met in 26·19% of the chemotherapy group (median 86 days), 38·57% (median 77 days) of the surgery group and 46·30% (median 63·5 days) of the endoscopic palliation group. Median time from the last investigation to treatment was uniform: 21·5 days (chemotherapy), 21 days(surgery) and 22 days(endoscopic palliation). More patients in the palliative therapy group met the 62 day target than in those undergoing curative treatment (50% *versus* 26·25% respectively, $p = 0{\cdot}0022$). This result was confirmed when looking exclusively at those undergoing surgery (90·9% *versus* 26·56%, $p = 0{\cdot}0002$).
Conclusion: Paradoxically, patients who have potentially curative disease are those who fail to meet the 62 day waiting target more frequently. This is due to thorough pre-operative investigation and staging in these patients. It remains to be seen whether such delays have an adverse impact on prognosis.

Cancer/surgical oncology 1201

Metabonomic profiling in patients with oesophageal cancer

D. Yakoub[1], H. Keun[2], G. Hanna[1]
[1]Department of Biosurgery and Surgical Technology, Imperial College London, St Mary's Hospital, London, [2]Department of Biological Chemistry, Imperial College London, London

Background: Characterisation of the metabolic profile of oesophageal cancers and investigate its potential use in diagnosis and follow up of patients. The shortcomings in current diagnosis and staging tools result in unreliable patient selection for multimodality treatment and uncertainty in the assessment of their outcome.
Methods: 600 MHz ^{1}H NMR spectroscopy was used to analyse intact tissue and bio-fluid samples from twenty six patients with gastro-oesophageal cancer and equal number of healthy controls. Acquired NMR spectral data was processed, normalised and bucketed, then submitted to multivariate analysis and pattern recognition techniques to identify differences in metabolite concentrations among samples giving them their specific metabolic phenotypes.
Results: Based on their metabolic profiles alone, confirmed by pathological examination, metabonomic profiling could correctly classify the samples according to their tissue of origin, presence of malignancy and even different pathological types. Two tissue samples were incorrectly classified as normal by histopathology, on re-assessment by immuno-histochemical staining; they were reclassified as malignant as has been by their metabolic phenotype. Profiling of serum samples could differentiate between normal and malignant patients as well. Recognition of malignancy patient group relied on detection of significantly increased concentration of intermediates of glycolysis e.g. lactate ($P = 0{\cdot}003$) as well as markers of proliferation as choline and related compounds ($p = 0{\cdot}009$).
Conclusion: Metabonomic profiling can be used to phenotype tissue samples according to their tissue of origin and pathology. The data acquired from bio-fluid analysis demonstrates the reproducibility and robustness of this method. It also shows its potential in the non-invasive diagnosis of oesophageal cancer. Further work to explore the ability of metabolic profiles to detect carcinogenesis, tumour regression and recurrence is granted.

Cancer/surgical oncology 1210

Congenital bile duct cysts in adults

A. T. George, M. Jacob, R. Rajan, M. Anandakumar, N. Subhlal, A. P. K Uruvilla, K. N. Vijayan
Medical College Hospital, Trivandrum, Kerala State, India

Background: Congenital bile duct cysts or choledochal cysts are usually a disease of children but can present late in adulthood. The most feared among its complications is the development of malignancy in these cysts – which has a dismal prognosis.
Methods: Our study was a retrospective study of 55 cases of adult choledochal cysts that were treated in a single tertiary referral centre between January 1989 and July 2006. The clinical presentations, investigative findings, treatment options and the morbidity and mortality patterns were reviewed.
Results: Various clinical and investigative parameters of 48 patients who had no evidence of malignancy in choledochal cysts were broadly compared with

that of 7 patients in whom choledochal cysts were complicated by malignancy. Older age of presentation, significant weight loss, higher levels of bilirubin and an absence of calculi in the biliary tree were found to be associated more with the malignant group than with the non-malignant group. Of the 7 patients in the malignant group, the diagnosis of malignancy came as a 'histological surprise' in 2 patients. Roux-en-Y hepaticojejunostomy was done on 42 out of the 48 patients in the malignant group. All 7 in the malignant group had surgery with 3 out of the 7 patients still alive and disease free. In a mean follow-up period of 60 months, three cases of recurrent cholangitis and one case of anastamotic stricture was detected.

Conclusion: In our study, older age of presentation, weight loss, and higher levels of bilirubin along with the absence of calculi in the hepato-biliary system was seen associated more with the malignant group than with the non-malignant group. A complete excision of the cyst with a roux-en-Y hepaticojejunostomy was done in the uncomplicated cysts with only few incidences of long term complications.

Cancer/surgical oncology 1220

Pre-operative axillary staging in breast cancer – an easy and pracitical appraoch

M. Tahir, K. Osman, J. Shabbir, C. Rogers, T. Bucknall
Queens Hospital, Burton-On-Trent

Background: To assess the feasibility and accuracy of Ultrasound guided FNAC for axillary staging in invasive breast cancer.

Methods: The data was collected prospectively from June 2005 to June 2006. All patients with invasive breast cancer and clinically non suspicious axillary lymph nodes involvement were included. All the patients had a pre-operative axillary ultrasound. If it showed suspicious nodes then Ultrasound guided FNAC was performed. Patients with FNAC positive for malignancy were planned for axillary nodes clearance otherwise they had Blue dye guided axillary lymph nodes sampling (ANS).

Results: 69 patients had a pre-operative axillary ultrasound. Only 43 patients had Ultrasound guided FNAC of axillary lymph nodes (ALN). Mean age of the patients was 57 (37–73). 3 cases were reported non conclusive on FNAC, so they were excluded. Out of the 40 cases, post operative Histology showed a total of 18 cases (45%) ALN positive and 22 cases (55%) ALN negative. Mean tumour size was 23 mm (10–50).

USG FNAC was positive in 9 cases (22·5%), negative in 31 cases (77·5%). The sensitivity of USG FNAC was found to be 50%, specificity 100%, positive predictability 100%, negative predictability 71% and overall accuracy 77·5%. USG FNAC was found to be more accurate and sensitive when 2 or more nodes were involved, raising the sensitivity to 82% and negative predictability to 91·5%

Conclusion: Pre-operative axillary staging with Ultrasound guided FNAC in invasive breast cancer patients is very beneficial in diagnosing nodes positive cases especially when 2 or more nodes are involved. These cases can be planned for axillary lymph nodes clearance straightaway therefore saving patients from undergoing further surgery as well as time and resources.

Chronic disease

Chronic disease 0155

Survey of the use of non-heart beating organs in paediatric practice

A. Edwards[1], J. Morgan[1], C. Inward[2]
[1]Southmead Hospital, Bristol, [2]Bristol Childrens Hospital, Bristol

Background: With the global shortage of donated kidneys for transplantation UK Transplant invested in programmes to retrieve organs from non-heart beating donors. Whilst this has increased the numbers of organs available for transplant into adult recipients it does not appear to have had a significant effect on paediatric practice. The aim of this survey was to look at current paediatric practice.
Methods: In June 2006 an online questionnaire was sent to research leads at all 13 UK paediatric nephrology units. This was re-sent to non responders.
Results: Replies were received from 12 units giving a 92% response rate. 10 units were aware of local NHB programmes. Since the establishment of UKT funded NHB programmes only one unit had actually transplanted a NHB organ into a paediatric recipient. Another unit was offering them to paediatric patients and had 3 children on the waiting list for them. Both these units had local programmes that retrieved organs of Maastricht category 3 and 4. None of the units whose local programmes involved retrieval of category 2 organs were offering organs to children. The main reason given for not using these organs was insufficient data regarding their use in children. In units where a local programme had been running for more than 3 years lack of data in adults to extrapolate to the paediatric population and poorer outcome compared to organs from other sources were also quoted.
Conclusion: This survey demonstrates that although most paediatric nephrology units have local NHB retrieval programmes these organs are not being transplanted into the paediatric population. Whilst there is a lack of data regarding the use of organs from NHB donors in paediatric recipients there is good evidence that, in adults, organs from NHB donors have equivalent survival to those from heart beating donors. Therefore, they should be strongly considered as an option for paediatric patients, but this will require better communication between surgeons and paediatric nephrologists.

Chronic disease 0332

Improvement in upper airway (UA) dynamics following bariatric surgery, despite patients remaining morbidly obese on early review

I. Alam, K. E. Lewis, M. J. Lewis, S. Hilldrup, J. W. Stephens, J. N. Baxter
Department of Surgery, Morriston Hospital, Swansea

Background: Upper-airway (UA) closure during sleep causes Obstructive Sleep Apnoea (OSA) and it is caused when the forces holding open the airway (mainly dilator action by UA muscles) are overcome by the inward forces, determined by inspiratory airflow and pressure from fat and other tissues in the neck. The number of UA collapses can be estimated during a sleep study and are referred to as the Apnoea Hypopnoea Index (AHI). We postulated that in morbidly obese people there is an adaptive response of increased UA dilator muscle action, over time, and that only a "small" amount of weight loss or reduction in neck circumference will therefore dramatically improve the AHI.
Methods: We studied 11 (8 female) morbidly obese patients, mean age 47·3 (±8) years; 5 had bilio-pancreatric diversion, 6 had gastric banding. Wilcoxon rank compared AHI, Body Mass Index (BMI) and neck circumference immediately before and 6 months after surgery.
Results:

	Pre-op	6 months Post-op	Z score	*P*-value
Mean AHI (events/hr)	25·7	9·4	−2·3	0·02
Mean collar size (cm)	44·1	40·1	−2·9	0·003
Mean BMI (kg/m^2)	48·4	39·4	−2·9	0·003

Pre-operatively, 7 patients had a pathological AHI > 10/hr (range 3–68/hr). Post-operatively, 4 patients had an AHI > 10/hr (range 0–19/hr) despite all remaining clinically obese with BMI > 33 kg/m^2 and a mean/median BMI still close to 40 kg/m^2.
Conclusion: Dramatic improvements in AHI (and therefore UA dynamics) occur within 6 months of bariatric surgery, despite the BMI remaining in a range normally associated with moderate-severe OSA. This supports the hypothesis of adaptation of UA muscles in morbid obesity, where a small reduction in inward forces can result in a big improvement in overall forces favouring opening of the UA.

Chronic disease 0502

Is phenotype of disease a predictor of early surgery in patients with Crohn's Disease? – A systematic review of prognostic studies

P. K. D. Rao[1], M. Davies[1], J. Parker[1], P. Price[2], J. Torkington[1]
[1]Llandough Hospital, Cardiff, [2]Wound Healing Research Unit, Cardiff

Background: Over the course of the disease, a large proportion of patients (61%–83% by 10 years) with Crohn's Disease (CD) will need surgery. One of the important concerns of patients with CD is – Will I need surgery? If so, when? Presently the answer to this question is, at best, when complications develop or medical treatment fails! Also, differences in "local practices" and follow – up bias can influence surgical rates. This systematic review aims to define risk groups based on prognosis of different disease patterns and identify phenotypic characteristics that would predict need for early surgical intervention.
Methods: Medline, Embase, Cochrane and Lilac databases were searched using standard Centre for Review and Dissemination (CRD) guidelines based search strategy to identify prognostic studies. References in textbooks and monograms were also searched and reviewed. Studies were screened according to strict inclusion and exclusion criteria. Data extraction was done using an in-house form developed with the help of statisticians.
Results: After eliminating duplicates, 5624 articles were screened using their abstracts. Of these, 173 were identified as fulfilling inclusion criteria were analysed further. Data extraction was possible from 56 articles only. Fifteen of these were population based, 41 hospital based or other cohort studies.
Age < 40 years at diagnosis, female sex, ileo-caecal disease and penetrating behaviour appear to be associated with increased need for surgery. Meta-analysis of the data was not possible as the data were a summation rather than actuarial – i.e. relation between events in each individual cannot be traced for our outcome assessment – time to surgery.
Conclusion: Age < 40 years at diagnosis, female sex, ileo-caecal disease and penetrating behaviour appear to be associated with increased need for surgery. Complete datasets of individual patients of each cohort either retrospectively or prospectively collected would be needed to identify phenotypic characteristics of patients who will need early surgery and so could be offered surgery primarily.

Chronic disease 0505

Fate of rectum following total colectomy in Crohn's Disease

P. K. D. Rao, N. Trent, J. Torkington
Llandough Hospital, Cardiff

Background: The high operative rates seen in Crohn's disease are well documented. In an emergency/urgent situation, those with more extensive colonic disease usually undergo a total colectomy and ileostomy (TCI) preserving the rectum. Subsequent management of the rectum in the patients with ileostomy remains controversial. The options available are leaving the rectum as an over-sewn stump and ileostomy, proceeding to a proctectomy (Proct.) and a permanent ileostomy, or have an ileo-rectal anastomosis (IRA) performed. Following total colectomy, the quality of life is generally good with an ileostomy. However the problems of a 'left' rectum i.e. recurrence, risk of cancer remain. For many people an ileostomy can significantly restrict activities of daily living. With this retrospective study of our cohort with a mean follow-up of 18 years, we hope to clarify these issues in patient management.
Methods: Retrospective cross-sectional study of patients who have undergone total colectomy during 1967–1988 in this institution under a single consultant for Crohn's colitis. The decision to perform primary IRA (Pri. IRA) was based on the condition of the rectal stump at TCI surgery.
Results: 30 patients (13 Male, 17 female) with complete follow-up data were identified. Their mean age at surgery was 41 years. Median follow-up is 22 years. Eighteen patients had TCI. Nine patients did not undergo any further surgery. Five patients needed proctectomy, 3 had IRA and 1 required small bowel resection (SBR). Of the3 IRA patients, one required a proctectomy and another required an SBR subsequently.
Twelve patients underwent a primary IRA. Of these, one patient each required a SBR, Proctectomy and revision of IRA. The patient who had a revision of his IRA required a re-revision and SBR
Conclusion: At median follow up of 22 years, proctectomy was required in only six patients due to their rectal stump condition. One patient in the Primary IRA group, only one patient needed proctectomy. Ileal recurrences needing surgery occurred in 20% following IRA, compared to the literature where recurrence rates of 30–60% have been quoted at 10 years post IRA.

Chronic disease 0563

Diverticular disease increases and affects younger ages: An epidemiological study of 10 year trends

S. Jeyarajah, S. Papagrigoriadis
Kings College Hospital, London

Background: Little data exists on epidemiological trends of Diverticular Disease (DD). We aimed in this study of 2979 DD admissions to a single hospital over 10 years, to examine the epidemiological trends and clinical outcomes.
Methods: A retrospective analysis of all admissions with DD from 1995 to 2004 was performed. General population data for the area served was obtained from the national Census and our local primary care trust.
Results: Between 1995 and 2004 annual admissions for DD increased from 71 to 263 ($p = 0{\cdot}000$). Median age of admissions was 75 years and 59·2%($n = 1764$) were female. There was a trend of decreasing mean age from 71·2 years in 1995 to 68·1 in 2004 ($p = 0{\cdot}06$). Although most admissions were aged over 50 (92%, $n = 2750$), there was an increase of admissions younger than 50 from 8 in 1995 to 42 in 2003 ($p = 0{\cdot}005$). The age and size of the catchment population remained stable in that time. More emergency admissions underwent surgery (14·4%, $n = 54$) than electives (6·1%, $n = 66$) and had a longer length of stay (25·2 *versus* 9·2 days)($p = 0{\cdot}000$). More male patients (21·3%, $n = 26$) than female (11·1%, $n = 28$) had emergency surgery ($p = 0{\cdot}027$). More patients under the age of 50 (19·6%, $n = 21$) had surgery compared with older patients (8·8%, $n = 100$) ($p = 0{\cdot}000$). Repeat admissions increased from 18 to 72 per year from 1995–2003 ($p = 0{\cdot}000$). They were not associated with longer stay, comorbidity, mortality or increased likelihood of surgery. There were 21 deaths overall. Deaths were more likely in emergencies ($p = 0{\cdot}000$,OR=56·42) and those aged over 80 ($p = 0{\cdot}000$,OR=2·87). Mortality was independent of comorbidity and other demographic factors.
Conclusion: There is an overall increase in admissions with DD unexplained by ageing of the population. DD increasingly affects younger patients who are more likely to undergo surgery, particularly as emergencies. Emergency admissions are associated with longer stay and higher mortality. Repeat admission cannot be used as guide to elective surgery. Efforts should be made to treat more DD on an elective basis.

Chronic disease 0715

Is a two week period of sacral nerve stimulation sufficient to predict a satisfactory improvement in quality of life and severity following permanent sacral nerve stimulator implant

L. Douglas, E. S. Kiff
Wythenshawe Hospital, Manchester

Background: Sacral nerve stimulation (SNS) is a method of managing patients with faecal incontinence Patient suitability is assessed using a two week trial of SNS. If there is an improvement in the continence diaries, Vaizey scores and quality of life questionnaires, permanent SNS is performed. The aim was to asses if severity and quality of life is the same during temporary SNS and at three months post permanent SNS.
Methods: 54 patients have undergone temporary SNS of which 24 patients had a permanent SNS inserted.13 patients were identified as having completed the, Vaizey scores and MHQ prestimulation, during temporary stimulation and 3 month post permanent stimulation. (Exclusion: 2 DNA follow up, 2 failure to complete MHQ or Vaizey score, 3 had missing date, 4 implants performed in another hospital) Retrospective analysis of Vaizey score and Manchester Health Questionnaire (MHQ), using the Wilcoxon Signed Ranks test to compared the prestimulation results with the temporary SNS to confirm improvement and the temporary SNS with the permanent SNS to confirm the reliability of the test.
Results: There was statistical significant improvement between pre stimulation and temporary SNS in the Vaizey score ($p = 0{\cdot}01$), role impact ($p = 0{\cdot}08$) and severity ($p = 0{\cdot}04$). There was no statistically significant deteriation in the results between the temporary SNS and the permanent SNS, there was further statistical improvement in quality of life for social impact ($p = 0{\cdot}05$), emotional impact ($p = 0{\cdot}05$), sleep impact ($p = 0{\cdot}02$) and overall quality of life ($p = 0{\cdot}01$)
Conclusion: There is no statistical difference between the temporary SNS results and the permanent SNS in the groups that had the initial improvement (Vaizey score, role impact and overall severity). This indicates that the two week trial of SNS is a good indicator of results to be obtained with a permanent SNS. There was continued improvement in the quality of life with the permanent SNS (Total MHQ results, sleep impact, emotional impact, and social impact) that is not initially revealed in the two week trial, so there may be some benefit in trying a longer period of temporary stimulation in people whose initial results are poor.

Chronic disease 0721

How often do sacral nerve stimulators need to be reprogrammed

L. Douglas, E. S. Kiff
Wythenshawe Hospital, Manchester

Background: Once sacral nerve stimulators are implanted patients are reviewed at 3 months, 6 month, 12 months 18 months, 24 months then yearly following this. If they feel that the efficacy of their stimulators is reduced or they are feeling sensations away from the anus, then the sacral nerve stimulators are reprogrammed so different electrodes are used. The aim was to assess if the need to reprogramme the sacral nerve stimulators decreased over time.
Methods: 23 patients in this unit have undergone sacral nerve stimulation. We looked at number of patients who needed to have their sacral nerve stimulators reprogrammed at each follow up appointment.
Results: 2 patients had no follow up information for the first 6 months and one patient had no follow up information for the first year due to there management

being undertaken in a different trust. 1 patient has never attended for follow up. 1 patient did not attend three month review. The minimum follow up was 3 months, the maximum follow up was 3 years. (*N* =Number of patients). 7 patients also needed additional reviews due to pain or falling onto implant.

Time (months)	3	6	12	18	24	36
N	19	16	12	9	8	1
Reprogrammed (%)	7 (36·8)	7 (43·8)	2 (18·2)	6 (66·7)	5 (71·4)	1 (100)

Conclusion: Patients who have sacral nerve stimulators need to be aware that they may continue to need their sacral nerve stimulators reprogramming intermittently. Our experience is at three year the stimulator may need further reprogramming, even if initially no reprogramming needed to occur. This implies that there is continued movement of the electrode within the sacral foramen even after considerable time and using tined electrodes. This highlights the need for close follow up of this group of patients to ensure that they have the maximum benefit from their stimulator. Patients may need to be seen at short notice if they are having problems with pain or spasm. This means follow up clinics should have access to reprogramming equipment

Chronic disease 0731

Outcome of fundoplication for ENT and pulmonary symptoms of reflux

M. Iqbal, A. Batch, B. Cooper, R. T. Spychal
City Hospital, Birmingham

Background: The role of surgery in treating extraesophageal symptoms is not clear. Some studies have reported good results but still far from esophageal symptoms. Aim of this study was to evaluate the outcome of surgery in terms of symptomatic improvement and patient satisfaction of patients who underwent fundoplication for extra esophageal (laryngeal, pharyngeal and pulmonary) symptoms of reflux in our firm from 1995 to 2005.
Methods: 51 patients referred by ENT surgeons and gastroenterologists were identified with a predominance of atypical symptoms from a database of 240 patients. All the patients underwent upper gastrointestinal endoscopy, 24-hour esophageal pH and manometric studies, and had objective evidence of reflux. They all received optimal medical therapy after diagnosis. Those with failure of medical therapy or with development of complications were offered surgery. Half of these patients had partial relief with drugs and the remaining half had no relief. 40 underwent laparoscopic and 11 open fundoplication. Patients were asked to score their symptoms before and after surgery with Reflux Symptom Index, use of medicine before and after operation, their experience with surgery and overall quality of life with a written questionnaire.
Results: 40 patients were available for analysis out of 51. Common symptoms were throat clearing/postnasal drip (31/40), sensation of lump in the throat (29/40), cough & breathlessness (32/40) and voice problems (22/40). Mean follow up at the time of questionnaire was 53·3 (6–120) months. The mean Reflux Symptom Index score improved from 22·80 (SD 10·80) to 11·83 (SD 9·91) [$p<0·0001$, paired t test]. 10/40 (25%) still take medicine for their symptoms. Maximum improvement was seen in cough and least in dysphagia. 6/39 (15·3%) said they would not have had the operation knowing what they know now. 5/33 (15%) had the opinion that problems added by the operation ruined the benefits. 25% described their overall quality of life excellent, 32·5% as good, 32·5% as satisfactory and 10% as bad. Voice changes, throat symptoms, globus and respiratory symptoms were cured in 45%, 61%, 41% and 51% patients respectively. Another quarter showed improvement and the remaining either worsened or showed no change.
Conclusion: Surgery is an effective modality of treatment for extraesophageal reflux and should be considered in patients with extraesophageal reflux with failed medical treatment and/or with complications.

Chronic disease 0865

Faecal incontinence – does gender matter?

D. Thekkinkattil, S. Gonsalves, P. Finan, P. Sagar, D. Burke
Division of Coloproctology, Leeds General Infirmary, Leeds

Background: To compare patterns of faecal incontinence and analyse the anorectal manometric measurements in male and female subjects.
Methods: A retrospective review of patients who underwent investigations for defaecatory disorders was performed. Patients were classified into 4 groups of faecal incontinence; idiopathic (normal tests), traumatic (sphincteric defect), neuropathic (pudendal neuropathy) and combined (both sphincter damage and neuropathy). Patient demographics, maximum mean resting pressure (MMRP), maximum mean squeeze pressure (MMSP) and vector volume (VV) were recorded.
Results: There were 265 men and 1027 women in total. Of these 187 males and 661 females were incontinent.

		Men	Women	*P*
Continent	Age (years)	44 (27–60)	45 (34–58)	0·32
	MMRP (mmHg)	76 (51–93·6)	68 (48·8–83·8)	0·04
	MMSP (mmHg)	125 (83·9–167)	90 (67·9–111)	0·001
	VV	32,476 (13,172–47,835)	18,311 (8889–32,446)	0·008
Incontinent	Age (years)	55 (44–66)	58 (47–67)	0·19
	MMRP (mmHg)	62 (41·4–87·3)	45 (30·2–65)	0·001
	MMSP (mmHg)	104 (71·8–140)	65 (42·6–89)	0·001
	VV	21,404 (10,493–44,459)	9889 (4629–20,131)	0·001

Values are median (i.q.r.).

Distribution of type of incontinence were as follows:

Type	Men $n = 169$	Women $n = 512$
Idiopathic	104 (62)	185 (36)
Traumatic	35 (21)	126 (25)
Neuropathic	25 (14)	79 (15)
Combined	5 (3)	122 (24)

Values in parentheses are percentages. $P = 0·001$.

Conclusion: In a significant proportion of males, faecal incontinence is idiopathic. The significant difference in manometric variables between genders in both continent and incontinent state, suggest the need for defining the normal range of variables separately according to gender

Chronic disease 0884

Analysis of pattern of sphincter damage and manometric variables according to type of faecal incontinence

D. Thekkinkattil, S. Gonsalves, P. Finan, P. Sagar, D. Burke
Division of Coloproctology, Leeds General Infirmary, Leeds

Background: The external sphincter (EAS) mainly responsible for voluntary control of defaecation whereas the internal sphincter (IAS) contributes mainly to the resting tone. The aim of our study was to assess the relation between pattern of sphincter damage and the type of incontinence.
Methods: A retrospective review of patients who underwent investigations for defaecatory disorders was performed. Investigations included anorectal manometry, pudendal nerve testing and endoanal ultrasound.
Results: There were 848 patients with faecal incontinence with a median age of 57(46–67) years.

	Passive	Urge	Mixed	*P*
Age (years)	56 (46–67)	56 (45–64)	58 (48–67)	0·4
Wexner score	9 (6–13)	8 (5–12)	12 (8–15)	0·001
MMRP (mmHg)	52 (33–78)	49 (34–72)	42 (28–63)	0·02
MMSP (mmHg)	82 (81–114)	72 (52–99)	59 (37–86)	0·001
Resting pressure gradient	1·9 (1–2·7)	1·9 (1–3)	1·4 (0·8–2·6)	0·02
Vector volume	12,780 (6163–29,391)	10,922 (5831–26,745)	10,841 (3879–24,614)	0·09

Values are median (i.q.r.).

Pattern of sphincter damage and type of incontinence

	Normal	IAS defect	EAS defect	Both
Passive	211 (63)	31 (9)	57 (17)	36 (11)
Urge	110 (66)	3 (2)	42 (25)	12 (7)
Mixed	62 (60)	10 (9)	18 (17)	14 (14)

Values in parentheses are percentages. $P = 0{\cdot}01$.

Conclusion: Manometric variables are distinct according to the type of faecal incontinence. Patients with mixed incontinence had lower measurements and severe incontinence. Significantly higher proportion of patients with urge incontinence had EAS damage. However this study failed to observe any significant increase in IAS damage in patients with a passive leak.

Education/training

Education/training 0027

A survey of urological experience amongst general surgery specialist registrars

J. Aning[1], M. Gohel[2], A. Ritchie[1], D. Jones[1]
[1] *Gloucestershire Royal Hospital, Gloucester* [2] *Northwick Park Hospital, London*

Background: Half of emergency surgical admissions in the UK are urological. General Surgery SpRs are usually expected to competently initiate treatment for these patients. The aim of this study was to survey the urological experience of current General Surgery SpRs and evaluate their perceived competency to manage acute urological emergencies.
Methods: General Surgical SpRs registered with the Association of Surgeons in Training (ASiT) e-forum were invited to complete an online questionnaire. The questionnaire contained 14 questions and responses were collected online.
Results: A total of 86 General Surgery SpRs completed the questionnaire, of which 61/86 (71%) were responsible for managing acute urological admissions. Of 51/86 (60%) respondents who had completed a formal postgraduate appointment in urology, 43/51 (84%) had done so at SHO level and 23/51 (45%) completed their post more than 5 years ago. A total of 46/86 (53%) of SpRs did not feel competent in managing acute urological emergencies and 63/86 (73%) of SpRs did not feel that it was appropriate for them to cover the urological take.
Conclusion: Urological emergencies are commonly managed by General Surgical SpRs, but the majority have had little recent urological training and do not feel competent to manage such patients. This study suggests that changes to surgical training are essential to ensure that surgeons are competent to manage urological patients and patient safety is protected.

Education/training 0039

Training opportunities in emergency surgery in the UK: the effect of reconfiguration

R. Sutcliffe, P. Hale
Royal Sussex County Hospital, Brighton

Background: Reduced hours and shortened training have dramatically reduced exposure of surgical trainees to emergency surgery. Reconfiguration of emergency surgical services has been introduced across the UK to save money and concentrate emergency work in larger centres, in an attempt to increase training opportunities for surgeons and improve patient safety. The aim of this study was to evaluate the effect of reconfiguration on training opportunities for general surgery SpRs and SHOs.
Methods: Since July 2005, emergency surgical services in hospitals H and C were reconfigured, so that all acute surgical patients are treated at H, and routine elective work is done at C. In October 2005, the number of surgical registrars at H increased from 8 to 13 to provide additional non-resident cover for inpatients at hospital C (hybrid 1 in 6·5 rota). Emergency operating data was retrieved from a prospective theatre database over a 30-month period at H, including 21 months pre- and 9 months post-reconfiguration. The effect of reconfiguration on (1) number of laparotomies (Lap) and appendicectomies (App) done per month; and (2) number of cases per trainee (SpR and SHO) was analyzed and differences measured using paired t-test.
Results: The average number of cases per month increased after reconfiguration (pre *versus* post: Lap 18 ± 5 *versus* 23 ± 4, $p < 0{\cdot}001$; App 11 ± 4 *versus* 23 ± 4, $p < 0{\cdot}001$). Registrars performed 69% and 63% of laparotomies and appendicectomies, respectively. However, the average number of cases performed by each registrar per six-month period decreased after reconfiguration (pre *versus* post: Lap 9 ± 5 *versus* 6 ± 3, $p = 0{\cdot}08$; App 6 ± 4 *versus* 5 ± 2, $p = 0{\cdot}18$). Overall, SHOs performed 150/447 appendicectomies (34%), with an average of 2 ± 2 per six-month SHO post before reconfiguration and 5 ± 4 after ($p = 0{\cdot}001$).
Conclusion: Reconfiguration of emergency surgical services can potentially increase training opportunities, but this effect is negated if trainees are required to provide additional cover at an elective site. Registrar rotas must be carefully planned to ensure patient safety whilst maintaining training opportunities.

Education/training 0092

Northern Ireland handover study: Trainees assessment of current practice

R. Kennedy, S. Kelly, S. Grant, B. Cranley
Royal Victoria Hospital, Belfast

Background: Effective handover of clinical information between working shifts is essential for patient safety. We aimed to identify current practice and trainees' assessment of handover in the general surgical departments of Northern Ireland.
Methods: A postal questionnaire was sent to general surgical trainees (BST and HST) currently working in acute hospitals. Information regarding timing, location, duration, participation and quality of handover was collated anonymously. Trainees commented on satisfaction with current practice and its perceived safety.
Results: 46 questionnaires were returned (58%) 30 at SHO grade and 16 at Registrar. 47% reported that handover took place with more than one grade of doctor present. 2% reported that handover was bleep free. 5 (11%) had received formal training on good handover. 32 (71%) were working in a unit that operated a "surgeon of the week" pattern of emergency cover. Satisfaction was recorded on a 4 point Likert scale. (0 = very dissatisfied with handover 3 = very satisfied) Overall satisfaction level was 1·52 out of 3. Those working in "surgeon of the week" teams had significantly higher scores 1·83 *versus* 0·86 ($P < 0{\cdot}005$). Overall 48% of trainees current handover practice "safe" (58% in "surgeon of week" group and 21% the remaining group, $P < 0{\cdot}05$)
Conclusion: General surgical trainees in Northern Ireland have expressed concern regarding current practices of patient handover between shifts. Those working under the "surgeon of the week" pattern are more satisfied and deem it significantly safer.

Education/training 0143

Comparison of banding *versus* HALO in the treatment of haemorrhoids – early results

M. Chand, P. J. Moore, T. Andrews, G. F. Nash, A. D. Clarke
Poole Hospital, Poole

Background: Banding is the most common office procedure for the treatment of haemorrhoids, but may be associated with significant morbidity. Doppler-guided haemorrhoidal artery ligation operation (HALO) by comparison has been shown to be an alternative treatment that is well tolerated, with promising short and medium term results.
Methods: We compared outcomes and satisfaction in 30 consecutive patients who had undergone band ligation for bleeding haemorrhoids (Grade II/III) in the out-patient setting to those who had undergone HALO (under general anaesthetic) for similar symptomatic haemorrhoids. The procedures were performed by consultant colorectal surgeons. Both cohorts were given a structured questionnaire to record outcomes associated with bleeding, pain and satisfaction. Patients with concurrent anal pathology were excluded.
Results: A total number of 30 patients underwent HALO. There were 15 males (50%) and 15 females (50%). These patients were compared against

30 patients who underwent banding, 16 males (53%) and 14 females (47%). All 60 patients reported bleeding as their major symptom. Bleeding and pain were measured on a visual analogue scale (0–4) subsequent to the procedures. Satisfaction was measured on a visual analogue scale (0–3). Pain scores were followed up at day 2, whereas bleeding and satisfaction were scored 6 weeks post-procedure.

Outcomes	Post-HALO score	Post-banding score	*P*
Bleeding (0–4)	0·833	1·9	< 0·001
Pain (0–4)	0·1	0·9	< 0·001
Satisfaction (0–3)	2·733	1·633	< 0·001

All patients were discharged home on the day of surgery. At follow up other than mild bleeding in the few days following surgery there were no reported complications and no patients required further treatment

Conclusion: We conclude that HALO is significantly more efficacious and better tolerated procedure than banding for patients with bleeding haemorrhoids. Considering the major morbidity of banding, we propose that HALO may become a first line definitive therapy for symptomatic piles in the future especially if general anaesthesia may be avoided. The health economics of this needs further study.

Education/training 0159

Continuity of care of emergency surgical admissions: Impact on SpRr training

S. F. C. Ledwidge, E. Bryden, P. Halestrap, R. B. Galland
Royal Berkshire Hospital, Reading

Background: Continuity of patient care is an important component of surgical education. This study assesses continuity of care in the current working climate.
Methods: Data were collected prospectively on consecutive emergency general surgical admissions during one month. Our SpR rota is a partial shift 24 hour on call with the SpR's own consultant. The SpR is free of commitments the next day following post-take work. The on-call general surgery SpR was designated the "assessor". Data were analysed according to involvement of the "assessor" at subsequent stages of the admission – consent, operation, review during admission and review on discharge. Data were also collected defining whether the "assessor" and operating surgeon followed up the patient.
Results: There were 200 admissions; 108 female and 92 male. Overall 23% admissions had the same "assessor" for all stages of patient care. The "assessor" dealt with an aspect of patient care in 11% of admissions who underwent an operation and 29% of admissions who were conservatively managed. 59% of admissions were followed up by the operating surgeon in person after the operation and 11% of admissions were followed up by the operating surgeon asking about the patient after the operation. 36% of admissions who were conservatively managed were followed up by the "assessor" in person and 5% admissions were followed up by the "assessor" asking about the patient afterwards.
Conclusion: This study has shown that continuity of care for emergency surgical admissions with this shift pattern is unsatisfactory but it is likely to be no worse than any other shift patterns. SpR follow up of patients on whom they had operated was better. This will have a negative impact on both surgical training and patient care.

Education/training 0160

What influences a student to choose surgery as a specialty?

C. A. Carden, J. L. Duncan, M. R. Laing
Raigmore Hospital

Background: Surgery has historically been considered an attractive career for students and recent graduates. Changes in career structure and in the number of female graduates mean that it is important that surgery continues to attract high quality graduates to the specialty. This study was questionnaire based and investigated factors, which are influencing current student opinion on surgery as a career choice.
Methods: An initial literature review was performed using a MEDLINE search. A draft questionnaire was then piloted using Foundation Doctors. The questionnaire was then electronically designed using the SNAP software programme. Paper versions of the questionnaire were given to 57 students, the remaining 123 students were asked to complete online copies.
Results: 57/57 paper copies and 47/123 online copies of the questionnaire were returned, giving a return rate of 104/180 questionnaires (58%). 59 (57%) of students were female, 44 (43%) were male. Lifestyle influences and interest in another specialty were the most important factors influencing a student not to pursue surgery, whereas a positive undergraduate experience was the most important factor influencing students to choose surgery. 50% of female undergraduates still feel that their gender is an influencing factor. Debt level is significant but did not influence career decision. Attitudes of certain surgeons also had a negative impact.
Conclusion: Factors which are currently affecting the potential career choices of undergraduates include lifestyle issues, gender, experience at undergraduate level, interest in other specialties and the attitudes of surgeons. These are therefore the areas which the surgical community needs to address to ensure the future of the specialty.

Education/training 0161

An objective assessment of clinical anatomy knowledge of final year medical students

C. A. Carden[1], S. Roberts[2], J. L. Duncan[1], M. R. Laing[1]
[1]Raigmore Hospital, Inverness [2]University of Aberdeen, Aberdeen

Background: Over the last number of years, medical schools have been altering their curricula in line with the 1993 GMC publication "Tomorrow's Doctors". The main philosophy has been to reduce the amount of non-essential, factual information that medical students are taught and to concentrate on essential knowledge, skills and attitudes[1]. As a consequence of this, there are fewer hours spent learning anatomy. It is not clear whether this has affected the anatomical knowledge of new graduates as they practice within clinical medicine. This study was designed to see if current final year students knew sufficient clinical anatomy to be able to practise on the wards as Foundation Doctors.
Methods: A Modified Essay Question examination was devised which emphasised clinical anatomy. A minimum acceptable standard was decided upon using an Angoff method. Final year students attended for the exam in two locations on the same day and their marks compared to the standard. Study marks were also compared with 1st year anatomy marks.
Results: 57 out of 180 final year students (32%) sat the exam. The agreed standard was 60% and 15/57 (26%) achieved this standard. Overall marks varied from 21 and 77% with a mean percentage mark of 51%. There was only a weak correlation between 1st and 5th year marks.
Conclusion: The clinical anatomical knowledge of final year students falls below the standard that would be expected by the panel of experts. There is now a realisation that anatomy teaching should be integrated throughout the undergraduate medical curricula and a number of methods have been introduced to rectify the situation in our establishment.

Education/training 0293

Audit of patient handover in surgery results in significant practice change

C. W. Lai[1], R. Lewis[2], N. Behar[3]
[1]Queen Elizabeth Hospital, London [2]Queen Elizabeth The Queen Mother Hospital, Margate [3]Eastbourne DGH, Eastbourne

Background: With the recent introduction of the EWTD and the resultant full shift patterns, it is essential to ensure that continuity of patient care continues whilst maintaining the highest standards in education and training. The role of an effective handover process is crucial in this. Previous audits have looked at adherence to guidelines set by institutions such as the BMA and the Royal College of Physicians, but little data is available on whether such guidelines are suitable in a surgical handover. We have therefore conducted an audit of two different handover systems; not only for patient care but also the educational and team building value inherent in the handover process.
Methods: The audit was conducted in two stages. In the first, handover was conducted in a seminar room, attended by all teams' members, in the second, at the bedside incorporating a post-take wardround of emergency admissions. This was a qualitative study designed using a Likert Scale Scoring System. A score of 1–5 was given by all involved in the handover in relation to the three focused aspects – Patient Care Value, Educational Value and Team Building Value. Guidelines and focus group discussions within the department were considered in designing of the guidance document which would enable a considered scoring. Each stage was audited for a period of one week enabling every team to get involved.
Results: The scores for all three aspects were significantly higher in the second system compared to the first – Patient Care Value (3 *versus* 4·3 $p < 0·05$), Educational Value (2·6 *versus* 4·1 $p < 0·05$) and Team Building Value (2·8 *versus* 4·1 $p < 0·05$). Although not significant due to small numbers, these results were still mirrored in a subgroup analysis of different grades from registrars to medical students.
Conclusion: The results are in favour of a wardround based handover. It was also observed that wardround based handover did not take significantly longer, appropriate feedback was made possible, whilst the receiving doctors and the by-standing students, had more opportunity for discussion and teaching. Handover process needs to be simple yet effective. While in our unit it works, we recognize that it is up to each unit to audit their individual process.

Education/training 0302

Opportunity for near misses and missed opportunity: poor patient handover in general surgery compared with medicine and trauma/orthopaedics – An all Wales telephone survey

O. M. Tokode, L. Barthelmes, B. O'Riordan
West Wales General Hospital, Carmarthen

Background: The implementation of EWTD and MMC could compromise patients' care and undermine the training of junior doctors unless handover is underpinned by robust information transfer and the learning potential of the time spent at work is maximised. Differences exist in the practice of handover in medicine, trauma/orthopaedics and general surgery. This study compares handover arrangements and quality in these specialities.
Methods: A telephone survey of all hospitals in Wales providing acute medical, trauma/orthopaedic and general surgical care was conducted between December 2005 and March 2006 using a structured questionnaire addressing handover practice and overall junior doctors' satisfaction with handover process.
Results: In medicine, 6/17 units used a structured handover proforma while junior doctors in orthopaedics and general surgery tend to use non-structured lists. More than a third of house officers in general surgery never or rarely receives feedback of management decisions while house officers in orthopaedics and medicine often receive feedback. Handover in orthopaedics is frequently used for teaching while house officers in medicine and surgery rarely receive teaching during handover. House officers in general surgery are more dissatisfied with handover compared with house officers in orthopaedics and medicine.
Conclusion: Handover in all specialties surveyed fell short of the standard set by the BMA – guidelines 'Safe handover – safe patients'. Handover in medicine and orthopaedics is often combined with a consultant – led post-take ward round as an opportunity for teaching and feedback leading to higher satisfaction among house officers in these specialities with the handover-process. In order to move on from the current situation of handover as a missed opportunity and opportunity for near misses in general surgery the Royal College of Surgeons may consider to give guidance on standards of handover similar to those of the Royal College of Physicians. Postgraduate deaneries may consider to use the existence of consultant-led post-take ward rounds as a yardstick for funding and accreditation of foundation programme posts to halt further erosion of general surgical experience in postgraduate training.

Education/training 0303

Future of vascular surgical training: The trainees' views

T. Richards, K. Jones
Queens Medical Centre, Nottingham

Background: Despite shorter training the intention remains to train the 'general surgeon'. Vascular surgery is evolving and incorporating many endovascular techniques. We wished to assess the views of vascular trainees on the future of vascular surgery and training in UK.
Methods: Trainees were surveyed in 2003, 2004 (post-EWTD) and 2005, concentrating on four areas; future of vascular surgery, role of endovascular training, specialisation and future training?
Results: Response was achieved from 60% of all trainees. Majority want to practise vascular surgery alone. In 2003 80% thought training should include endovascular techniques, by 2005 all regarded training as mandatory. All anticipated and wanted endovascular techniques would represent a significant part of their own future work (40–50%) as a consultant. Opinion changed on training over time; from general and vascular surgery (qualification in general surgery) to wanting vascular surgery alone with a specialist qualification in vascular surgery ($p < 0·0001$), also that vascular surgery should spilt from general surgery to form its own speciality ($p < 0·0007$). In 2005 there were two one-year fellowships in interventional radiology in the UK. Twelve trainees had established a one four hour session a week in interventional radiology, the majority were unable to gain access.
Conclusion: Trainees regard endovascular and EVAR training as mandatory. Current training opportunities are lacking. Trainees wish to separate training from general surgery and achieve a separate qualification in the speciality of vascular surgery.

Education/training 0361

Assessing generic & specific technical skills in lower gastro-intestinal endoscopies

S. Sarker, T. Albrani, A. Zaman, R. Marley, P. Fairclough, B. Patel
Royal London & Free Hospitals, London

Background: Assessing endoscopic technical skills competency in a structured manner is a topical issue, in light of MMC and other factors which may affect the training of future endoscopists. To date there has been little attempt to comprehensively assess both generic and specific technical skills in lower gastro-intestinal endoscopies, in this study we aim to develop and validate a new tool which can assesses these varied skills.
Methods: Hierarchical task analysis of generic and specific technical skills were constructed on flexible sigmoidoscopy and colonoscopy after expert panel discussions. Generic technical skills are subtasks (e.g. movements of the control wheel) which allow the endoscopist to complete a main task (specific technical skills) e.g. reaching the caecum. Weighted likert scales were then constructed individually for generic and specific technical skills for each procedure. Two observers assessed each procedure independently.
Results: In total 126 endoscopic procedures were performed by 8 Consultant and 11 Registrars. Mean inter-rater reliability Cronbach alpha was 0·79 and 0·81, $p =< 0·05$, for generic and specific skills respectively. Construct validity for both generic and specific technical skills for Consultants and Registrars were significant for each procedure, ANOVA $p =< 0·05$.
Conclusion: This new assessment tool of lower gastro-intestinal endoscopies seems to have face, content, concurrent and construct validities. The tool has the possibility of being used in surgical training and appraisal, we aim to modify and apply this tool to other endoscopic procedures in the future e.g. OGD, ERCP, endoluminal and transluminal procedures.

Education/training 0363

Training & assessing decision making in laparoscopic cholecystectomy

S. Sarker, S. Rheman, M. Ladwa, S. Khan, I. Amygdalos, A. Chang
Royal Free Hosital, London

Background: Correct decisions are an integral part of surgical competency and excellence. To date there has not been an attempt to assess surgical operative decision making, in our present study we aim to develop and validate an operative decision making assessment tool in laparoscopic cholecystectomy.
Methods: Three decision making modules were developed on a desktop computer programme for laparoscopic cholecystectomy: knowledge of operation, surgical technique and completion of surgical steps. The later two modules were based on answering questions watching from a portfolio of recorded live operations. The questions were devised by two experienced surgeons with > 15 years postgraduate surgical experience and following the Royal College of Surgeons of England laparoscopic cholecystectomy course manual. Three groups with varying surgical experience were assessed: novice, intermediate and expert surgeons. These groups were determined by the number of laparoscopic cholecysteomies performed as well as of number of years of operative surgical experience.
Results: A total of 84 subjects were assessed, 36 novices, 27 intermediate and 21 experts. Mean time to perform the assessment programme was 32 minutes (range 21–45). Construct validity for total scores for each module and the final total score between the individual surgical groups using Mann-Whitney test was significant, $p < 0{\cdot}05$.
Conclusion: Our computer-based decision making assessment tool in laparoscopic cholecystectomy seems to have face, content, concurrent and construct validities. This interactive surgical computer programme may have a role in training and could be used in a web base or CD format.

Education/training 0379

Hospital at night – the nemesis of higher surgical training

A. Gilliam[1], R. Ishak[2], L. Horgan[2], P. Gallagher[1]
[1]Wansbeck Hospital, Ashington [2]North Tyneside Hospital, North Shields

Background: The Hospital at Night (HAN) project redefines provision of out-of-hours medical cover to comply with the European Working Time Directive with cover being defined by competency rather than specialty and grade. This study aimed to determine the affect of HAN in a single Trust on General Surgery Specialist Registrar (SpR) training
Methods: The number of Accident and Emergency referrals made by triage nurses directly to the on-call SpR was prospectivley recorded over a 1 year period. Night time operating was also collected from SpRs' logbooks over a 2 year period with trainees being asked their opinion of the HAN project by e-mail questionnaire. Out of hours operating data for the Trust was confirmed with theatre logbooks
Results: During a week of nights the number of patients seen by the on call SpR was 35·5 (range 26–45) with 5·5 (range 1–8) patients being seen first in A + E by the surgical middle grade per week and F1 duties being performed 78·6% of nights. The mean number of operations performed and assisted over a year of nights (7 weeks) by the trainee was 1·1 (0–6 range) and 1·0 (0–2 range) respectively. All 10 of the 12 SpRs who responded to the questionaire said that the HON system had a negative impact on their training.
Conclusion: The HAN project is adversely affecting SpR training and should be urgently revised. Out-of-hours emergency cover by SpRs needs to be reviewed and a return to a 24-hour on call system be considered to minimise loss of training opportunities.

Education/training 0384

Opportunities for current higher surgical trainees in Wales – A vision of the future

B. Saravanan, F. Siddiqui, L. Jenkinson
Ysbyty Gwynedd, North West Wales NHS Trust, Bangor

Background: Recently it was estimated that, about 80 cardiothoracic trainees will not become consultants and there is also a surplus of orthopaedic trainees. In 1999 obstetrics and gynaecology had a similar problem. This study analysed the job opportunities in General Surgery in Wales, over the next 25 years, based on estimated retirements.
Methods: Details of all consultants (96 in total) in Wales, was obtained from the respective hospitals. It was assumed that they would retire when 60 years old. Their age was calculated from the date they qualified at 23 years old. The numbers of vacancies in each speciality was calculated for three yearly intervals over the next 15 years and 10 yearly upto 2030.
Results: Currently there are 54 (9 each year) SpRs in general surgery in Wales. The number of consultants who will be retiring in each sub-speciality in general surgery in Wales, over the next 25 years, is shown below:

Period of years	Breast	Colo-rectal	General	Upper GI	Vascular	No per year
2006–2008	4	3	1	1	0	3
2009–2011	0	6	1	2	3	4
2012–2014	4	3	0	3	3	4
2015–2017	1	3	0	3	5	4
2018–2020	2	3	0	2	0	2
2021–2030	7	9	11	5	10	4

In addition one hepatobiliary surgeon would retire in 2009.

Conclusion: This study shows that the predicted vacancies in Wales, range from 2–4 per annum, with a median of 4. This exceeds the number of trainees being produced, and in the future, general surgery may have a similar manpower crisis to that being experienced by cardiothoracic and orthopaedic trainees. A formal UK wide study of retirements is needed to help with manpower planning, as the Welsh data suggests that we are over-producing surgeons.

Education/training 0408

Centralisation of vascular services: an improvement in SHO training

S. M. Worthington[1], V. P. Jagadesham[1], J. A. Lawrenson[2], D. C. Berridge[1], D. J. A. Scott[1]
[1]Leeds Vascular Institute, Leeds, [2]Leeds Medical School, Leeds

Background: Surgical training has undergone dramatic reform in response to the European Working Time Directive (EWTD). Previously vascular services in our city were split between two sites. The reduction in working hours and night commitments meant vascular SHOs had limited vascular surgery exposure. With centralisation of vascular services a SHO rota was designed to improve surgical exposure and remain compliant with the EWTD. The new rota involved SHOs ($n = 4$) working day shifts (8 am–6 pm, Monday to Friday) and doing one in four weekends (8 am–6 pm). Night commitments were covered by the vascular SpRs ($n = 4$) and Research Fellows ($n = 3$). The aim was to assess if centralisation of vascular services & a revised rota could improve surgical exposure for vascular SHOs
Methods: Rotas pre- and post-centralisation were analysed for a theoretical change in vascular surgery exposure. Any potential change was quantified by analysing SHO theatre attendance and operative experience.
Results: In a six-month period after taking into account study leave and annual leave a potential 130 working days (WD) were available for vascular exposure. Pre-centralisation, SHOs at Hospital A carried out 36·5 (36%) WD with SHOs at Hospital B carrying out 46·5 (46%) WD. Post-centralisation (C) the 4 SHOs

carried out 87·5 (86%) WD. The analysis of theatre logbooks demonstrated an improvement in SHO attendance at all-day lists (A 12–14, B 13–17, C 32–41). This was further quantified by a significant improvement in SHO participation in arterial cases.

Conclusion: The improvement in vascular surgery exposure with the new SHO rota is promising and will convey benefit to their surgical training. Whilst SHO theatre attendance and participation has increased the rota has remained compliant. Even with a reduction in working hours we have identified a way in which surgical exposure can be improved. When the next phase of the EWTD is enforced in 2009 further alterations to SHO rotas will have to occur to ensure training needs.

Education/training 0517

Are current surgical trainees achieving standards set by the Intercollegiate Surgical Curriculum Project for their equivalent levels in specialist training?

D. Mackrill, B. Johnson
Hull and East Yorkshire Hospitals NHS trust, Hull

Background: To assess current surgical trainees' experience and competencies according to standards set by the Intercollegiate Surgical Curriculum Project.

Methods: A questionnaire was sent to all surgical SHOs working in two NHS trust teaching hospitals. The questionnaire listed exams, recommended courses and practical skills (such as operations) required to reach competency level 3 or 4 (able to do with some senior assistance/able to do unsupervised) in the beginner and intermediate levels of general surgical specialist training.

Results: Replies with exam/course completion:

SHO experience	MRCS part 1 + 2	MRCS viva	MRCS clinical	BSS course
< 24 months	56%	33%	22%	67%
> 24 months	100%	92%	62%	100%

Level 3–4 competency for all listed ward based procedures:

SHO experience	Beginner procedures	Intermediate procedures
< 24 months	56%	11%
> 24 months	92%	54%

Level 3–4 competency for all listed operations:

SHO experience	Beginner operations		Intermediate operations		
	General	Urological	General	Vascular	Plastics
< 24 months	33%	0%	0%	11%	0%
> 24 months	77%	31%	46%	23%	38%

Other operation level 3–4 competency rates: Simple surgery of the skin and subcutaneous tissues at intermediate level, 92%. Melanoma excision, 23%. Short saphenous vein surgery, 18%.

Conclusion: Basic Surgical Trainees in two NHS Trust teaching hospitals gained the required experience in most general surgical operations used as standards for the new ISCP training programme. They also rapidly completed the essential exams and courses. However, for some operations, the standards were difficult to achieve and this impacts on the design of new surgical training programmes.

Education/training 0545

Whither the appendicectomy as a training procedure

W. Neary, A. Weale, D. Mitchell
North Bristol NHS Trust, Bristol

Background: To see if fewer senior house officers (SHO) are performing appendicectomy as the main operator and to discuss possible reasons.

Methods: The theatre PAS database of two city teaching hospitals was interrogated. Details of appendicectomies over a six year period was obtained with primary surgeon grade.

Results: There were 1661 procedures performed. Over years 2000–2003 the number of operations was split equally between SHO and Middle grade or registrar (R) (561/556). The ratio dropped to 86/315 for the final years.

Conclusion: It is significantly rarer for an SHO to perform an appendicectomy in 2005 than in 2000 in a large city teaching hospital. The introduction of a new technique (laparoscopic), centralisation of paediatrics, and changes in working practice have decimated a once common part of the surgical house officer's routine work.

Education/training 0547

Accuracy of certification of colorectal cancer deaths – A process often neglected

S. K. P. John, S. Collis, J. Bt, R. D. Howell, R. J. Lawrance, J. B. J. Fozard
Royal Bournemouth Hospital, Bournemouth

Background: Death certification data is widely used and quoted. The process of certification is however routinely left to trainees and completed without supervision.

Methods: We analysed data from a prospective MDT audit of death over one year (2005). Consideration was given to all aspects of the patient's journey from clinical presentation to death, using a validated proforma, and death certification was critically analysed.

Results: Eighty-nine patients with colorectal cancer who had died in the last 11 months were discussed in the weekly meeting. Median age of 80 (45–93 years) and 56% were male patients. While there was correct death certification in 71% (63 out of 89) of patients, over 18% (16 out of 89) were wrongly certified and no death certificate available in ten patients.

Wrong organ diagnosis (eg. bowel instead of ovarian, pancreatic etc) was seen in 5 patients. Bowel cancer was described as leading cause of death in 8 patients cured of it, where medical co morbid conditions contributed to actual death. In 3 patients wrong site of the tumour (eg.colon for rectum), contributed to inappropriate certification. Wrong death certification was noted in 29% of deaths in Macmillan unit compared to 19% in secondary care.

Conclusion: Inappropriate death certification of colorectal cancer patients is common. Measures such as education and supervision need to be in place to provide for correct certification. Otherwise data from cancer registries, and comparison of international mortality rates are of limited value.

Education/training 0556

Basic emergency surgical training in a large district general hospital "BST or not BST? That is the question"

C. Magee
Wirral NHS Trust, Wirral

Background: Surgical training is undergoing enormous change in the UK as a result of the European Working Time Directive, Hospital at Night (H@N), Modernisation of Medical Careers (MMC). Open appendicectomy

has traditionally been viewed as performed by Basic Surgical Trainees (BSTs). Anecdotal evidence suggests that exposure of trainees to theatre has lessened and ability of trainees to perform independently may be reduced. This study considers whether this is true for BSTs in a large DGH.

Methods: Open appendicectomy was chosen as the index procedure for analysis. Prospectively collected data over the period 2001–2005 was analysed. Statistical analysis was performed using the Chi-squared test.

Results: 1578 cases of open appendicectomy were identified. The number of appendicectomies performed has increased year on year (mean = 285). The number of cases performed independently by BSTs has fallen year on year with a significant decrease from 2004 onwards ($p < 0{\cdot}001$ Chi squared, range 59–24). The numbers performed by HST alone has increased significantly ($p < 0{\cdot}001$ Chi squared, range 121–174). Further analysis of showed reduction in operating around handover times and despite the presence of a dedicated on call team at night virtually no operating was done after midnight.

Conclusion: The ability of BSTs to perform appendicectomy has decreased significantly over the last 5 years. This has become particularly apparent in the last two years with the introduction of H@N. The new surgical curriculum proposed with MMC states that entry to ST3/4 (specialist registrar) requires the ability to perform appendicectomy independently. This may not be possible if exposure to theatre is reduced.

Education/training 0560

Training radiologists to be venous surgeons

D. Beckett, B. Braithwaite
Nottingham University Hospital, Nottingham

Background: The Vascular Society and British Society of Interventional Radiology have agreed on the principle of the Vascular Specialist for the future management of patients. Data from the Rouleaux Club show surgical trainees are keen to acquire interventional radiological skills. How will radiology trainees acquire surgical skills?

The aim of this study was to determine the feasibility of training a senior radiology trainee in the care of patients with venous disease.

Methods: Under the supervision of a Consultant Vascular Surgeon, a year 6 radiology trainee attended out-patient clinics, the vascular laboratory and day case theatres. Over the course of five months the trainee attended 6 specialist clinics in each of which up to 14 patients were seen with venous pathology. During the same time period, the trainee attended 10 operating lists where a total of 49 legs in 39 patients were treated with different methods. Multi-disciplinary feedback, formative and summative competency based assessments were used to assess the trainee.

Results: The trainee was able to diagnose, investigate and propose a treatment plan identical to the trainer's opinion in over 90% of the consultations. The trainee performed some 13 of the 21 traditional sapheno-femoral ligations, GSV strips and avulsions; Radiofrequency ablation and avulsions (3/16); Endovenous laser ablation (1/6); endovenous chemical ablation (1/4); avulsions (2). There were no immediate or early (6 weeks) complications.

Conclusion: This study shows that the skills of a senior trainee interventional radiologist appeared to be such that they could be trained, in a relatively short period of time, to assess and treat most patients with venous disease. Success was achieved by a good relationship between mentor and trainee. This system of training may strengthen the collaboration between vascular surgeons and interventional radiologists.

Education/training 0598

Defining useful surrogates for user participation in online medical e-learning

P. Beddy[3], P. Ridgway[1], D. Beddy[3], E. Clarke[2], O. Traynor[2], S. Tierney[2]
[1] St Vincent's University Hospital, Dublin, Ireland, [2] Royal College of Surgeons, Dublin, Ireland, [3] Adelaide and Meath Hospital, Dublin, Ireland

Background: "School for Surgeons" is a web-based distance learning program which provides online clinical and literature based tutorials to surgical trainees. Our aim was to determine surrogates of active participation and to assess the efficacy of methods to improve usage.

Methods: Server logs of the 82 participants in the "School for Surgeons" were assessed for the two terms of the first year of the program. Data collected included total time online, mean session time, page requests, numbers of sessions on-line and the total number of assignments. An intervention regarding comparative peer usage patterns was delivered to the cohort between terms one and two.

Results: Of the 82 trainees enrolled, 83% (*85% second term*) logged into the program. Of all participators 88% (*97% second term*) submitted at least 1 assignment. Median submissions were 4 (*8 second term*) per trainee. Assignment submission closely correlated with number of sessions, total time online, downloads and page requests. Peer-based comparative feedback resulted in a significant increase in the number of assignments submitted ($p < 0{\cdot}01$).

Conclusion: Despite its recent introduction, "School for surgeons" has a good participation rate. Assignment submission is valid surrogate for usage. Students can be encouraged to move from passive observation to active participation in a virtual learning environment by providing structured comparative feedback ranking their performance

Education/training 0627

Considerations on the learning curve for laparoscopic colorectal surgery: a view from the bottom

R. Cahill, S. Leong, B. Mehigan, R. Stephens
St James's Hospital, Dublin

Background: Those who have surmounted the learning curve for laparoscopic colorectal resection frequently state that considerable numbers of highly selected cases are required to comprise a department's early experience so that the technique becomes reproducibly reliable prior to its incorporation in to routine clinical practice. The objective of this study was to determine how their advice may impact upon the acquisition of procedural familiarity by considerably disrupting case flow.

Methods: The numbers and types of all colorectal operations performed in a single institution over a four-year period (2001–2004) were gleaned from a prospectively maintained database. Patient profiles were scrutinised to identify how their presentation and demographics would impact upon the theoretical completion rates of a proposed laparoscopic learning curve if varying, published, exclusion criteria were to be applied.

Results: In total, 317 colorectal resections were performed. 259 operations were for malignancy-these comprised 83 right hemicolectomies and 156 left sided resections (of which 100 were for tumours below the sacral promonitory). Of these those with malignancy, 25 (10%) were obese (BMI > 30), 52(20%) had previous intra-abdominal surgery while 55(21%) were aged over 80 years. Strictest exclusion criteria would half the number of cases that could be commenced laparoscopically thereby doubling the duration of a learning curve. A specialist registrar rotating through the department for six months would have case exposure cut from a mean 33 (15 rectal resections) to 11 under this regimen. In the same time period, 58 colonic resections were performed for benign diseases. Prioritising these cases in the initial experience as has been recommended by certain groups would mean that, at most, 1·2 cases would be performed every four weeks during the learning period.

Conclusion: Although the overall caseload of our department may seem sufficient to allow the acquisition of expertise in laparoscopic techniques in a timely fashion, the procedural flow would be markedly interrupted if stringent pre-selection is applied. A low threshold for initiating the procedure laparoscopically seems a more pragmatic way of establishing departmental familiarity and confidence.

Education/training 0643

The impact of trainees in the surgery of colorectal cancer

A. Al-Bahrani, C. Surrey, B. Bactawar, R. I. Hallan
Department of Colorectal Surgery, Hemel Hempstead General Hospital, Hemel Hempstead

Background: Radical resection of colorectal cancer is the most important factor influencing the outcome. Surgical trainees perform many of these resections, but their results are rarely separately analysed. This study compares the results of trainee and consultant resections in colorectal cancer.
Methods: An 11 years prospective audit from January 1994 to December 2004, recorded operative details, staging and outcome of patients with colorectal cancer treated in a district general hospital. The results were compared for trainees and consultants. Mann-Whitney test was used for statistical analysis with a significance level accepted at 5%.
Results: Out of 1144 patients with colorectal cancer, 997 (87%), median age 71 years, had respectable tumour (colon = 612, rectum = 379, both = 6). Trainees performed 334 (34%) cancer resections. Rectal resection constituted 19% of the operations performed by trainees (consultants = 48%, $p =< 0{\cdot}001$). Supervised operations occurred in 42% of cases. Trainees operated on more emergencies (24% *versus* 9%, $p =< 0{\cdot}001$) and higher ASA grade ($p = 0{\cdot}016$). Stomas were fashioned at higher rate by consultants *versus* trainees (32% *versus* 17%, $p =< 0{\cdot}001$). In rectal cancers, trainees performed less total mesorectal resection than consultants (41% *versus* 64%, $p = 0{\cdot}019$). There was no significant difference between the two groups in the post-operative complications, both minor and major ($p = 0{\cdot}651$ and $p = 0{\cdot}790$, respectively), five year survival ($p = 0{\cdot}309$) and 30 days operative mortality ($p = 0{\cdot}784$). Trainees had lower 2 year survival rate for colonic cancer than consultants (57% *versus* 65%, $p = 0{\cdot}038$).
Conclusion: The outcome of resection of colorectal cancer by trainees is similar to that of consultants. Case mix (more emergencies and less rectal resection by trainees) accounts for the difference between the two groups, and reflects the degree of delegation to, and direct supervision of, surgical trainees by their consultants.

Education/training 0666

Death certificates: Fact or Fiction!

V. R. Velchuru, S. Ilyas, N. Munasinghe, G. Chatora, V. Chitre
James Paget University NHS Foundation Trust, Great Yarmouth

Background: Death certificates are legal documents; their accuracy is of vital importance as they provide invaluable epidemiological data. The aim was to determine the frequency and type of errors in death certificates within a surgical department. Secondary aim is to analyse the factors associated with erroneous certification.
Methods: Death certificates of patients who died over a 6 month period were included in the study. Certificates which were issued after post mortems were excluded. An error grading system was employed. Errors were graded on a 1 to 4 scale, with grades 3 and 4 being the major errors. Investigator bias was minimised by the independent assessment of each case note by 3 investigators. Two investigators graded the errors independently. The third (senior) investigator then discussed each case with other two. The proposed certification was compared with the original certification and a final error grading was agreed.
Results: Seventy one deaths occurred during the study period, of which 63 certificates were analysed. Ninety five percent of certificates had errors. Only 3 certificates had no mistakes. Grade 1 and 2 errors occurred in 60% and 32% of certificates. Grade 3 and 4 errors (mechanism of death or wrong cause of death used) were noted in 41% and 29% of certificates respectively. Fifty nine percent ($n = 37$) of certificates had major (grade 3 and 4) errors. Nineteen per cent ($n = 12$) of certificates were issued by consultants, of which 83% had major errors.
Conclusion: The frequency of major errors was very high in our institution. The seniority of the issuing doctor did not affect certification.

Education/training 0703

Active mentoring in major hepatic and pancreatic oncologic resection avoids the adverse effects of the "learning curve" in hepatobiliary surgery

A. Siriwardena, A. Sheen
Department of Liver Surgery, Manchester Royal Infirmary, Manchester

Background: Newly-appointed consultants in Hepatobiliary (HPB) surgery may have participated in a reasonable number of major resections but will rarely have completed a large series without supervision. This study reports the outcome of a programme of active mentoring, set in place to allow newly appointed HPB surgeons to achieve top-of the range surgical outcomes without the adverse effects of the learning curve for their patients.
Methods: Surgeon 1 is a Calman-trained HPB surgeon with 2 years senior training experience in local HPB units and 1 year as senior clinical fellow in a major national Hepatobiliary/Liver transplant unit, appointed to a regional network-approved HPB service. Surgeon 2 is an experienced HPB consultant surgeon. All new cancer referrals were discussed at a weekly multidisciplinary meeting and a policy of active mentoring was implemented with all major resections undertaken jointly in the first 12 months (with Surgeon 1 as Lead operator in all). For the purposes of this study, outcome data were collected on in-hospital mortality and volume of work. Data are compared to results achieved by surgeon 2 in his initial 12 months in post – a period without any formal mentoring. Any statistical comparisons are made by non-parametric tests.
Results: Surgeon 1 undertook 4 major pancreatic resections (3 Whipple, 1 total) and 7 major hepatic resections in the first 12 months. There was no in-hospital mortality. This compares with 2 deaths in 10 pancreatic resections (but 0 in subsequent 51) and 0 deaths in 3 liver resections by surgeon 2 over a comparable period (P = NS, Fisher's exact).
Conclusion: Interpretation of this small experience of two individual surgeons' practice must be cautious as it may be biased by local practice. However, given that the avoidance of operative mortality in the first year of consultant practice is paramount, our study suggests that translation of the airline industry's "active safety" strategy to "active mentoring" is of value in complex HPB surgery.

Education/training 0765

Relative value of internet derived gastrointestinal cancer information

K. R. Morgan, S. Burrows, R. Stratford, A. N. Hopper, W. G. Lewis
University Hospital of Wales, Cardiff

Background: Doctors are increasingly faced with patients and relatives who have accessed the internet to source information prior to consultations. The aim of this study was to assess the accuracy and breadth of internet derived information relating to gastrointestinal (GI) cancers.
Methods: The top 30 each of the 431 000 oesophageal, 240 000 gastric, 385 000 pancreatic, 540 000 colon, and 222 000 rectal cancer sites found by www.google.co.uk were assessed by two surgical trainees and information fields (definition, prevalence, risk factors, symptoms, investigations, neoadjuvant therapy and toxicity, surgical details, morbidity and mortality, prognosis) were scored for accuracy and breadth of information (0 to 2).
Results:

	Cancer site				
	Oesoph.	Stomach	Pancreas	Colon	Rectum
Symptoms	43	40	50	63	37
Investigations	40	33	37	60	50
Surgical details	27*	23#	43	50*#	63*#
Op. mortality	0	0	13	0	3
Prognosis	3	7	43	37	33
Median scores	8·5	12	10	13·5	13

Figures are percentage internet sites giving adequate information, *# $P = 0{\cdot}002$. Inter-rater agreement 91·2%.

Conclusion: Prognostic 5-year survival data varied widely regardless of stage of disease; oesophageal 6 to 25%; gastric 5 to 70%; pancreatic 0 to 25%; and colorectal cancer 40 to 92%. Health professionals should be aware of these idiosyncrasies when patients are armed with information derived from the internet.

Education/training 0860

The freedom of information act and the colorectal trainee – who's leak is it anyway

P. Sharma, A. Macdonald
Department of Surgery, Monklands Hospital, Airdrie

Background: Following the introduction of the Freedom of Information Act, there has been increasing pressure from the press and public to release data on morbidity/mortality rates down to the level of individual surgeons. Historically, the complication rates of trainees have been recorded as part of the consultant team they were attached to. The aim of this study was to record the attitudes of trainees and trainers to anastomotic leaks, in light of the increasing demand for public disclosure of results.
Methods: 40 trainers (20 regional, 20 national) and 36 trainees (15 regional and 20 national) were questioned re responsibility for anastomotic leaks specifically. Data was collected on grade of trainee, type of operation, experience of consultant, consultant presence in theatre (scrubbed/unscrubbed), consultant presence in hospital, and audited anastomotic leak rate of trainee and consultant.
Results: The majority of trainers (35/40) accepted responsibility for anastomotic leaks regardless of whether they were scrubbed/unscrubbed in theatre or in the hospital. However they felt that responsibility transferred to the trainee, if surgery was carried out when they were not in the hospital. 30/35 trainees reported that responsibility for this complication rested with the consultant trainer. Seniority of trainee did not influence the result. Interestingly, none of the trainees questioned had ever been asked for details of their anastomotic leak rates by trainers and no trainer reported routinely seeking this information from trainees. No trainer questioned, routinely discussed the experience of their trainee/status in theatre (main operator/assistant) with patients, prior to consent although all believed that morbidity was probably greater if the trainee carried out the operation. The introduction of the Freedom of Information Act had not altered their practice as a trainer.
Conclusion: Early evidence suggests that recent statutory changes to the provision of information to the public, has not altered the trainer/trainee relationship. Most consultants accepted responsibility for trainees' anastomotic leaks. Interestingly none had actively sought this information from their trainee and this information was not routinely offered.

Education/training 0870

Laparoscopic incisional/ventral hernia repair (LIVHR): Assessment of risk, complications and competence

A. Siddika, S. Samlalsingh, J. Birdi, S. Wijeyekoon, A. Banerjea, A. Bhargava
King George Hospital

Background: The learning curve of any new surgical technique should result in improvement of surgical outcome over time. This may due to greater familiarity of the technique or better selection of patient case-mix. We evaluated to what extent case-mix influences post-operative complication rate by developing a risk score.
Methods: A series of first 50 LIVHR performed by a single surgeon between May 2003 and December 2005 was analysed prospectively. A risk score based on presence of the following risk factors: age (≤ 60 years: 0 or > 60 years: 1), number of clinical defects (single defect: 1 or two defects: 2), and defect area ($\leq 78\ cm^2$: 0 or $> 78\ cm^2$: 1) was calculated. A Cumulative Sum (CUSUM) model compared occurred complication rate to the expected rate progressively through the series.
Results: The median risk score was 2 (range 1 to 4). The CUSUM model showed that more complications were experienced than expected for the first 15 cases. For cases 15 to 30 observed complications were less than expected. This corresponds to a lower mean risk score for these patients. Thereafter, the observed complication was as expected.
Conclusion: The CUSUM model demonstrates a "learning curve" effect whereby across the first 15 operative cases there were 3 more complications than expected ($34\% - 53\% = -19 \times 15/100 = 2{\cdot}9 \approx 3{\cdot}0$). In the subsequent 15 cases number of complications decreased probably due to selection of lower risk patients. Beyond the 30th case the observed complication rate was as expected ($34\% - 34\% = 0$) despite the inclusion of more high risk cases. These data suggest that 30 cases or more are required to achieve expected complication rates in a normal case-mix for a surgeon with Laparoscopic experience.

Education/training 0891

Diathermy training in surgical trainees is inadequate. Will we get our fingers burnt?

D. Raptis, A. Engledow, B. Stubbs, A. Obichere, A. Huang
University College Hospital, London

Background: Diathermy plays an integral part in most operations, either for dissection or coagulation. Inappropriate use can lead to adverse events for patients. Despite this, little formal training or education on diathermy exists in the UK. We aimed to assess the level of training and current practice amongst higher surgical trainees.
Methods: An e-mail questionnaire was sent to 300 randomly selected members of The Association of Surgeons in Training. This asked the following questions: age, year of specialist registrar (SpR) training, subspecialty interest, and the presence or absence of formal training in diathermy use. Also asked were whether as the operating surgeon you would place the diathermy pad yourself on the patient and check the equipment prior to starting to operate? Do you routinely check diathermy pad sites yourself at the end of operation? Would you use diathermy for opening the abdomen, colonic or rectal mobilisation and if a complication secondary to diathermy was to arise who do you think is responsible?
Results: There were 126 (42%) replies. 24 (19%) respondents were aged 20–29 years, 92 (73%) were 30–39, 6 (5%) were 40–49 and 4 (3%) were 50–59. 46 were in their first year as SpRs, 18 in their second, 12 in their third, 14 in their forth, 8 in their fifth, 18 in their sixth and 10 had been SpRs for longer than six years. 60 (47%)of the trainees had a colorectal subspecialty interest, 24 (19%) vascular, 18 (14%) upper GI, 12 (10%) breast, 4 (3%) transplant, 4 (3%) laparoscopic, 2 (2%) hepatobiliary, and 2 (2%) endocrine. 64 (51%) had received formal diathermy training, while 62 (49%) did not. There was no statistical significance between seniority of trainee and diathermy training ($p > 0{\cdot}05$). Older surgeons were less likely to use diathermy other than for coagulation. 112 (89%) do not routinely place diathermy pads on patients themselves, 86 (68%) do not routinely check diathermy equipment before use, and 84 (67%) do not check the diathermy pad site at the end of operation. 96 (76%) use a scalpel for the skin incision while 30 (24%) use diathermy. 62 (49%) use diathermy for colonic mobilisation, while 64 (51%) use scissors. 70 (56%) use diathermy for rectal mobilisation 54 (43%) use scissors, and 2 an harmonic scalpel. When asked whose responsibility it was in an event of a diathermy complication, 24 replied incorrectly while 102 replied correctly that it is the surgeon's responsibility.
Conclusion: Surgical trainees have inadequate training in diathermy use resulting in failure to adhere to what is considered best practice. This may lead to adverse events for the patient along with medico-legal consequences. This problem could be overcome by ensuring adequate diathermy training in the Basic Surgical Skills Course now compulsory for all basic surgical trainees.

Education/training 0903

The impact of MMC and the working time directive on the ward round? Is it still an effective means of communication between medical staff?

J. W. McCormick, S. Tanna, B. Soin
Heatherwood and Wexham Park Hospitals NHS Trust, Slough

Background: Modernising medical careers (MMC) and changes in working patterns dictated by the European Working Time Directive (EWTD) have changed the structure of the traditional firm. This prospective study sets out to explore whether, in this new evolving system, the ward round remains an effective way of communication within the team.
Methods: A form was constructed using categories of prioritisation. In a prospectively performed, blinded comparison a list of tasks was generated on the ward round by the F1 doctor and prioritised accordingly (1, 2, 3). This was then blinded from the senior doctor who reviewed the list and prioritised it as they had intended to communicate when conducting the ward round. Data was collected from each of six teams conducting rounds on a daily basis over a four-week period during the second month of the F1 training.
Results: The six F1 doctors attached to each of the six surgical firms collected a total of 305 data points for prioritisation from 42 ward rounds out of a potential 120. Of these ward rounds 44% were led by SHO/F2s, 33% by SpRs and 23% by Consultants. Consultant led ward rounds achieved the highest matching of priorities, (43) 61%, while SpR and SHO wards rounds obtained (54) 53% and (72) 54% matching respectively. However there was no statistically significant difference between the three groups.
Conclusion: The lack of a positive correlation to the seniority of the doctor conducting the ward round and successful communication suggests a failure of the system of the ward round rather than just poor methods by middle grade trainees. The authors feel that the current daily ward round is a less than perfect tool for communicating task priorities to junior doctors in firm based systems. We recommend the following: **1.** Explicit prioritisation of the tasks generated at the end of every ward round. **2.** Regular updates with the team throughout the day. **3.** On long, post take ward rounds stopping after every 4 or 5 patients or at the end of each ward to review the list and modify priorities.

Education/training 0945

The effect of calman training in general surgery on multi-regional and international exposure

B. Bisase, S. Thrush, G. Layer
Worcestershire Royal Hospital, Worcester

Background: Since the introduction of Regional Training Programs the necessity for travel as a part of career progression, both nationally and internationally, has diminished. Whereas many established consultants would have spent clinical time abroad, the perception is that the number of current trainees making such trips has decreased. The aim of this study was to determine the perceived importance of multi-regional and international exposure towards training a general surgeon. A direct comparison of its relevance was made with that of time out for research in surgical training and a whether a research thesis was awarded. The difference between those consultants exposed to "Calman" training compared to pre-Calman training was assessed.
Methods: A postal questionnaire was sent to 134 general surgery consultants in the UK. The information obtained included: years in post, number of regions exposed to as a senior house officer (SHO) and as a specialist registrar (SpR), sabbaticals over three months and for further interest whether they were awarded a thesis or not.
Results: Of the 134 questionnaires, 67 replies were returned (50%). 39% of respondents had been appointed within the last 5 years (*the Calman group*). The majority were exposed to more than one training region as an SHO and registrar (75% and 73%). The number having undertaken a sabbatical was 40% with the majority visiting the United States. The sabbatical rates of the Calman and the Non-Calman group are 12% and 61%.
Conclusion: The introduction of the structured training programme has had many benefits to the surgical trainee. It incorporates a year specifically for either research or a clinical sabbatical. This study shows there has been a marked decrease in overseas travel. Its importance to training is recognised by both the pre-Calman and Calman consultants and is perceived to be more beneficial than a thesis.
Overseas and extra-regional attachments should be encouraged both organizationally and financially.

Education/training 0974

The role of intra-operative pus swabs in appendicectomy

A. Narayanan, B. Piramanayagam, R. S. Rajput, D. Kanji, S. Sundararaman, M. J. Osborne. P. D. Murphy
West Wales General Hospital, Carmarthen

Background: Evaluation of the bacterial flora of peritoneal fluid is a widespread practice during appendicectomy. However the pathogens cultured are invariably sensitive to broad-spectrum antibiotics used perioperatively. We analysed the clinical and pecuniary implications of routine culture of peritoneal fluid.
Methods: 256 appendicectomies were performed between July 2004 and March 2006. The culture results were analysed and correlated with clinical and histological findings. The impact of a positive culture on antibiotic treatment was evaluated.
Results: All patients received at least one dose of broad-spectrum antibiotics (cefuroxime and metronidazole) usually at induction of anaesthesia. 62 patients had histologically confirmed appendicitis of which 17 had positive and 45 negative culture swabs. Bacteroides species and Escherichia coli were the commonest organisms isolated. 4 patients had normal histology with negative swab culture. No culture swabs were done in 132 patients with positive histology and 58 patients who had normal histology.
Conclusion: The bacterial flora cultured was sensitive to the broad-spectrum antibiotics used. Positive swab results did not influence the choice of antibiotic. No difference in clinical outcome was identified in those who had positive, negative or no swabs. This also has implications both in terms of manpower and costs, particularly in the current climate of cost effectiveness.

Education/training 1055

Generic quality of life analysis in varicose veins treated with endovenous laser therapy: Can the short form 8 replace the short form 36

M. N. A. Abdul Rahman, S. Gulati, A. Mekako, J. Hatfield, P. T. McCollum, I. C. Chetter
Hull Royal Infirmary, Hull

Background: 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 in varicose vein status as the SF36.
Methods: We studied 117 patients treated with endovenous laser therapy (EVLT) for primary varicose veins. 74 women and 43 men, median age 49 (range 18–83) years were CEAP graded (C2 = 84, C4 = 31, C5 = 2). Patients completed SF36 and SF8 prior to, and at 1, 6, 12 weeks and 1-year post procedure. Both instruments analyse the same 8 QoL domains. Responsiveness of normalised data was analysed using the Friedman test (across all time points) and Wilcoxon's ranked sum test (two time points).
Results: *SF36:* At 1-week post procedure, significant ($p < 0{\cdot}05$) differences were observed in 4 of 8 SF36 domains (physical function, role physical, bodily pain & social function). At 1-year post procedure, across all time point; significant ($p < 0{\cdot}05$) improvements were observed in 6 of 8 SF36 domains (general health and social function not significant).
SF8: At 1 week post procedure, significant ($p < 0{\cdot}05$) differences were observed in 5 of 8 SF8 domains (general health,role emotional and mental health not significant). At 1 year post procedure, across all time points; significant ($p < 0{\cdot}05$) improvements were observed in 7 of 8 SF8 domains (general health not significant).

Conclusion: 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.

Education/training 1088

The role of the non-dominant hand in operative surgery

K. Dickinson, M. J. Gough
The General Infirmary at Leeds, Leeds

Background: World-class footballers are often equally skilled with either foot. Logically highly competent surgeons might become proficient with their non-dominant hand to facilitate the performance of technically difficult surgical procedures. However conventional training in theatre and on skills courses focuses on the dominant hand with little regard for practicing skills with the non-dominant hand. This study has assessed the attitudes of surgeons to the role of the non-dominant hand in vascular surgical practice.
Methods: A web-based questionnaire was emailed to 100 Consultant Vascular Surgeons and 50 surgical specialist registrars.
Results: 93 surgeons responded to the questionnaire (62%). The ratio of right to left-handed surgeons was 12·3 : 1. Although only 18 surgeons (19·8%) considered themselves ambidextrous (able to use both hands for day to day tasks), 80 (85·9%) reported that they would use their non-dominant hand in surgical practice for tasks normally performed with their dominant hand. Considering surgical techniques and procedures 30 (32%) surgeons hand tie preferentially with their left hand (despite only 7·5% being 'left handed'). In contrast, when holding a needle holder or performing groin dissection, 80 (86%) use their right hand preferentially and only 5 (5%) would use the left hand. While 92% of surgeons felt that they performed less well with their non-dominant hand the majority (79·6%) used it during surgery if forced to.
Conclusion: While the majority of surgeons feel that their non-dominant hand performed worse than their dominant hand, a large proportion use this hand during surgical procedures, especially when hand tying. We therefore suggest formal training of the non-dominant hand may be beneficial as part of basic and higher surgical training.

Education/training 1095

Training of Specialist Registrars in oesophago-gastric cancer resection does not compromise outcome

R. Date, B. Decadt, K. Pursnanai, J. Ward, M. Mughal
Chorley and South Ribble District General Hospital, Chorley

Background: With changes in working patterns currently being implemented, Specialist Registrars (SpR's) currently need more training opportunities in less hours of theatre to reach the same amount of experience as trainees from before the Calman era. Our unit believes that every oesophago-gastric resection is a training opportunity for the fourth and fifth year upper GI trainee. As a result more than 95% of these complex procedures are performed by our SpR. We have analysed the outcome of oesophago-gastric resection by five consecutive sub-specialist SpR's.
Methods: A prospective database on major oesophago-gastric resections has been reviewed between April 2000 and November 2006. Outcome measures included major complications, mortality and length of hospital stay.
Results: Trainees performed 75 potentially curative resections: 50 cardio oesophagectomies (CO) and 25 total or sub-total gastrectomies (G). Numbers of procedures for the five SpR's were respectively 4G and 9 OG, 11 G and 10 OG, 5 G and 23 OG, 2 G and 7 OG & 2 G and 1 OG. Complications (including 4 leaks) and 3 deaths (4% mortality) were equally distributed between the trainees. Causes of death were meningitis following an epidural abscess, chyle leak and chest infection. Median length of stay was 14 days (range 7–88).
Conclusion: This study shows an acceptably low morbidity and mortality for major oesophago-gastric resections performed by trainees. As working hours are reduced it is imperative that SpR's are given every opportunity to train in major resections.

Education/training 1106

Opening the "black box" of surgical judgment: an assessment method, which demonstrates construct validity

R. Jacklin, N. Sevdalis, A. Darzi, C. Vincent
Imperial College, London

Background: Sound judgment is a key surgical skill, and forms one of the cornerstones of the new Intercollegiate Surgical Curriculum Project. There is a need for valid, reliable methods for its assessment and teaching. The aim of this study was to evaluate whether an experimental technique known as judgment analysis showed construct validity, if used for quantitative assessment of surgeons' judgments of operative risk.
Methods: We investigated trainees' estimates of the likelihood of conversion from laparoscopic to open cholecystectomy, using judgment analysis. 84 hypothetical cases were created, differing in biliary disease history, previous abdominal surgery, body habitus, age/comorbidity, sex and race. 64 were design cases, with variables were randomised in an orthogonal experimental design, and 20 were repeat cases. Two groups of 20 trainees participated: a novice group in their first year post qualification, and group at SHO level. For each case presented, they estimated the risk of conversion based on preoperative factors. Three measures were derived for each participant: test-retest reliability (correlation with repeated cases), linear regression models indicating the weighting placed on each experimental variable, and correlation of their judgments to an outcome-derived "gold standard" from the published literature. Results were compared across groups using the Mann-Whitney U test to evaluate the method for construct validity.
Results: Comparing the more experienced group to the novices, both mean test-retest reliability and correlation of their estimates to a gold standard was significantly greater for the more experienced group ($p =< 0{\cdot}001$ for both). The regression model fit (measured by adjusted r^2) was significantly better for the more experienced group ($p =< 0{\cdot}001$), with different patterns of use of the variables seen.
Conclusion: Judgment analysis offers potential as a powerful tool for quantitative evaluation of both the consistency of surgeons' judgments of risk and the influence of different variables. Comparison to a gold standard model enables accuracy to be measured. With appropriate careful task design, judgment analysis represents a methodology for opening the "black box" of surgical judgment, with construct validity demonstrated to a highly significant level in this study.

Education/training 1109

First class vascular surgical training can be delivered despite changes in surgical training

P. Coughlin, I. Chetter, P. Renwick, B. Akomolafe, P. McCollum, B. Johnson
Academic Vascular Unit, Hull Royal Infirmary, Hull

Background: Concerns have been raised about surgical training over the recent times. We analysed senior vascular trainees (ST's) experience over a 9 year period to assess changes in experience.
Methods: The logbooks of six ST's in post for a period of one year each were analysed to assess overall number of index procedures experienced and whether it was as sole operator (P); assisted by a trainer (PA); or assisting the trainer (A). Two ST's were in post before 1/10/00 (group A), two in post between 01/10/00 and 30/09/03 (B) and two in post after 01/10/03 (C). Total number of index procedures undertaken within the unit was determined (T).

Results:

			Time period A		Time period B		Time period C	
CEA	T	P	181	10	206	27	177	20
		PA		55		37		34
		A		28		28		6
AAA	T	P	192	7	199	22	167	16
		PA		58		57		31
		A		14		21		19
LLP	T	P	161	37	128	26	126	29
		PA		59		47		39
		A		1		0		5

CEA, carotid endarterectomy; AAA, abdominal aortic aneurysm repair; LLB, lower limb bypass procedures.

There was a significant reduction in the number of cases experienced by the ST in the last three year period, due to reduced exposure to CEA and AAA ($p < 0{\cdot}05$ χ^2 test). ST's in period B and C performed a larger proportion of AAA and CEA cases as sole operator when compared to period A ($p < 0{\cdot}05$ χ^2 test).

Conclusion: Despite the recent changes in surgical training, it is still possible to experience appropriate levels of specialist higher surgical training in a dedicated vascular unit.

Education/training 1113

Leeds discomfort score in colonoscopy, patients and nurses disagree

A. Ghanbari, T. Cuming, A. Ballinger, H. Pardoe
Homerton University Hospital, London

Background: A recent national colonoscopy audit (Healthcare Commission) required an assessment of comfort during colonoscopy using Leeds discomfort scale. The aim of our study was to determine if these scores accurately reflect patient's discomfort level.

Method: Data was collected by an independant observer from 150 consecutive colonoscopies. The sedation and discomfort scores were recorded by the nursing staff using the Leeds criteria. After colonoscopy each patient used the Leeds criteria to rate their own experience of colonoscopy.

Results: The overall caecal intubation rate on an intention to treat basis was 90% with an average time to caecum of 15·2 minutes. 74 females and 76 males completed the study. The correlation coefficient between the nurses and patients score for discomfort (D) and sedation (S) was 0·34 and 0·28 respectively (not significant). Nursing staff consistanly underestimated the patient level of discomfort. The patient D score was > 2 points above the nurse's score in 35% and was > 1 point above the nurse's score in 60% of the cases.

Conclusion: Discomfort and sedation scores assessed by nurses showed little correlation to the patient's score in our study. We propose that discomfort score should be recorded by the patient if it is to be included as a criteria for assessing the performance of units.

Education/training 1157

Performance results from the first virtual reality-based laparoscopic colorectal training course for experienced laparoscopic surgeons

P. Neary[1], A. Gallagher[2], A. Tanner[2], O. Traynor[2], F. Keane[1]
[1]Adelaide and Meath Hospital, Tallaght, Dublin, Ireland, [2]National Surgical Training Center, Royal College of Surgeons in Ireland, Dublin, Ireland

Background: Virtual reality (VR) training offers surgeons a safe environment to perfect advanced surgical techniques. We report our results from the first Virtual Reality based LC training course for experienced laparoscopic surgeons.

Methods: 11 experienced surgeons, > 14 years practising minimally invasive surgery but novice in LC, constituted the novice group and 3 colorectal surgeons (minimum 300 laparoscopic colectomies completed) served as our experts. Training and testing was completed during one day. Novice subjects received instruction in LC from the experts with didactic DVD based educational sessions. This included the surgical technique they were to use for the VR simulation component. Experts performed the exact same case as the novices. Trainees were trained to perform the LC in a standardised stepwise fashion on the ProMis VR simulator. The independent variable was whether the procedure was performed by an expert or a trainee (Group) and the dependant variables were, time to perform the procedure, instrument path length and the smoothness of the trajectory of the instruments.

Results: The experts performed each step of the procedure between 2–5 times as quickly as the novices. Procedure completion time 28 minutes (experts) v's 51 minutes (novices). The individual tasks were faster as indicated by the smaller standard deviation (i.e., 12·5 mins. *versus* 5·2 mins). Overall, the experts performed the procedure 1·8 times faster ($z = -2{\cdot}37$, $p < 0{\cdot}01$). Expert instrument path length showed a similar pattern and they varied from as little as 1·3 times longer for mobilization of the descending colon to 3·6 times longer path length for sigmoid mobilization ($z = -2{\cdot}12$, $p < 0{\cdot}028$). Novices displayed inefficient instrument usage particularly in colonic mobilization with their smoothness score being four times worse ($z = -2{\cdot}37$, $p < 0{\cdot}14$).

Conclusion: The parameters assessed by the ProMis VR simulation for LC training distinguished between the novice and experts. The results confirmed that experts performed the procedure significantly faster with more efficient use of their instruments as indicated by both path length and smoothness measures.

Emergency surgery

Emergency surgery 0070

A national survey of current surgical treatment of acute gallstone disease

E. J. Campbell, D. A. Montgomery, C. J. Mackay
Glasgow Royal Infirmary, Glasgow

Background: Acute cholecystitis (AC) and acute pancreatitis are two potentially life threatening complications of gallstone disease. There are national guidelines for the treatment of gallstone pancreatitis, but none exist for the management of AC. Consequently, the management of AC is subject to great variation. The aim was to establish the preferred management of uncomplicated AC and adherence to the guidelines for management of mild gallstone pancreatitis among all consultant general surgeons working in Scotland.
Methods: A national postal survey of all 192 consultant general surgeons in Scotland.
Results: 135 responses were received from surgeons, a response rate of 70%. 126 were suitable for further analysis. For uncomplicated AC, 55 (44%) perform urgent laparoscopic cholecystectomy (LC), 29 (23%) perform same admission LC after clinical improvement. 38 (30%) perform interval LC after discharge. Within this group, 15 surgeons (12% of all replies analysed) manage AC conservatively at least partly due to insufficient operating time or equipment when on call.
Factors found to increase the likelihood of carrying out same admission LC are undertaking regular elective laparoscopic work ($p < 0{\cdot}001$) and having a specialist upper GI or vascular interest.
In mild gallstone pancreatitis, 74 (58%) perform same admission LC, 21 (17%) would perform sphincterotomy, 3 (2%) would perform one of these, depending on the patient and 5 (4%) would refer to an upper GI colleague.
Conclusion: Uncomplicated AC and mild gallstone pancreatitis are conditions managed by all subspecialties within general surgery in Scotland. The majority of surgeons (67%) now manage AC by same admission LC, although those not performing regular elective laparoscopy are significantly less likely to do so. Of those who manage conservatively, more than a third report lack of resources as being the reason. For mild gallstone pancreatitis, the majority of surgeons in Scotland perform urgent laparoscopic cholecystectomy or prophylactic sphincterotomy in accordance with current guidelines.

Emergency surgery 0233

Obturator hernias: a DGH experience of the last 10 years

S. Midya, C. Wakefeild, P. C. Gartell
Royal Hampshire County Hospital, Winchester

Background: Obturator hernias are rare, difficult to diagnose and there is no consensus regarding its method of repair. We looked back to see how we have dealt with this rare problem in the last 10 years.
Methods: The hospital database was searched from April 1996 to March 2006 for patients who had been diagnosed with "Obturator hernia". Their notes were then studied to find details of patient profile, presenting symptoms, preoperative investigations, timing of surgery, type of surgery and postoperative recovery.
Results: Six patients had been diagnosed with obturator hernia in this District General Hospital (DGH) in the last ten years, all of whom underwent surgery. Patient profile: All these patients were elderly, frail ladies with a mean age of 84 years (range 78–89 years). All six of these patients presented with symptoms of intestinal obstruction (100%). Three of them had a definite history of recent weight loss (50%), one patient had palpable lump in the groin (16·66%) and only one had positive Howship Romberg sign (16·66%). Preoperative diagnosis: Two patients went for surgery without any further investigations. The other four had CT scans, which could correctly diagnose obturator hernias in three of them (75%). All of these patients underwent surgery through an abdominal approach. Two of them needed bowel resection. The repair technique was different in each of these six patients. The average duration of stay was 26 days. There was no mortality and no recurrences have been reported.
Conclusion: Obturator hernia is a rare condition. Most of them present as intestinal obstruction in elderly frail ladies and Howship Romberg sign is uncommon. CT scan is reliable in diagnosing this condition preoperatively. Open abdominal surgery is popular in our hospital with some form of mesh repair in uncontaminated cases. Contaminated cases were repaired by interrupted prolene sutures or left unrepaired.

Emergency surgery 0327

Surgical management of mediastinal sepsis: audit of our experience

B. J. Decadt, D. Elsharief, J. Ward, M. M. Mughal
Stepping Hill Hospital, Stockport

Background: The diagnosis and management of oesophageal perforation and mediastinal sepsis is challenging and controversial. We present our experience and treatment strategy with this intriguing emergency.
Methods: We reviewed a prospective database on emergency referrals during the period Jan 2002 to Dec 2005. Cases included patients with a spontaneous or iatrogenic perforated oesophagus and cases of mediastinal sepsis due to complications following a cardio-oesophagectomy. Patient's age and co-morbidity, etiology, symptoms, time from perforation to treatment, endoscopic or radiological findings, treatment and hospital stay are reported.
Results: Twenty patients were treated (11 males) with a mean age of 58 (range 21–80). Five patients presented following oesophageal instrumentation for dilatation or removal of food bolus. Other causes included diagnostic endoscopy in 2, spontaneous perforation in 6 and perforation following laparoscopic Heller's myotomy in one patient. Six patients developed sepsis following elective cardio-oesophagectomy. Treatment was primary repair of the perforation over a T-tube with a gastrostomy, feeding jejunostomy and drainage in 9, emergency oesophagectomy in 3, thoracoscopy and drainage in 3, insertion of stent in 2 and conservative treatment in 3 patients. Median hospital and intensive care stay were respectively 80 (range 11–170) and 44 (range 4–84) days. Four patients died (mortality 20%).
Conclusion: This series accounts the favourable outcome in a cohort of patients with a dismal prognosis. After confirmation of the leak by contrast studies, CT or endoscopy, urgent thoracotomy with repair of the perforation over a T-tube with a gastrostomy, feeding jejunostomy and drainage appears a safe policy. Patients with existing oesophageal pathology may be considered for emergency cardio-oesophagectomy.

Emergency surgery 0364

Diagnostic peritoneal lavage and ultrasonography for blunt abdominal trauma: attitudes and training of current general surgical trainees

C. Bhan, M. Forshaw, D. Bew, Y. Kapadia
Eastbourne District General Hospital, Eastbourne

Background: It has been suggested that diagnostic peritoneal lavage (DPL) is now obsolete in UK hospitals with access to either skilled ultrasonography or emergency physician or surgeon-performed FAST (focused abdominal sonography in trauma). DPL continues to be advocated and taught on ATLS courses. The aim of this study was to evaluate the experience and attitudes of general surgery trainees in one UK training region towards DPL and FAST in managing blunt abdominal trauma.

Methods: An anonymous postal piloted questionnaire was sent to all 66 general surgery specialist trainees in one UK training region between January and March 2005.
Results: Amongst 40 replies to the questionnaire (response rate 61%), 53% and 38% of surgical trainees had either never performed or observed a DPL during their training. 13 trainees (33%) felt DPL to be obsolete and would never contemplate using it; and 15 trainees (37%) might consider using DPL if computed tomography (CT) or ultrasonography were unavailable. Ten trainees (25%) felt that DPL had been superceded by CT. Only 12 trainees (30%) had worked in a UK hospital with access to FAST facilities and only 7 trainees (18%) had received any FAST training or experience.
Conclusion: Surgical trainees in one UK training region lack both DPL and FAST skills in managing blunt abdominal trauma and are therefore reliant upon the availability of prompt skilled radiological assistance or emergency physician-provided FAST.

Emergency surgery 0410

Surgical and pathological findings of 876 consecutive appendicectomies: macroscopic findings are unreliable

K. Roberts, M. Behravesh, J. Dmitrewski
Russells Hall Hospital, Dudley

Background: At laparoscopy for acute abdominal pain some authors advocate leaving a normal appearing appendix *in situ*. Most patients who undergo appendicectomy are not routinely followed up. Both practices depend upon the surgeons ability to correctly diagnose normal, inflamed and neoplastic tissue. Thus we have correlated macroscopic findings at appendicectomy with reported histological findings.
Methods: All appendix samples over a three year period (1/1/2003–1/1/2006) were identified. Patient notes were then reviewed with patient age, sex, surgical approach, grade of surgeon(s), operative and histological findings recorded. For comparison with surgical findings the histological diagnosis was taken as being most accurate.
Results: Of 972 appendicectomies we obtained 876 notes (90·1%). There was 100% congruity between surgeons and pathologists when perforation, abscess or gangrene of the appendix was noted ($n = 235$). When inflammation was the sole recorded finding 8·3% of cases (37/445) were histologically normal. This false positive value was 46·6% (26/57) when surgeons used vague terms describing inflammation such as catarrhal inflammation or congestion. 33·1% (47/139) of appendixes perceived as normal by surgeons demonstrated histological signs of inflammation. The choice of operative approach (laparoscopic/open) or seniority of operating surgeon had no effect on the correlation between surgical and pathological findings. Of 16 neoplastic lesions only 3 were identified at the time of surgery. 2 were incidental findings at elective surgery the remainder presented as acute appendicitis. A mass was palpable in the caecum of the third case.
Conclusion: The ability of surgeons to correctly diagnose a normal or mildly inflamed appendix is poor. The ability to detect features of neoplastic lesions is also poor. Thus at laparoscopy to investigate acute abdominal pain, in the absence of other identifiable pathology, a macroscopically normal appendix should be removed. Histological assessment must be performed on all appendicectomy specimens. Follow up is not routine for the majority of appendicectomy patients. Thus surgeons must be vigilant when reviewing histology reports to identify all patients with neoplastic lesions of the appendix.

Emergency surgery 0572

Dedicated consultant care over a week significantly shortens the length of stay following emergency surgical admission

N. Manimaran, D. R. McArthur, A. Sverisdottir, J. Eccersley
Queen's Hospital, Burton-Upon-Trent

Background: Emergency surgical practice is continuously challenged by CEPOD recommendations, European directives and changes to surgical training. Combining elective activity with a day on call may not permit appropriate focus on emergencies. We aimed to test whether a week of dedicated on call at consultant level without routine commitments, improved the patient care as measured by a reduction in the length of stay at the hospital.
Methods: We changed over from traditional on call surgeon of the day to single consultant on call for a full week, in late 2005. Prospectively collected data in relation to length of stay, time to surgery and mortality, maintained in the hospital computer system between 2004 and late 2006 was analysed. All patients aged over three, admitted to our surgical admissions unit (SAU) for at least one night were included in our study.
Results: Prior to the introduction of the week of on call surgical take, mean duration of hospital stay for patients admitted to SAU between January and September 2005 was 4·54 days. This has reduced to 3·74 days ($P = 0·03$ Mann Whitney U test) between January and September 2006 when consultants were on call for whole week, without affecting mortality. This reduction is temporally related to change in the consultant on call rota, since other aspects of patient care remain unchanged. Further there had been no such significant reduction in length of stay during the two years prior to the rota change.
Conclusion: Change in the consultant on call rota to a dedicated week of on call without routine commitments, provides excellent continuity of care for patients and reduce their length of stay at hospital.

Emergency surgery 0660

Conservative management of pneumoperitoneum secondary to complicated sigmoid diverticulitis: A prospective observational study

S. Shaikh[1], Z. H. Krukowski[2], T. O'Kelly[1]
[1]Aberdeen Royal Infirmary, Aberdeen, [2]University of Aberdeen, Aberdeen

Background: Pneumoperitoneum secondary to complicated diverticulitis is conventionally regarded as an absolute indication for emergency laparotomy. However there is increasing acceptance of a policy based on active observation with surgery reserved for failure of conservative management and early operation may not be necessary in patients with pneumoperitoneum. This study describes experience of a conservative approach in this setting.
Methods: Information on patients with radiological evidence of pneumoperitoneum secondary to complicated diverticulitis presenting between 1991 to 2006 was extracted from a prospective database and follow-up data obtained for all subsequent admissions.
Results: Twenty-eight patients (14-M, 14-F; median age-72) were identified. The diagnosis of pneumoperitoneum was based on radiological evidence of free gas under the diaphragm of an erect chest film or on cross sectional imaging. The diagnosis of complicated diverticulitis was confirmed in 26 cases by either contrast enemata or cross-sectional imaging and in 2 cases at autopsy. Initial management was by resuscitation, intravenous antibiotics, active observation and serial assessment; except in two aged patients in whom an active decision was taken to limit treatment and not operate. Thirteen (46 per cent) patients required operative intervention (8 Hartmann's; 5 resection and primary anastomosis) during the index admission (median hospital stay-18 days; range: 3–46 days). The remaining 13 patients did not require an operation during the index admission (median hospital stay-14 days; range: 5–31 days). Of these 8 (62 per cent) have not undergone subsequent surgery; 4 (31 per cent) had an elective sigmoid resection with primary anastomosis and one (8 per cent) had a subsequent emergency sigmoid resection with primary anastomosis. There was one (8 per cent post-operative death and no leaks in the 10 anastomoses. There were no deaths in the 13 patients managed conservatively.
Conclusion: In this series of pneumoperitoneum associated with complicated diverticulitis laparotomy was required in 50 per cent of patients during the index admission. The majority (62 per cent) of patients discharged without an operation at index admission did not require subsequent resection. The low mortality observed suggests that pneumoperitoneum is not an absolute indication for urgent surgery.

Emergency surgery 0740

Predicting the mortality risk of emergency surgery in the elderly. Which score gives the best estimate of risk before operating?

T. E. Rix[1], S. Shankaranarayana[1], M. Hachem[2], T. Bates[1]
[1]William Harvey Hospital, Ashford [2]Eastbourne DGH, Eastbourne

Background: Risk scores help surgeons and patients assess the risks of surgery. Most, including the P-POSSUM score, rely on operative data and cannot be used before operating. This study aimed to compare a pre-operative estimate of the P-POSSUM score with other scoring systems' predictions of mortality in a cohort of elderly patients requiring emergency surgery.
Methods: Data were collected prospectively on patients aged 65 and over who needed an urgent or emergency surgical operation. For each patient a hypothetical P-POSSUM score (h-POSSUM) was created pre-operatively by predicting the operative elements from the provisional diagnosis and using the available radiological investigations. The sum of the risk predictions was used to predict the total number of deaths and compared with observed mortality, as well as with the real P-POSSUM score prediction (in patients receiving operations) and with 3 other systems – ASA, Surgical Risk Score (SRS) and Sickness Assessment (SA). The literature on ASA scoring in this setting was reviewed and the pooled data of 5 previous studies (1175 patients) was used to establish accurate mortality predictions for each ASA grade.
Results: Over 9 months, 139 elderly patients (57% female) required an urgent or emergency operation. 107 (77%) were judged fit to proceed while 32 were managed conservatively, of which 28 died. Operative mortality was 22·4% (24 patients). The mortality predictions of the 5 scoring-systems are shown in the table. h-POSSUM predictions closely matched P-POSSUM, but these were the least accurate scores. The prediction using the ASA score was precise, both for the patients receiving operations and those managed conservatively.

	Operated	Unfit
ASA	24	28
SRS	18	19
SA	19	17
h-POSSUM	11	9
P-POSSUM	12	—
Deaths	24	28

Conclusion: P-POSSUM scores can be accurately estimated before emergency surgery in the elderly, but underestimate the true mortality risk in these patients. ASA score predictions of mortality, based on patients in the same setting, gave precise predictions of mortality for both operated and unfit patients.

Emergency surgery 0797

Outcomes following colectomy for Clostridium difficile colitis

M. Kelly[1], S. Helme[2], S. Chan[3], M. J. Forshaw[3]
[1]Royal Sussex County Hospital, Brighton, [2]Queen Elizabeth the Queen Mother Hospital, Margate, [3]St Thomas's Hospital, London

Background: Clostridium difficile associated diarrhoea has become an important health problem in UK hospitals but surgical intervention is rarely required. There is little evidence regarding the best practice for patients requiring surgical intervention. The aim of this multicentre study was to review our experience in patients requiring surgery for Clostridium difficile colitis.
Methods: Patients who underwent surgery for Clostridium difficile colitis in three hospitals in Southeast England over a 6 year period (1 teaching hospital and two district general hospitals) were identified from histopathology databases. Data was collected regarding the presentation, indication for surgery and post operative outcomes.
Results: 8 patients (4 males; mean age = 68·5 years (range = 35 to 84 years)) underwent surgery. 50% of these patients contracted Clostridium difficile during their hospital admission for other medical reasons and 75% of patients were initially admitted under other medical specialities. Diagnosis was only made preoperatively in 4 patients (50%). Indications for surgery were peritonitis and systemic toxicity ($n = 6$), failure of medical management ($n = 1$) and unresolving large bowel dilatation ($n = 1$). 5 patients (62·5%) underwent total colectomy and the remainder underwent segmental resection. All patients were admitted to the intensive care unit post operatively with a mean stay of 4 days. 2 patients needed a second look laparotomy. Mortality rate was 62·5% ($n = 5$), with all patients dying within the 30 day postoperative period. The mean length of hospital stay of survivors was 18 days (range 17 to 21).
Conclusion: Surgical intervention for Clostridium difficile colitis remains uncommon. The outlook for patients requiring surgery is poor.

Emergency surgery 0944

Presenting features of E. Vermicularis in the vermiform appendix

M. Sodergren[1], S. Wilkinson[1], P. Jethwa[2], R. Kerwat[1]
[1]Queen Mary's Hospital, Sidcup, [2]Queen Elizabeth Hospital, Birmingham

Background: Enterobius Vermicularis infestation is known to present with symptoms resembling acute appendicitis, although current evidence suggests that in the majority of cases it does not cause inflammation of the appendix. We aim to characterize the presenting symptoms, signs and haematological profile of patients with pinworms in the vermiform appendix compared to patients with acute suppurative appendicitis.
Methods: Patients found to have pinworms present in the vermiform appendix on histology between 1998–2003 were retrospectively compared with an age-sex matched group who had histologically confirmed acute suppurative appendicitis from the same time period. Presenting features, vital signs and Alvarado scores were obtained from the patients' notes.
Results: 18 patients had pinworms on histology in the appendix. Median age was 10 (range 8–37) and there were 12 females and 6 males. Only 2 out of 18 appendices containing pinworms showed evidence of inflammation. Patients with pinworms had a significantly lower WCC than the control group (median 9·2 *versus* 16·05; $p = 0·012$) and they had a lower total Alvarado score (median 6 *versus* 7; $p = 0·016$). They were also more likely to have had recurrent episodes of RIF pain and previous presentations to hospital ($p = 0·0006$). Pulse rate, eosinophil differential and individual components of the Alvarado score were not significantly different between the two groups.
Conclusion: Enterobius infestation of the appendix can present in a similar way to acute suppurative appendicitis although in the majority of cases does not cause an inflammatory reaction in the appendix. It should be included in the differential diagnosis of patients, especially young girls, who present with signs and symptoms of acute appendicitis, or recurrent right iliac fossa pain, but do not have a significantly raised WCC, or a high Alvarado score. This group of patients should be investigated with early faecal sampling and night-time application of cellophane tape in the perianal area, and may benefit from empirical antiparasitic treatment.

Emergency surgery 1087

Abscess drainage-waiting time and its economic impact

M. Mulchandani, F. Alchami, O. Khan
Medway Maritime Hospital, Gillingham

Background: Abscess drainage is the commonest procedure seen in General Surgical Practice. In spite of this, other emergency procedures, take priority over it and increase the suffering of such patients. This study assessed the incidence of patients presenting with an abscess to a Surgical Unit, at a District General Hospital and the time delay to perform the procedure. The impact of this delay on the patients' health and anxiety and the economics of the hospital were also assessed.
Methods: A retrospective study over a 3 month period between 1/09/2005 to 30/11/2005 wherein all patients presenting with an abscess and those drained in surgical theatre were included in the study. The database was prepared to assess

the delay in the time of surgery, reason for the delay and consequence of the delay (use of antibiotics and rise in temperature).

Results: During this study period, 91 patients presented with an abscess to the Surgical Unit, of which 79 were drained in theatre. Most common forms were perianal (26%) followed by pilonidal (14%).

78% of these patients presented to hospital between noon and 1800 hours and 50% of the procedures were performed during dedicated emergency operating theatre session between 13·00 and 17·30 hours. Twenty nine patients waited > 24 hours while 4 patients waited longer than 48 hours for surgery. Mean stay of patients prior to surgery was 21 (2–54) hours.

52 of 79 patients stayed overnight in hospital and 16 of these patients developed complications while waiting for surgery.

Conclusion: Incision and drainage is a quick, simple procedure for treatment of abscess which is one of the commonest surgical emergencies Our audit shows that 36·7% of the patients had to wait more than 24 hours for this procedure and as high as 65·8% patients had to stay overnight. This delay increases the morbidity as well as affects the economy of the hospital.

Emergency surgery 1096

Is drainage of perianal abscess an SHO operation? A survey of surgical senior house officers in Wales

A. H. Farooq, M. K. Zia, G. Harinath, B. I. Rees
Universit Hospital of Wales, Cardiff

Background: Surgical trainees conventionally performed drainage of abscesses early on in their careers. However, due to implementation of the EWTD, there has been reduced overall training of the junior surgical trainees. Particularly, the operative experience is limited in the current shortened training system. We aimed to assess the senior house officer's perspective of the management of perianal abscess in Wales.

Methods: A formal questionnaire was used to assess trainee's confidence in the management of perianal sepsis including the operative experience. A telephonic interview was carried out to elicit responses of junior surgical trainees.

Results: A total of 63 BST SHOs were interviewed. Only 44% of SHOs felt confident to perform incision and drainage of perianal abscesses independently. Previous or current experience in colorectal firms had no influence on the trainee's overall confidence. The following table suggests better skills and confidence in management perianal sepsis with progressive seniority.

Training Year	Number (Total = 63)	SHOs who could differentiate between Perianal & Ischiorectal abscess	SHOs who could diagnose horseshoe abscess
1st	15	47%	20%
2nd	23	66%	21%
3rd	25	79%	44%

Conclusion: Although most 3rd year SHOs were able to diagnose perianal sepsis confidently, but lacked confidence to operate. Furthermore, a significant number of trainees were deficient in their operative skills for drainage of perianal abscess and diagnosis and management of ischiorectal and horseshoe abscesses. Our study suggests a need for more exposure to operative management of this common surgical emergency.

Emergency surgery 1105

Caution regarding electing to delay operation for acute appendicitis

D. Kearney, R. Cahill, W. Kirwan, H. P. Redmond
Cork University Hospital, Cork

Background: The timing of emergency surgery has been under scrutiny recently due to both nCEPOD recommendations and EWTD limitations. Some advocate that operations for appendicitis in adults should be scheduled primarily by physician and theatre list convenience.

Methods: Retrospective clinical audit of a six month period to determine how in-hospital waiting time for appendicectomy may impact on patient outcome. A&E journals, theatre log books and HIPE were interrogated to identify patients aged > 16 years admitted with and operated upon for histologically confirmed acute appendicitis. Demographics, observations and investigations on arrival were correlated with subsequent clinical care.

Results: 61 patients were identified with complete records being available for 55 (90%). Of this latter group, the mean age was 29·5 years (median 23 yrs) while 37 were male. The average duration of symptoms prior to presentation was 37·6 hours (median 24 hrs) with the mean in-hospital waiting time before operation being 21·3 hours (median 16·9 hrs). Patients subsequently found at operation to have gangrenous and/or perforated appendicitis had considerably delayed presentations and, more worryingly, longer in-hospital preoperative waits (*see table*). Neither symptom duration nor WCC on admission were significantly associated with in-hospital preoperative time. 38% of all operations for appendicitis (rising to 77% [14/18] in females) were commenced laparoscopically with the remainder being performed as open procedures.

	Prehospital symptom duration (hrs)	Heart rate (bpm)	Temp (°C)	WCC ($\times 10^9$/ml)	Time to OT (hrs)	Total hospital stay (days)
Suppurative	35	82	37·0	14·3	20	4
Gangrenous/ perforated	61	105	37·6	13·7	32	8

Values are means.

Conclusion: Time from symptom onset to operation is associated with more advanced degree of appendicitis and increased hospital stay. Advice to delay operation for convenience may further compromise the care of this already under-prioritised patient cohort.

Emergency surgery 1129

The epidemiology of emergency general surgery is mismatched with surgical expertise

M. Jefferies, J. P. Gilmour, J. K. Pye
Maelor Hospital, Wrexham

Background: Sub-specialisation for elective general surgery is well established however emergency general surgery does not present itself in a sub-specialised fashion.

We sought to demonstrate that the range of expertise employed in elective general surgery by individual consultant general surgeons is drifting further away from the expertise required to manage presenting general surgical emergencies.

Methods: An analysis was made of all general surgical admissions and operations performed in a district general hospital in two one year periods, ten years apart (1995 and 2005). Data was obtained retrospectively from computerised records. All operations were categorised as elective or emergency and by sub-speciality. Individual consultant operating/supervision profiles were generated for comparison.

Results: There were 2412 elective general surgery operations in 1995 and 2525 in 2005. There were 585 emergency general surgery operations in 1995 and 681 in 2005. The overall type and range of both elective and emergency general surgery problems changed very little. A key measure of the diversity (or lack thereof) of a consultant operating profile is obtained by calculating the percentage of operations in the predominant sub-speciality. The higher the percentage, the less diverse the operating profile. Average scores for the consultants were as follows: 26·6% in 1995 rising to 51·7% in 2005 for elective general surgery; 19·8% changing to 17·9% in 2005 for emergency general surgery.

Conclusion: Individual consultant elective operating profiles have changed over a ten year period but the emergency operating profiles remain unchanged. This highlights the importance of maintaining general surgical skills for those surgeons on call for unselected emergency admissions.

Emergency surgery 1187

Rockall score for selection of patients with upper gastrointestinal bleeding for emergency endoscopy in a district general hospital setting

B. Michael, S. Chaudhri
North Cheshire NHS Hospitals NHS Trust, Warrington

Background: Upper gastrointestinal (UGI) bleeding is a common cause for emergency admission often requiring emergency endoscopy. In a District General Hospital (DGH) setting, emergency endoscopy is often undertaken in the operating theatre. The Rockall scoring system can be used to identify patients with an UGI bleed who are at most risk of re-bleeding and death and also most likely to benefit from intervention. We studied its use as an assessment tool to select patients for emergency endoscopy.
Methods: A retrospective audit of the 50 consecutive emergency UGI endoscopies undertaken within 24 hours of admission to hospital for an UGI bleed. All case notes were studied including endoscopy findings and the Rockall score determined.

Results: Of the 50 patients (31 Male : 19 Female, mean age 61; range 20–89 years), significant pathology was identified in 13 (26%) and 3/50 (6%) patients required therapeutic endoscopy. The Rockall Scoring stratified 12 (24%) patients as 'High', 23 (46%) 'Medium' and 15 (30%) 'Low Risk'. The incidence of pathology within the Rockall groups was as below:

Findings	High risk	Medium risk	Low risk
No abnormality	0%	17%	47%
Varices	25%	4%	0%
Peptic ulcer	33%	17%	7%

All patients requiring therapeutic endoscopy were in the high risk group.
Conclusion: The Rockall score can be used to select patients for emergency endoscopy undertaken within the operating theatre and thereby reduce the incidence of negative UGI endoscopies and improve utilisation of the emergency surgical theatre resources. Patients at 'Low Risk' can be deferred to the next available endoscopy list.

General – First Class Service

General – First Class Service 0052

The enhanced recovery programme in a dgh setting: our initial experience

K. F. Gomez, J. Johnston, M. E. Foster
Royal Glamorgan Hospital, Llantrisant

Background: Multimodal rehabilitation of elective colonic resection patients reduces hospital stay and return of normal gut function without risking patient safety. The aim of this audit was to assess the feasibility, success and safety of the enhanced recovery programme (ERP) introduced at a District General Hospital (DGH) in November 2005.
Methods: The medical records of 20 patients who had elective colonic resections before November were retrospectively reviewed, forming a control group. They received conventional postoperative care. Data on 32 consecutive patients in the enhanced recovery programme were collected prospectively and reviewed. The primary outcome measure was length of stay. Data was also collected on adherence to ERP, return of normal gut function and complications.
Results: Mean overall hospital stay was reduced from 13·4 days to 7·9 days. Complete adherence to the ERP programme reduced hospital stay to only 4·8 days. Mean time for return of gut function was reduced from 6·6 to 2·8 days. There was no significant difference in anastomotic leak and surgical complication rates. No patients were readmitted after discharge from hospital.
Conclusion: ERP is achievable in a DGH setting. This has resulted in reduced length of hospital stay and time for normal gut function to return without increasing surgical complications.

General – First Class Service 0104

Out of hours vascular surgery

P. K. Jha, M. P. Armon
Norfolk and Norwich University Hospital, Norwich

Background: To assess the impact of New Vascular surgery on call rota on the amount of consultant surgeon presence in theatres from 8 pm onwards on weekdays and all weekends. To assess the impact of a separate Vascular surgery on call rota on the SpR emergency Vascular surgery case mix.
Methods: Data was extracted from the theatre computer records (ORSOS) on all operations commencing after 8 pm during the week and at any time during the weekend. Details of the operating surgeon, 1st and 2nd assistants and procedure were recorded. Two 12 month time periods were assessed: 1st February 2002–31st January 2003 and 1st February 2005–31st January 2006. Comparison was made with other specialities during the same time interval.
Results:

Table 1 No. of cases

	2002–2003		2005–2006	
	Consultant present	Trainee with no consultant	Consultant present	Trainee with no consultant
Vascular	47 (58%)	34 (42%)	87 (70%)	37 (30%)
General	88 (13%)	577 (87%)	113 (18%)	501 (82%)
Total	135	611	200	538
	746		738	

Table 2 Vascular procedure mix

	2002–2003			2005–2006		
	Consultant	Trainee	Trainee supervised	Consultant	Trainee	Trainee supervised
Arterial	34	7	1	46	2	1
Embolectomy	2	8	0	13	4	0
Amputation	6	17	0	11	8	0
Other	3	3	0	15	14	2
Total	45	35	1	85	28	3

Vascular surgeons spent twice as much time operating out of hours than any other specialty (vascular 21 : 45 hrs, general surgeons 10 : 02 hours, orthopaedics 6 : 12 hrs).
Conclusion: The introduction of a separate vascular/general rotas has led to an increase in out of hours vascular operating, the bulk of which is done by vascular consultants.

General – First Class Service 0108

Prospective validation study of an algorithm for triage to MRCP or ERCP for investigation of suspected pancreatico-biliary disease

C. N. Parnaby[1], J. T. Jenkins[2], J. C. Ferguson[1], B. W. A. Williamson[2]
[1]Southern General Hospital, Glasgow, [2]Royal Alexandra Hospital, Paisley

Background: In patients with suspected pancreatico-biliary disease, endoscopic retrograde cholangiopancreatography (ERCP) should be reserved for those requiring therapeutic intervention, however, difficulty arises in identifying patients likely to require therapy. An algorithm has been developed by the authors based upon prospective assessment of ERCP patients for triage of patients to magnetic resonance cholangiopancreatography (MRCP) or ERCP with suspected pancreatico-biliary disease. We aimed to validate this algorithm in an independent group of patients using a different group of endoscopists blinded to the algorithm.
Methods: Patients were stratified into different categories by clinical, ultrasound and liver function test findings. The algorithm stratified patients by the likelihood of therapeutic intervention. The accuracy of the algorithm for a therapeutic outcome was assessed by Receiver Operator Characteristics (ROC) Curve analysis.
Results: 126 consecutive patients (Oct 2005 – July 2006) were prospectively assessed by MRCP or ERCP according to the algorithm, and the outcomes recorded. 57 patients were triaged to MRCP and 63 patients were triaged to ERCP. A category was not assessable in 6 patients. Three patients from the MRCP group required subsequent therapeutic ERCP. Diagnostic ERCP was performed in 4 patients in the ERCP group. ERCP related complications occurred in 4 patients. The algorithm performed well in predicting the requirement for intervention as determined by the area under the ROC curve [0·84 (95% CI 0·76–0·92)].
Conclusion: Our study confirms that an algorithm-based approach can reproducibly predict those patients requiring therapeutic biliary intervention and may increase the efficiency of investigation for patients with suspected pancreaticobiliary disease.

General – First Class Service 0145

Healing by primary *versus* secondary intention after surgery for pilonidal sinus: a Cochrane systematic review

I. J. D. McCallum[1], J. Bruce[2], P. M. King[1]
[1]Aberdeen Royal Infirmary, Aberdeen, [2]University of Aberdeen, Aberdeen

Background: The aim of this Cochrane systematic review is to determine the relative effects of open *versus* closed surgical treatment for pilonidal sinus on the outcomes of time to healing, infection and recurrence rate.
Methods: We sought relevant trials from the Cochrane Register of Controlled Trials, Cochrane Wounds Group Specialised Trials Register, MEDLINE, EMBASE and CINAHL to July 2006. All RCTs evaluating open *versus* closed surgical treatment for pilonidal sinus were eligible. Studies of pilonidal abscess and of children aged < 14 years were excluded. Screening of eligible studies, data extraction and assessment of methodological quality of trials was conducted independently by two reviewers. Statistical analysis was conducted using Cochrane RevMan meta-analysis software.
Results: 18 trials were eligible for inclusion: 12 RCTs compared open healing *versus* primary closure, 11 of which compared midline closure and 1 trial used closed off-midline. A further 6 studies compared midline and off-midline closure. Many variations in surgical treatment were identified. Open *versus* closed techniques: time to wound healing was significantly shorter after wound closure ($p < 0{\cdot}001$); there were no differences in rates of SSI; recurrence was less likely to occur after open healing (OR 0·34; 95% CI 0·2, 0·6). There was little useable data on time to return to work, cost, patient satisfaction and pain. Closed midline *versus* closed off-midline: there was strong evidence of quicker healing, lower rates of SSI and lower rates of recurrence after off-midline primary closure compared to midline closure techniques.
Conclusion: There was no evidence of a clear benefit for surgical management by primary closure or open healing by secondary intention. A clear benefit was shown for off-midline closure rather than midline closure after pilonidal sinus surgery. Off-midline closure should be the standard management of when primary closure is the desired surgical option.

General – First Class Service 0219

Intraperitoneal tension-free repair of small midline ventral abdominal wall hernias with a Ventralex hernia patch: initial experience in 61 patients

H. I. A. Hadi, A. Maw
Glan Clwyd Hospital, Bodelwyddan

Background: Midline ventral hernias are common. Tension-free mesh repair of ventral hernias is becoming popular due to the high recurrence rate with conventional techniques. Different types of meshes have been tried. We have used an open intraperitotoneal techniques using the Bard® Ventralex™ Hernia Patch in small midline ventral hernias. It is a self-expanding bi-layer prosthesis made of an outer Polypropylene monofilament mesh and inner ePTFE sheet. This ePTFE surface can be applied safely against the bowel. The aim was to assess the initial outcome of small midline ventral hernia repair using the intraperitoneal Ventralex hernia patch.
Methods: 61 patients had Ventralex repair in the period of October 2003 to November 2006. There were 39 males and 22 females with a median age of 53·5 (range 18–82). 29 patients were obese (BMI $\geq$ 30 g/m^2). Operative times, analgesic used, hospital stay and postoperative complications were recorded prospectively.
Results: The mean operative time was 30 min (range 10–68). 48 patients out of 61 were discharged as a day case. 42 patients required mild/moderate analgesics (Paracetamol/Dihydrocodine/Cocodamol) and only 7 patients required strong analgesics (Morphine sulphate). 12 patients required no analgesics. There were one seroma, two minor wound infections and one recurrence.
Conclusion: Intraperitoneal tension-free repair of small midline ventral abdominal wall hernias using Ventralex hernia patch is safe and simple. Our early experience suggests it can be performed with minimal postoperative complications, less postoperative analgesic and as a day case procedure.

General – First Class Service 0228

How much does hospital staff know about Clostridium Difficile?

S. Aroori, N. Blencowe, S. Chinti, R. Fallaize, G. Pye, R. West
Weston General Hospital, Weston Super Mare

Background: Hospital acquired *Clostridium difficile* infection (CDI) is associated with high morbidity and mortality. Adequate knowledge about CDI is essential to prevent transmission of infection and subsequent sequelae. The aim was to determine the depth of knowledge of hospital staff regarding CDI.
Methods: We conducted a questionnaire survey to determine the current awareness of CDI amongst 85 staff across our hospital: 47 doctors (12 consultants, 35 trainees) and 38 nurses. Questions covered 4 main areas: antibiotics frequently cited to cause CDI; first and second-line treatment of CDI; CDI-associated complications; control measures used to limit outbreaks of CDI.
Results: 17% of trainees and 49% of nurses had some knowledge of Trust CDI policy. Only 51% of trainees, 33% of Consultants and 13% of nurses were aware of the range of antibiotics frequently cited to cause CDI. Compared to 77% of trainees, only 17% of consultants and 19% of nurses correctly stated that a change to oral vancomycin is the second line treatment for persistent symptomatic CDI. Only 34% of trainees, 25% of consultants and 5% of nurses identified that antibiotic restriction was the single most control measure to reduce symptomatic disease due to CDI. Only 60% of trainees, 25% consultants, and 30% of nurses identified that hand washing with soap and water is the single most effective way of preventing transmission of C.difficile infection.
Conclusion: There is a significant lack of knowledge concerning CDI amongst hospital staff, in particular consultants and nurses. Until hospitals take adequate measures to educate their staff, the rate of CDI will continue to rise.

General – First Class Service 0280

Rectal Irrigation (RI) is a boon for chronic constipation – A prospective review

N. Srinivasaiah, J. Marshall, A. Gardiner, S. Maslekar, G. Duthie
Academic Surgical Unit, Castle Hill Hospital, Cottingham

Background: RI is used in faecal incontinence to relieve symptoms & improve quality of life. Literature on its role in constipation is limited. We aim to evaluate the causes for referral, efficacy & acceptability of RI using health outcome measures and assess effect on constipation.
Methods: Review of prospective database of RI between 2002 & 2005. Symptom quantification using general standardized questionnaire (GSQ) determined efficacy. SF-36 & FIQL determined acceptability.
Results: 175 patients' data is used. 111(63%) patients found RI useful & 64(37%) unhelpful. The median follow up is 20 months. 79 of 175 patients were referred for constipation. 39 (49%) had success with RI. The success/failure rate is significantly different for patients with constipation *versus* other diagnosis (Chi Sq = 12·28, $p = 0{\cdot}000$). Comparison of patients presenting with constipation between the successful cases and failed cases showed no gender or age difference. For the patients presenting with constipation who had successful RI, 56% said that they were 'doing well' or 'good improvement' using RI, 26% said there had been a 'dramatic improvement' whilst 17% said there had been 'limited' improvement using RI. Up to one third of the patients had RI once a day. GSQ, SF 36 and FIQL were analyzed pre & post RI for the whole group. Analysis is done only on successful cases. GSQ: showed significant improvement in symptoms of straining, incomplete emptying, wind & urinary leak on stress post RI (95% CI). Visual Analog Scales show reduction in the severity of the problem. SF36: 71 of 111 patients completed SF36 pre RI & 43 of these also completed it post RI. In the whole group the median value for Mental Component Score (MCS) increased from 43 to 55 and Physical Component Score (PCS) increased from 47 to 66. PCS is significant (p value of 0·03). In the group of patients with constipation the percentage increase in MCS & PCS is 20% and 33% respectively post RI. FIQL: slight improvement in QOL is measured post RI but statistically insignificant.

Conclusion: Constipation accounted for nearly half of referrals. RI was successful in nearly half of the referred population. SF-36 demonstrates a significant improvement in the PCS. Generally speaking, RI offers symptomatic improvement & most patients find it acceptable.

General – First Class Service 0269

Intravenous cannulation in patients: Room for improvement?

A. T. George, P. Turner, D. Defriend
Torbay General Hospital, Torquay, Devon

Background: More than 90% of all patients admitted to hospital will have a peripheral cannula inserted. Complications associated with this procedure include extravasation, thrombosis and infection. The latter represents one of the most common preventable causes of MRSA bacteraemia.
Methods: To investigate both compliance with national guidelines on cannula insertion and care, as well as complications associated with use, 130 randomly selected medical/surgical patients with a peripheral venous cannula *in situ* were monitored daily for 8 days or until removal of the cannula. A non-interventional study was undertaken by gathering information on all aspects of care including site, size, use and indications, level of documentation, status of dressings, infection/thrombosis risk using the VIPS (Visual Infusion Phlebitis Score) as well as cannula changes.
Results: Analysis demonstrated poor compliance with choice of non-dominant hand, cannula size, continuing indications for use. 95% of cannulae had no documentation regarding its insertion, removal or changes. Compliance of cannulae maintaince was poor with most of the cannula dressings becoming contaminated with blood and fluid or the cannulae being inappropriately secured with non-sterile adhesive tape and bandage dressings. A non-compliance with best practice for cannulae removal was seen even when the VIPS score was 2 or more with a significant group being left in with a score of 3-indicating active thrombophlebitis. Frank pus was seen on 2 dressings-in spite of which it was still being used. 22% of the inserted cannulae were never used. Most cannulae were left *in situ* for 48 or more hours after its use had stopped with a significant minority being left in for more than 120 hours.
Conclusion: This study shows that though protocols and national guidelines exist for use, maintenance and removal of peripheral cannulae, they may be overlooked and tend not to be followed. As a result, the potential for serious consequences such as nosocomial MRSA bacteraemia remain. The lack of documentation is also concerning, given that there is a legal requirement to do so. An improvement in peripheral cannula use, care and documentation is essential to ensure best clinical practice and reduce complications in vulnerable patients.

General – First Class Service 0323

Impact of a full time colonoscopist – a 16 month review

A. Kumar, S.L. Grainger
Barking, Havering & Redbridge Hospitals NHS Trust

Background: To deal with the ever-increasing deadlines for colonoscopy, a Staff surgeon fully trained in endoscopy was appointed as a full time endoscopist. We review the impact of this novel idea.
Methods: A new post of an Associate Specialist in Endoscopy was created in this Trust in August 2005. The appointee was a Staff surgeon, who had received formal structured training in endoscopy including therapeutic colonoscopy. The endoscopy work commitment was across two hospitals within the Trust, comprising six sessions per week. Apart from one fixed list, the other five were lists to cover the absence of consultants. Prospectively collected data (Microsoft Access database) over the first 16-month period beginning from August 2005 was reviewed.
Results: 1201 colonoscopies were done during this 16 month period across two hospitals within the Trust. In addition, this endoscopist also performed 671 gastrostopies and 200 flexible sigmoidoscopies.

Table 1

Number of colonoscopies	1201
Complete colonoscopies	1111 (93%)
Adjusted Completion rate (allowing for stricture/faeces)	1154 (96%)
Tumour	61 (5%)
Polypectomy	239 (20%)
No of list undertaken to cover absent Endoscopists	288 (4·23/week)

There were no significant complications i.e. no perforations, no bleeding.
Conclusion: A full time colonoscopist for the Trust has meant: (1) a significant increase in the capacity – 900 additional colonoscopies per year, which has facilitated dealing promptly with 2 week pathway patients; (2) absent 'endoscopist's lists' were covered (4·23 lists/week). In the era of bowel cancer screening, creation of full time colonoscopists, unimpeded by on-call demands, can provide the solution to providing A First Class colonoscopy service.

General – First Class Service 0330

Bariatric surgery reverses risk factor for cardiac arrhythmia and sudden cardiac death

I. Alam, M. J. Lewis, K. E. Lewis, J. W. Stephens, S. Hilldrup, A. M. Fielding, J. N. Baxter
Department of Surgery, Morriston Hospital, Swansea

Background: Morbid obesity is associated with significant cardiac morbidity and mortality. We hypothesised that bariatric surgery influences cardiac morbidity via autonomic nervous system (ANS) modulation. Heart rate variability (HRV) describes ANS-mediated changes in heart rate; QT variability index (QTVI) measures relative ANS influence on atrial and ventricular myocardium. Increased QTVI and abnormal HRV are risk factors for ventricular arrhythmia, sudden death and cardiac pathology respectively. We quantified HRV and QTVI before and after bariatric surgery.
Methods: Ten morbidly obese subjects (8 female) mean age 47·8 (± 8·2) years; underwent weight-reduction surgery (5 biliopancreatic diversion, 5 gastric banding). Holter ECG was recorded continuously for one hour (20 minutes each in lying, sitting, standing (ambulatory)). HRV, QTVI and Sample Entropy (SE) were quantified in 10-minute blocks to assess steady state conditions and influence of postural change. Paired t-tests compared parameters pre *versus* post-surgery (one-month and six months). There were no medication changes during the study.
Results: Surgery resulted in significantly reduced body mass index (Effect Size (d) = − 0·7 to −1·4; $p < 0·0001$), heart rate ($d = -0·8$–$1·1$; $p = 0·001$–$0·05$) and QTVI ($d = -0·7$ to 1·7; $p = 0·003$–$0·04$). Total HRV increased ($d = 0·9$–$1·2$; $p = 0·01$–$0·03$). SE was increased when supine post-surgery ($d = 0·8$; $p = 0·04$); long-term HRV increased during sitting and standing ($d = 1·2$–$1·5$; $p = 0·004$–$0·03$) and its responsiveness to postural change (sitting) was enhanced at 6-months ($d = 1·2$, $p = 0·016$). Magnitude and responsiveness of other parameters were unchanged.
Conclusion: Reduced heart rate and increased HRV following surgery indicated positive cardio-protective effects of bariatric surgery. Moreover there was a prompt and persistent reduction in QTVI post-surgery, suggesting a more electrically favourable ratio of ANS modulation of atrial/ventricular myocardium. QTVI, SE and HRV indices are sensitive discriminators of the beneficial cardiac effects of weight-reduction surgery.

General – First Class Service 0388

Suspicious thyroid cytology results - informing patients of malignancy risk

S. Heap, M. Stewart, P. Smith, M. Tomlinson
University Hospitals of Morecambe Bay NHS Trust, Lancaster

Background: To assess the results of thyroid fine needle aspiration (FNA) cytology in order to inform clinicians and patients of the quality and efficacy of this investigation.
Methods: A prospectively maintained pathology database was interrogated to obtain all cytology reports with thyroid codes based on the SOMMED protocol from January 2000 to June 2006 at a Teaching Hospital Trust. The reports were correlated with all end histology for those patients who had undergone surgical excision. Data was collected, entered and analysed using Excel Spreadsheet.
Results: A total of 504 FNAs were performed on 369 patients. Malignancy was diagnosed in 28 patients following FNA and confirmed histologically. However there were a total of 40 malignancies diagnosed on histological specimens and 4 of 28 patients diagnosed on cytology required more than 1 FNA. All Thy 5 reports were proven malignant histological and 3% of patients whose cytology had been reported as Thy 2 were subsequently found to have a malignancy. The suspicious rate for each FNA was 9·33% compared to a malignancy rate of 5·5%.

Positive Predictive Value Thy 5	100	False Negative Rate	30·3
Positive Predictive Value Thy 4	86	False Positive Rate	0
Positive Predictive Value Thy 3	27	Suspicious Rate	9·3
Negative Predictive Value Thy 2	97		

Conclusion: Suspicious thyroid cytology results have high positive predictive values and knowledge of individual unit results should aid informed discussion with patients regarding surgery. Whilst Thy 2 in this series had a high negative predictive value, a substantial false negative rate demonstrates that clinical assessment remains important in the management of nodular thyroid disease.

General – First Class Service 0403

A protocol for the early management of Acute Pancreatitis reduces admissions to critical care beds without increasing mortality

R. Saif, A. Burza, M. Runyowa, T. Symes, M. Cleanthis, V. Bhattacharya, R.J. Farrell
Queen Elizabeth Hospital, Gateshead

Background: Acute Pancreatitis (AP) is a common cause of admission, usually to non-specialist surgical units. AP is associated with significant mortality and use of resources such as critical care beds.
Methods: Patients admitted with AP from August 2001 to July 2002 were audited retrospectively. In 2003, a PANCREATITIS PROTOCOL was introduced, using: (i) automatic biochemical severity stratification, based on the Glasgow severity score, for all admissions with a diagnosis of AP; (ii) close monitoring of physiological parameters and clinical scoring using the Modified Early Warning System (MEWS) chart, with written instructions to be followed for specific MEWS scores and (iii) early discussion of patients with elevated Glasgow or MEWS scores with the critical care team. A prospective audit of AP was performed from August 2003 to December 2004. Finally, admissions with AP from January 2005 to June 2006 were audited retrospectively.
Results: The impact of the PANCREATITIS PROTOCOL is summarised in the table below:

Audit period	2001–2	2003–4	2005–6
PANCREATITIS PROTOCOL	NO	YES	YES
Total admissions	105	147	229
Critical care admissions	31	20	30
(admission rate %)	*(29·5)*	*(13·6)*	*(13·1)*
Deaths	6	7	11
(mortality %)	*(5·7)*	*(4·8)*	*(4·8)*

Conclusion: The PANCREATITIS PROTOCOL resulted in significantly less ($p < 0·001$) admissions to critical care beds without an increase in mortality. It is cost-effective, safe, and simple. It does not require major investment, training or introduction of new technology.

General – First Class Service 0421

The role of systemic warming of surgical patients during the initial hospital phase

K. S. Satheesan, D. Whetter, A. Melling, E. A. Baker, D. C. G. Emerton, D. J Leaper
Professorial Unit of Surgery, University Hosptial of North Tees, Stockton-on-Tees

Background: The physiological effects of perioperative hypothermia cause significant morbidity and mortality. The aim of this clinical trial is to investigate the role of systemic warming of surgical patients during the initial hospital phase.
Methods: Adult patients presenting to an accident and emergency department with abdominal pain, as elderly fallers or suspected fractured hip were randomised to either intervention group (IG) or control group (CG) IG group was treated with systemic warming using a carbon polymer mattress/blanket warming system and CG received standard treatment only Core temperature, pain, anxiety and comfort scores were recorded pre and post warming using visual analogue scales (0–100) Morbidity and mortality were recorded by a blinded observer.
Results: 23 patients were randomised (12 IG, 11 CG). There was no difference in the core temperature, pain score, anxiety score and comfort score on arrival to A&E between IG and CG Pain and anxiety improved significantly in the IG during the 1st hour On departure core temperature, pain, anxiety and comfort all showed a significant difference between IG and CG (Mann-Whitney test) 60%(CG) and 73%(IG) were hypothermic on arrival 7%(CG) and none from IG were hypothermic on departure 44% of CG and none from IG were found to be hypothermic following ward transfer. There were 4 complications all from CG. There were no deaths.
Conclusion: These early results suggest that systemic warming of surgical patients during the initial hospital phase prevents hypothermia. It may also contribute towards greater clinical gains particularly the reduction of pain, anxiety, discomfort and infectious complications.

General – First Class Service 0425

Local anaesthetic inguinal hernia repair in obese patients

T. D. Reid, P. Sanjay, A. Woodward
Royal Glamorgan Hospital, Llantrisant

Background: The repair of inguinal hernias under local anaesthetic (LA) has obvious advantages for comorbid individuals, and high rates of patient satisfaction. However there is a perceived difficulty amongst many surgeons in performing LA repair in overweight and obese patients. This relates in part to concerns of exceeding the maximum safe doses of local anaesthetics. The aim of this study was to establish if inguinal hernia repair could be safely performed in overweight and obese patients.
Methods: All patients who underwent elective LA hernia repair under a single consultant surgeon were retrospectively studied. Each patient received the same LA mixture developed at our hospital specifically for hernia repair. The mixture

includes Lignocaine and Marcaine, both with adrenaline, made up to a 100 ml volume with saline for infiltration. Information on patient demographics, BMI, the surgical procedure, local anaesthetic dose and complications was collected by case note review, postal and telephone surveys.

Results: 124 patients who underwent LA hernia repair, in whom BMI was measured, were studied. Based on WHO classification there were 36 normal weight, 62 overweight (BMI $\geq$ 25) and 26 obese (BMI $\geq$ 30) patients. The BMI ranged from 20 to 38. The mean volume of LA mixture used was 58·7 ml, 61·0 ml and 62·6 ml in the 3 groups respectively, with no significant differences between these. High day case rates of 94%, 82% and 85% were achieved in the normal, overweight and obese groups respectively. Complications were limited to 3 haematomas (2 in normal weight group, 1 in overweight group) and 1 simple wound infection in each group.

Conclusion: This study demonstrates that local anaesthetic inguinal hernia repair in the obese is feasible and safe. Use of a large volume mixture of Lignocaine and Marcaine is recommended.

General – First Class Service 0428

Audit of thyroid cytology inadequacy rates – time for informed consent and a quality assurance programme?

S. Heap, M. Stewart, P. Smith, M. Tomlinson
University Hospitals of Morecambe Bay NHS Trust, Lancaster

Background: To determine current inadequacy rates for thyroid fine needle aspirations (FNAs) performed in a multi-site trust in order to assess current quality standards and aid informed consent of patients.

Methods: An audit of a prospective pathology database for all FNAs performed on thyroid nodules/mass between January 2000 and June 2006 at a Teaching Hospital Trust. All cytology reports were examined and the result and the clinician performing the FNA were recorded. An aspirate was only regarded as adequate if at least six thyroid epithelial groups were present. The inadequacy rate was defined as the number of Thy 1 results (i.e inadequate) divided by the total number of FNAs performed. Doctors who performed fine needle aspiration more than 5 times were analysed using Microsoft Excel to determine their inadequacy rates.

Results: There were 504 FNAs performed on 369 patients by 34 clinicians during this 78 months study period. The number of FNAs performed by individual clinicians ranged from 1 to 123 aspirates. The overall inadequacy rate of thyroid FNA was 28%. For clinicians who performed less than 30 FNAs the average inadequacy rate was 27·3% individual rates varied from 9% to 56%). Five doctors performed more than 30 FNAs with a similar average inadequacy rate of 29·4% (range 22–38%). Various FNA techniques were used.

Conclusion: One in four thyroid FNA results are inadequate when performed by clinicians, and patients should be informed of this and the potential need for repeat FNA when consenting. Units should establish a quality assurance programme and only clinicians with known acceptable audited inadequacy rates should perform this investigation. A standardised technique and immediate cytopathological analysis of FNA quality has been reported to reduce inadequacy rates.

General – First Class Service 0511

Factors contributing to delays in operating start times

S. N. Andrews, G. Shingler, M. J. Cooper, S. Wajed
Department of Thoracic and Upper GI Surgery Royal Devon and Exeter Hospital, Exeter

Background: Prompt commencement of operating lists is vital to assume maximum productivity from the allocated resources. Delayed starts can have a profound effect on theatre efficiency and lead to unnecessary cancellation of cases. We examine factors which were attributed to late starts for individual theatres for routine morning elective lists.

Methods: Data was collected prospectively over a two month period for seven different theatres and operating lists. Identified were the '*send times*', '*time of arrival in theatre*', and '*actual anaesthetic start time*'. These values were then used to calculate the median relative theatre delay times (DT).

Results: Significant differences were observed between theatres and this was attributed to the policy relating to the admission status of the first patient on the list. Least delays (DT = 10 min) were observed for those lists with patients already admitted and anaesthetically assessed the night preceding surgery. Where these patients had not been seen by the anaesthetist, delay was increased (DT = 25 min). Patients admitted the day of surgery had the longest delay (DT = 30 min). No variation was observed per day of the week. Nominated start time of 0900 rather than 0830 significantly reduced delay (median 13 min *versus* 21 min)

Conclusion: Admission on the day of surgery reduces bed occupancy and is considered cost effective, however this may inadvertently cause delays, up to 30 min/theatre/day equating to a loss of over 100 hours of operating time per year with implications on revenue.

Institutional reorganisation to enable anaesthetic assessment prior to day of surgery may improve outcome, and currently it appears that efficiency is improved by a slightly later morning start.

General – First Class Service 0534

Pitfalls in endoscopic management and selective cholecystectomy in the elderly

M. O. Mamah, G. Offiah, I. Tunau, M. Mahdi, F. O. Cunningham, J. P. McGrath
Our Lady's Hospital, Navan, Ireland

Background: We aim to evaluate the management of symptomatic cholelithiais in patients over 75 years of age presenting to our institution.

Methods: We examined the presentation, treatment and outcome of surgical, endoscopic (ERCP) and non-operative treatments in patients over 75 years, through the period 2003–2005.

Results: We recorded 615 patient admissions with symptomatic cholelithiasis resulting in 407 cholecystectomies. Of these, fifty six patients were over 75 years and presented with cholecystitis (31%), biliary colic (34%), obstructive jaundice (31%) or gallstone pancreatitis (10%). Sixty per cent did not have surgery, with 63% of this group undergoing endoscopic therapy. Of those undergoing surgical management, 23% had an ERCP. There was no mortality in the operative group. The only morbidity was a subhepatic abscess. In the non-operative group there was one mortality in an 89 year old lady with cholangitis. There were however 11 readmissions with recurrent symptoms. This is reflected in a longer hospital stay in the non-operative group (14·6 v 9·89, $p = 0{\cdot}07$). We compared the ERCP findings in our surgical and non operative groups. Endosopic clearance of CBD stones was undertaken more frequently in that those undergoing subsequent surgical intervention, 64% v 34%. Biliary stents were more frequently deployed in the non operative group, 21% v 9%. 64% of the surgical group had a sphincterotomy compared with 41% of the non operative group. Eight patients had repeat ERCPs for choledocholithiasis, 75% being in the non operative group.

Conclusion: With judicious clinical assessment and decision making in elderly patients it is possible to selectively offer endoscopic and surgical intervention safely in this group. The morbidity associated with non-operative management requires further study. It is not insignificant with a third of this group representing and a significant proportion require repeated endoscopic interventions.

General – First Class Service 0602

Two-week rule referrals to colorectal surgeons: appropriate and effective?

M. S. Sajid, K. S. Jehle, M. Chauhan, M. K. Baig
Worthing Hospital, Worthing

Background: The two week rule (TWR) was implemented with national guidelines to identify high risk patients for urgent referral to secondary care. The aim of this study is to evaluate the effectiveness of this system to diagnose colorectal cancers and to determine the appropriateness of these referrals.

Methods: TWR referral letters to the colorectal surgeons over a 5-month period to January 2006 were examined and classed as appropriate if they complied with national evidence-based guidelines. Incomplete referrals were considered inappropriate. Referrals to other specialties were excluded. Colorectal cancers were identified from a separate database.
Results: 274 letters (89%) of 309 referrals were analysed. 17 referrals were excluded and 18 letters were missing. 151 letters (55%) were in accordance with guidelines for TWR referral. Among these, the common presenting symptoms were change in bowel habit (60%), rectal bleeding without anal symptoms (19%), palpable rectal mass (17%) and rectal bleeding associated with a change in bowel habit (13%). Reasons for inappropriate referrals included too short symptom duration or failure to state duration (44%), symptoms not associated with high risk for malignancy (26%), non-specific symptoms not included in referral guidelines (15%) and irrelevant findings on examination (9%). During the study period 21 malignancies (17 colorectal, 4 upper gastrointestinal) were diagnosed via the TWR system compared to 18 through routine referrals (61%) and emergency admissions (39%). 76% of referral letters via the TWR resulting in a diagnosis of cancer, were appropriate according to referral guidelines.
Conclusion: Referral guidelines are not appropriately used by general practitioners to identify high risk patients. Although many colorectal cancers are diagnosed outside the TWR system, adherence to referral guidelines identify patients with malignancy in 76% of patients.

General – First Class Service 0636

Impact of reconstruction with local flaps using oncoplastic techniques in breast conservation surgery on reduction in number of mastectomies in breast cancer patients

S. Shaikh[1], S. Heys[2], S. Chaturvedi[1]
[1]Aberdeen Royal Infirmary, Aberdeen [2]Aberdeen University, Aberdeen

Background: Mastectomy rate for the breast cancer differs institution to institution. On an average approximately 65 to 75% breast cancer patients end up with mastectomy. The aim of this study was to determine the impact of using oncoplastic local flaps techniques for breast conservation on mastectomy rate in breast cancer patients.
Methods: A surgeon with interest in oncoplastic breast surgery using local flaps to reconstruct and reshape breast joined Aberdeen Breast Unit in June 2001. Prior to this either breast conservation surgery or mastectomy was the norm. Breast reconstruction following mastectomy was done by either latissimus dorsi or TRAM flaps in conjunction with plastic surgeons. For last 4 years a substantial number of patients have been treated with wide local excision using oncoplastic techniques of Paranchymal Flaps, Wide Local excision with Mastopexy and symmetrisation. We looked at the mastectomy and breast conservation surgery rate from 2001 to 2005 and compared these with a similar period from 1997 to 2001.
Results: A total of 1073 breast cancers were treated by surgery for the period of June 1997 to May 2001 and 1077 for the period of June 2001 to May 2005. 756 mastectomies were carried out in the first period as compared to 511 in the second. The remaining patients were treated with breast conservation surgery. The drop in mastectomy rate was directly related to increase in breast conservation using local flaps. This was statistically analysed using SPSS version 10. The deference was statistically highly significant (chi-square = 0·001 at 25df). Patient satisfaction with conservation surgery was also significantly higher (using Quality of Life questionnaire).
Conclusion: Use of local flaps in breast conservation surgery significantly reduces mastectomy rate as more generous wide local excisions can be done with out the fear of disfigurement. Patients get more choice and over 4 years there has been no increase in recurrence rate.

General – First Class Service 0639

Minimally invasive parathyroid surgery using intra-operative PTH assays

O. Komolafe, A. McMinn, J. Doughty, C. Wilson
Department of Surgery, Western Infirmary, Glasgow

Background: The classical approach to parathyroid surgery involves bilateral neck dissection to identify all four glands, followed by removal of the macroscopically abnormal gland(s). A minimally invasive method was adopted in our unit with an emphasis on biochemical confirmation of removal of the source of excess parathyroid hormone (PTH).
Methods: All patients with primary hyperparathyroidism had pre-operative localisation of the abnormal gland by ultrasound and/or radio-isotope scan. In theatre, a 5 cm central collar incision was performed and the gland dissected. Venous blood samples were taken prior to, and after excision of the gland, and assayed for PTH. A 50% fall in the PTH value was accepted as demonstrating that the hyperactive gland was excised. All patients were seen at 3 months post-op.
Results: A total of 54 (34 female) patients were treated over a four year period. Localisation was possible in 48 (88·9%) of these patients. PTH fell by a median of 82% (mean 80%). Adjusted serum calcium (mmol/l) fell from a median of 2·88 (mean 2·91) to 2·30 (mean 2·30) within 24 hours; and was 2·33 (mean 2·34) at 3 months. None of the patients have required re-operation.
Conclusion: All of the patients in our study had biochemical confirmation that the source of excess PTH was removed during the operation. Intra-operative PTH assays coupled with pre-operative localisation facilitates successful minimally invasive parathyroid surgery.

General – First Class Service 0693

The surgical emergency review clinic: its role in reducing acute surgical admissions

G. Tripuraneni, V. Ramsey, M. Ahmad, D. Bowley, S. Karandikar, C. Hendrickse
Heart of England NHS Foundation Trust, Birmingham

Background: In the modern health service, pressure on acute surgical beds is severe and optimal utilisation of beds is of vital importance. A surgical emergency review clinic (SERC) was instituted in an attempt to reduce acute surgical admissions. The aim of this study was to analyse whether this initiative has been a safe and effective addition to our care pathways.
Methods: A SERC was instituted in a large district hospital on four days of the week. This clinic was staffed by specialist surgical nurses and executive decisions were made by the duty surgical registrar. Dedicated ultrasound slots were available on each SERC day. Data was collected prospectively on a dedicated proforma for consecutive patients asked to attend the SERC between June 2004 and July 2006. Demographic data, diagnosis and clinical outcomes were recorded.
Results: In a twenty-three month period, the total number of patients considered to require admission by the duty surgical registrars was 6939. Of these, 6365 were admitted and 574 (8·3%) patients were asked to attend the SERC the following day. 544 patients attended (5% DNA rate). Outcome data was unavailable on 28 patients leaving 516 patients whose outcome is known. Median age was 39 years (range 15–95 years), male : female ratio was 1 : 2. Of the 516, 57 (11%) were admitted from the SERC and 276/516 (53%) were discharged. 25/516 (5%) were booked for elective surgery and 158/516 (31%) had follow-up booked in outpatient clinic. Ultrasound was undertaken in 348/516 (63%). Common diagnoses included non-specific abdominal pain in 130/516 (25%), biliary colic in 98/516 (19%), abscess and postoperative wound complications in 32/516 (6%).
Conclusion: This study has demonstrated that institution of a SERC on four days of the week has allowed safe avoidance of admission in nearly ten per cent of patients assessed as requiring an acute surgical bed.

General – First Class Service 0713

The use of wireless video capsule endoscopy in the investigation of persistent iron deficiency anaemia

T. De Almeida, M. Aslam, U. Jaffer, A. V. Thillainayagam
Division of Surgery, Oncology, Reproductive Biology and Anaesthetics, Faculty of Medicine, Imperial College, London

Background: Persistent iron deficiency anaemia is mostly caused by gastrointestinal (GI) blood loss. In 10% of patients with persistent iron deficiency anaemia (IDA), a source of bleeding cannot be found using conventional upper and lower gastrointestinal endoscopy and the small bowel is not evaluated. Capsule endoscopy (CE) is a recently established, painless and minimally invasive technique for examining the entire small bowel. The aim of this study is to evaluate the ability of CE in finding a diagnosis for iron deficiency in such patients.
Methods: In the study period 2005–2006, patients were recruited from the GI clinic, who had presented with persistent IDA and negative findings from upper and lower GI endoscopy. The patients then underwent CE and the findings were recorded and evaluated.
Results: A total of 72 patients were investigated with CE ($n = 72$). There were 70 successful examinations and 2 failed procedures. CE found a cause for anaemia in 53 (75·7%) patients. The diagnoses included ulcers 23 (41·1%), angioectasia 16 (28·6%), tumours 11 (19·6%), inflammation 4 (7·1%), Crohn's disease 1 (1·8%) and small bowel diverticulae 1 (1·8%). The location of the findings in the GI tract was distributed as follows- 14 (26·4) diagnoses were found in the upper GI tract, 37 (69·8%) diagnoses found in the small bowel and 2 (3·8%) diagnoses were found in the colon.
Conclusion: CE has a high yield of diagnosis in this study and is thus very sensitive for causes of obscure GI bleeding. These findings are consistent with existing studies and add additional evidence to the argument that CE should be recommended as the first-line, routine investigation in patients with persistent IDA and negative endoscopy.

General – First Class Service 0726

Open incisional hernia repair with an onlay mesh – results of over 100 complex cases

A. Valliattu, K. Shahid, R. Hadden, C. Porter, A. Kingsnorth
Derriford Hospital, Plymouth Hospitals NHS Trust, Plymouth

Background: A recent national audit of methods of open incisional hernia repair indicated that surgeons are evenly divided between the use of the sublay and onlay techniques. In 2004, because of the ease of performance, applicability to all abdominal compartments and excellent results in our hands, we adopted exclusive use of the onlay method. After over 100 operations we have analysed our results. To assess the results of onlay incisional hernia repair performed by a single surgeon at a tertiary referral centre in a series of patients that is the second largest in the reported literature.
Methods: A prospective database was maintained and audited for patients who had their operation between 07/04 to 07/06: 110 patients received onlay repair during this period. We compared the important variables including co-morbidities, size of the defect, bowel injury, use of components separation, use of tissue sealant, postoperative complications, length of stay and quality of life (by standardised telephone questionnaire) between 2 years and 3 months after operation.
Results: Median age was 61·0 years, female : male ratio, 2 : 1. Median weight was 85 kgs and 40% had co-morbidities other than obesity, the most common being diabetes and CHD. Mean duration of hernia was 71 weeks; 20% had a previous repair and 5% had episodes of irreducibility and obstruction. Most common sites were midline and Pfannensteil incisions. Mean size of the defect was 20 × 8 cms and incidence of preoperative bowel injury was 2%; Ramirez components separation was used in 16%; tissue sealant was used in 20%. Mean duration of post operative stay was 5 days. Complications occurred in 16% the most common being seroma and one patient had partial wound dehiscence. The majority of patients had an improvement in their quality of life. At median 9 months follow-up there were two recurrences.
Conclusion: Onlay technique for incisional hernia repair with modern adjuncts of components separation and tissue sealant gives excellent results. A randomized study comparing the sublay and onlay techniques is required to inform a surgeon which is the appropriate technique in differing situations.

General – First Class Service 0764

Group and hold blood requests are no longer justified for routine cholecystectomy

M. Quinn, A. Li, R. Ravindran
Aberdeen Royal Infirmary, Aberdeen

Background: Cholecystectomy is a safe procedure with almost negligible need for blood products. Our aim was to obviate the need for routine group and hold practice for patients undergoing cholecystectomy.
Methods: Retrospective regional analysis of all cholecystectomy patients identified from pathology records between 1st January 1998 and the 14th February 2005 was undertaken. Data was entered into Excel 2000. Patients in whom cholecystectomy was not the primary operation were excluded.
Results: A total of 4652 patients were identified. Of these, 19 (0·4%) patients were excluded due to incomplete data and 171 (3·7%) patients were excluded as cholecystectomy was secondary to another procedure. Of the remaining 4462 patients, 2916 (65%) patients had a blood sample sent to BTS. The 2916 patients were subdivided into group and hold samples (2461/2916 = 84·4%) and cross-matched samples (455/2916 = 15·6%). 48 patients (48/4462 = 1·1%) required a blood transfusion. Sub analysis of the transfused group ($n = 48$) revealed: 27 (27/4462 = 0·6%) had a primary cholecystectomy (13 emergency/14 elective surgeries). Eight required a re-operation secondary to complications from laparoscopic cholecystectomy. Six received blood for unrelated pathologies. Seven received a transfusion with poor documentation of the reason. Of 27 patients undergoing primary cholecystectomy 3/6 laparoscopic and 15/21 open were transfused in theatre. Within this group 4/27 (14·8%) of patients were on anticoagulant therapy, 2/27 (7·4%) had obstructive jaundice, 2/27 (7·4%) were patients in ITU and 2/27 (7·4%) were ASA grade 3 or more. Intra operatively 9/27 (33·3%) were laparoscopic converted to open procedures, 6/27 (22·2%) sustained a solid organ injury and 2/27 (7·4%) sustained a significant vascular injury precipitating transfusion.
Conclusion: The need for routine group and hold is not justified. A more targeted approach will reduce the demand on BTS without detriment to those undergoing cholecystectomy. However, there is no substitute for adequate vigilance to bleeding as a complication to any surgical procedure.

General – First Class Service 0829

Conversion following laparoscopic cholecystectomy is more common after endoscopic sphincterotomy (ES)

G. David[1], S. Sareen[1], A. Al-Sarira[1], D. Corless[1], M. Deakin[2], J. Slavin[1]
[1]Leighton Hospital, Crewe [2]University Hospital of North Staffordshire, Stoke-on-Trent

Background: Conversion during laparoscopic cholecystectomy is though to be more common following ES as it becomes technically difficult to dissect a contracted and shrunken gall bladder.
Methods: Hospital Episode Statistics (HES) for the years 2003–2005 were obtained from The Department of Health and exported to an Access database for analysis. Patients who underwent ES for common bile duct (CBD) stones during the year 2003–04 served as our study population. These patients were then followed until April 2005 to identify any admission in which an elective laparoscopic cholecystectomy was undertaken. A diagnosis of CBD stone was identified by the ICD code – 10th revision and ES, laparoscopic cholecystectomy and laparoscopic converted to open cholecystectomy were identified based on the OPCS - 4 operative codes.
Results: Four thousand four hundred and forty two patients had an ES for CBD stones in England during the year 2003–04. One thousand three hundred and twenty six (29·9%) of them had an elective cholecystectomy at a later date. One thousand one hundred and forty five (86·3%) of these were attempted laparoscopically. The overall conversion rate was 10·46%. Conversion rate rose as the delay between ES and laparoscopic cholecystectomy increased. *Chi-square 11·382, 4df, $p = 0·02$.

Time delay	Laparoscopic cholecystectomy	Lap converted to open cholecystectomy	Conversion Rate*
0–3 months	517	52	9·1%
3–6 months	168	14	7·7%
6–9 months	181	22	10·8%
9–12 months	109	19	14·8%
> 12 months	47	12	20·3%

Conclusion: Conversion following laparoscopic cholecystectomy is more common in patients who have undergone ES for CBD stones and is more likely if there is a delay in surgery.

General – First Class Service 0842

BNP predicts one year survival following major non-cardiac surgery

C. Payne[1], S. Gibson[1], G. Bryce[1], C. Berry[2], H. Dargie[2], D. Byrne[1], D. Kingsmore[1]

[1]Gartnavel General Hospital, Glasgow, [2]Western Infirmary, Glasgow

Background: B-type natriuretic peptide (BNP) is an independent predictor of peri-operative cardiac events in patients undergoing major non-cardiac surgery. With an increasing range of surgical options now available, we wished to determine if 1 year survival after discharge from hospital was also predicted by BNP.
Methods: A prospective single centre observational cohort study of 189 patients undergoing major non-cardiac surgery between Jan 2004 and August 2005 was performed. All patients had standard pre-operative assessment, with an additional venous blood sample taken for serum BNP. Screening for cardiac events (non-fatal myocardial infarction and cardiac death) was performed (days 2, 5, 42) using clinical criteria, cardiac troponin and serial ECGs. Patients were followed-up for 1 year. Patients were stratified by a BNP of 100 pg/ml, and the survival of patients with BNP < 100 pg/ml (low BNP) was compared to those with ≥ 100 pg/ml (high BNP).
Results: Overall survival was 156/189 (82·5%) at 1 year, with 18 post-operative deaths (within 6 weeks) and 15 deaths at the subsequent follow-up period. 49 (25·9%) patients had a high BNP in whom peri-operative mortality was 4 times higher (22·4% *versus* 5·0%), and in whom the 1 year mortality rate was also significantly poorer (40·8% *versus* 9·3%). The mean BNP of patients who died in the year following discharge was significantly higher than those who survived (396·9 pg/ml *versus* 80·8 pg/ml).
Conclusion: BNP is higher in patients that do not survive the first post-operative year following major non-cardiac surgery. Furthermore, a serum BNP > 100 not only predicts a high peri-operative mortality, but confers a fourfold increase in the risk of not surviving the first post-operative year.

General – First Class Service 0921

Attitudes towards surveillance of colorectal polyps – a national survey

B. John, S. Irukulla, N. Dabbas, G. Pilgrim, J. Boorer, A. M. Abulafi

Mayday University Hospital, Croydon

Background: Polyps are the commonest incidental findings on colonoscopy. Guidelines for surveillance proposed by the BSG stratify risk based on the size and number of adenomas, with no mention of villous features or degree of dysplasia, nor of hyperplastic polyps. Numerous audits have shown that compliance with these guidelines is poor.
We surveyed colonoscopists around the UK to ascertain the criteria they used to guide surveillance.
Methods: 250 ACPGBI and 200 BSG randomly selected members were sent postal questionnaires that addressed management of both adenomas and hyperplastic polyps.
On analysis, practitioners who used number and size of adenomas alone as criteria to determine surveillance were deemed to have followed the guidelines.
Results: The response rate was 123/250 & 80/200 for ACPGBI and BSG members respectively. 5 BSG members were excluded as they were not practicing colonoscopists.
Overall 19/123 ACPGBI & 15/75 BSG ($p = 0{\cdot}41$) members followed guidelines. 130/198 practitioners used severe dysplasia as a criterion to guide surveillance.
Conclusion: Compliance with guidelines is poor due to lack of confidence. This is supported by the widespread use of severe dysplasia as a criterion for risk stratification in the recent American guidelines. Although most hyperplastic polyps need no further follow up, practitioners should be aware of the hyperplastic polyposis syndrome and the serrated sub-type, both of which are associated with an increased risk of malignancy. Changes to the guidelines and audit of individual practices are recommended.

General – First Class Service 0924

Twenty-three hour stay thyroid surgery – a first class service!

C. M. Borg, A. S. Kheraj, S. Udayshankar, M. A. Ayub, B. Guimicheva, T. A. Jeddy

Basildon and Thurrock University Hospital NHS Foundation Trust, Basildon

Background: Shorter hospital stays are beneficial for patients, clinicians as well as the primary care trusts. Traditionally, following thyroid surgery patients were observed as in-patients for up to 72 hours.
Methods: Between the 1st of January 2001 and the 31st of December 2005, all patients referred for elective thyroid operations were considered for 23-hour stay surgery. The pre, intra and post-operative care of the patients was standardised prior to commencing this study. Demographic patient data and information about their admission was collected prospectively. There were 277 procedures were carried out on 272 patients (mean age: 52 years, range: 14–83 years, 238 females and 34 men).
Results: Over these 5 years, 182 total thyroidectomies and 95 hemithyroidectomies were performed. The pathology was varied. One patient had a post-operative myocardial infarction and another had a pulmonary embolism. There were no other serious complications or deaths. 17 of the 182 patients who had total thyroidectomy had transient hypocalcaemia and 6 required treatment with intravenous calcium for this.
Conclusion: 23 hour thyroid surgery is a safe option for the patients and has obvious economic benefit for the NHS.

Criteria used to determine surveillance	No. of polyps	Size of adenomas	Histological type of adenoma	Mild dysplasia	Moderate dysplasia	Severe dysplasia	Might follow up hyperplastic polyps
ACPGBI members	110/123	116/123	85/123	8/123	19/123	85/123	13/123
BSG members	75/75	72/75	50/75	14/75	18/75	45/75	24/75
p value	0·036	0·287	0·721	0·08	0·13	0·19	< 0·0001

General – First Class Service 0972

The effectiveness of ultrasound in breast cancer follow up surveillance in conjunction with established protocol

S. N. Andrews, A. Cheeyandira, R. R. Davies, D. Ferguson, J. M. Dunn, M. J. Cooper
Department of Breast Surgery Royal Devon and Exeter Hospital, Exeter

Background: Our unit has offered mammography and ultrasound in conjunction with clinical assessment as part of standard breast cancer follow up protocol. The primary objective was to assess the value of ultrasound for follow up of breast cancer patients as an adjunct to mammography in detection of local/nodal recurrent disease. The secondary objective was to assess what follow up methods were most effective at detecting these different sites of breast cancer recurrence.
Methods: A retrospective analysis of all breast cancer recurrence was performed over an 8 year period. Site of recurrence was noted (local and/or nodal) the method of detection also recorded i.e. by patient, in follow up clinic or as a result of radiological investigation by either mammogram exclusively, ultrasound exclusively or both.
Results: During the 8 year study period 2580 patients were treated surgically and 116 recurrences detected (4·5%). From the 116 patients the total number of recurrences detected as a result of radiological invite was 43% ($n = 50$). Of those 22% ($n = 11$) were ultrasound detectable only. The primary method of detection was very different depending on site of recurrence. Intra mammary recurrence ($n = 38$) and nodal recurrence ($n = 42$) was primary detected radiologically in half of these cases. However skin/scar recurrence ($n = 36$) was predominantly found in follow up clinic.
Conclusion: Ultrasound does have value in radiological breast cancer follow up as an adjunct to mammography, being the primary and exclusive detection tool in 1/5 of radiologically detected cases overall. By offering ultrasound it has primarily detected 25% of nodal recurrence which otherwise would have lead to delayed diagnosis. We would recommend ultrasound in breast cancer follow up surveillance. Clinical follow up is effective at detecting nodal and skin/scar recurrence.

General – First Class Service 0978

Payment by results - a surgeon's perspective

M. Mulchandani, G. Singh, S. Ward, U. Shukla, W. Garrett, H. Wegstapel
Medway Maritime Hospital, Gillingham

Background: The introduction of "the payment by result" system into the NHS (National Health Services) has changed dramatically the way in which money flows within the NHS[1]. Under the new system health care providers will no longer be paid by block contracts, but by case mix-adjusted activity[1].
Surgical activity is a significant contributor to hospital practice. We wanted to calculate the income generated by a consultant colorectal surgeon in a district general hospital taking into account the tariff of various procedures as per Department of Health website.
Methods: This was a prospective study carried out over a period of three months from April-June 2006. It included all activities carried out by a General Surgeon Consultant. The activities carried out by Associate Specialist and Specialist nurse in his name were excluded.
The tariff of various activities was taken from Department of health website and various codes used were confirmed with the coding department of the hospital. Tariff rates were cross checked with finance department of the hospital.
Results: The activities covered and income generated was as follows:

Outpatient Clinics	£ 41,581
Endoscopy Sessions	£ 11,283
Day Surgery	£ 8,736
Main theatre sessions	£ 92,597
Emergency (operative)	£ 95,179
Emergency (non operative)	£ 72,403
TOTAL	£ 321,779

The income generated annually would be £1, 287, 116
Conclusion: Clinicians are the main income generators for a hospital. To maximise income potential, each hospital should ensure that consultants are well supported in administration, outpatient and theatre areas.

General – First Class Service 0979

The effectiveness and influence of Botulinum toxin A injection in the management of upper limb hyperhidrosis

J. D. Horsnell, F. Slim, L. Emerson, K. Poskitt
Cheltenham General Hospital, Cheltenham

Background: Symptoms of upper limb hyperhidrosis cause significant social disability. In 2002 botulinum toxin A injection was introduced locally for the treatment of upper limb hyperhidrosis increasing patient choice and options available. The aim of this study was to investigate the effectiveness of botulinum toxin A injection and its influence on the surgical management of upper limb hyperhidrosis.
Methods: Patients treated for primary upper limb hyperhidrosis with either botulinum toxin A injection or Transthoracic Endoscopic Sympathectomy (TES) were identified using a prospective database and retrospective case note review. All patients treated between 1997 and 2006 were included. Patients were followed up at 6 weeks. Repeat treatments of botulinum toxin A were available when symptoms recurred.
Results: 69 patients with a median age of 30 years (range 16–78) received treatment for upper limb hyperhidrosis. 18 patients underwent TES, 14 in the five years prior to 2002 and 4 in the five years since 2002. This change was significant $p < 0{\cdot}05$ (Mann-Whitney U test). All 18 patients reported an alleviation of symptoms. Complications included compensatory hyperhidrosis (44%) and 1 temporary Horner's syndrome.
Since its introduction in 2002, 51 patients have received botulinum toxin A injections. The total number of treatments was 150 ranging from 1–9 per individual. All 51 patients reported symptomatic improvement with a mean effectiveness of 90% in alleviating symptoms. 8% reported minimal compensatory hyperhidrosis. 90% of patients presented for further treatments within one year. The median time prior to requesting a second treatment was 6 (range 2–14) months. The time interval between subsequent injections remained consistent at 6 months.
Conclusion: The introduction of Botulinum Toxin A injections has significantly reduced the number of TES procedures performed. With repeated treatment Botulinum Toxin A continues to be a safe and effective option for upper limb hyperhidrosis.

General – First Class Service 1021

Incidence, prognosis and follow up of acute Acalculous Cholecystitis in outpatients. Results of a 10 year study

K. Kochar, E. P Whiteman, A. Palit, G. Mathew
George Eliot Hospital NHS Trust, Nuneaton

Background: Acute acalculous cholcystitis (AAC) traditionally tends to be associated with critical illness and tends to have a fulminant course. In recent

years there has been an increase in number of patients presenting with AAC without any predisposing factors. Our aim was to characterize these patients, assess prognosis and present the findings of long term follow up.

Methods: Patients diagnosed with cholecystitis at our hospital during a 10 year period (1996–2006) were identified using our clinical coding system. Ultrasound reports of all these patients were analysed for presence or absence of stones. The initial ultrasound scans were then reviewed by a radiologist for confirmation of diagnosis. The radiology reports, patient demographics, co-morbidity, surgical follow up notes and histology reports were analysed.

Results: Of the 45 patients identified by clinical coding system, 6 were excluded on review of USS. 35 (89%) of remaining 39 patients presented as outpatients without any history of acute illness or severe trauma. (M : F = 17 : 22, Average age at diagnosis = 55 ± 18 years, hypertension = 44%, diabetes = 2·5%). All patients were managed conservatively with no mortality. 4 (11%) patients developed AAC while hospitalised (M : F = 1 : 1, Av.age = 69·25 years). All patients underwent cholecystectomy with a mortality of 25%.

5 patients were lost to follow up. 30 patients had repeat imaging. 12 (40%) developed gallstones on follow up USS (median time = 2·5 ± 1·5 years). Out of 18 remaining patients, 11 underwent laparoscopic cholecystectomy for recurring symptoms. No stones were found on preoperative USS and histology. 7 patients had no recurrent symptoms and were discharged after a median follow up of 2·5 years.

Conclusion: AAC is seen more frequently in out patients rather than in acutely ill patient. They tend to have a better prognosis and can be managed conservatively. These patients have a high risk of subsequently developing gallstones.

General – First Class Service 1153

Telephone follow up clinics: a cost effective way of delivering colorectal services

F. Oscin, L. Foley, J. Hewitt, S. Chaudhri, B. Taylor
North Cheshire Hospitals NHS Trust, Warrington

Background: Recent media focus on financial deficits in the health service have encouraged a debate on cost effective delivery of hospital services and the need for reorganisation with emphasis on efficiency whilst continuing to maintain a high standard of healthcare. Following the introduction of nurse-led telephone follow up clinic, we assessed its impact on patient care, practicality and cost effectiveness.

Methods: Data was collected between 1 Jan 2004 and Dec 2005 on all patients referred to a single colorectal consultant firm and recorded on a prospective database. All patients with a normal colon or mild diverticular disease following a barium enema were eligible. The hospital patient administration system was used to determine the impact on out patient services and Department of Health tariffs were used to calculate cost effectiveness. A postal questionnaire was used to assess patient satisfaction.

Results: 638 patients (M : F ratio 32 : 68, median age 65 years) were followed up by telephone. Of these 32 (5%) required further OPD appointment with the consultant. No patients followed up by telephone presented at a later date with a colonic malignancy. Average outpatient clinic waiting times dropped significantly from 14 weeks in 2002 to 5 weeks in 2005. Total cost for telephone follow up was calculated at £9068 compared with £44524. Response rate to the postal questionnaire was 52% and 80% of patients were satisfied and pleased with the telephone follow up clinic. 13% of responders called the CNS for advice of whom 83% found the advice they were given useful.

Conclusion: Telephone follow up is a practical and cost effective alternative to traditional follow up. It has increased the number of new patient consultations and dramatically reduced clinic waiting times. Patient satisfaction with this follow up system is high and has enhanced colorectal service provision by providing patients with rapid and convenient access to experienced specialist colorectal advice.

General – First Class Service 0337

Should we offer liver resection to elderly patients with colorectal liver metastases (CRLM)? A comparative audit of UK performance against other European centres

R. J. Glendinning, C. Nesbitt, G. J. Poston, L. McKie[1], T. Diamond[1], M. Taylor[1], D. Stell[2], D. Delvart[3], R. Adam[3] on behalf of the members of LiverMetSurvey, the European colorectal liver metastasis resection registry
[1]University Hospital Aintree, Liverpool, Mater Hospital, Belfast, [2]Derriford Hopital, Plymouth, [3]Paul Brousse, Villejuif, France

Background: Elderly patients are increasingly submitted to hepatectomy for CRLM, but questions remain about possible age limits for surgery. LiverMetSurvey is an international registry allowing long-term evaluation of large patient cohorts, avoiding any single-centre effect. The aim of this study was to compare demography and outcomes in participating UK and other European centres in patients ≥ 70 years compared to those < 70.

Methods: From January 1991 to July 2006, 3773 patients underwent CRLM resection in 3 UK (296 pts.) centres and 33 (2477 pts.) centres from 10 other countries, 735 (19%) were aged ≥ 70 years [70–75 years: 469 (12%); 75–80 years: 194 (5%); ≥ 80 years: 72 (2%)], 59 (8%) underwent repeat hepatectomy. The total cohort of patients ≥ 70 years was compared to those < 70.

Results: Demographic age distribution and overall actuarial survival between UK and non-UK centres were identical. However, these data showed larger maximum tumour size ≥ 50 mm (28% *versus* 24%, $p = 0{\cdot}015$) but less multinodular disease (> 3 nodules: 11% *versus* 23%, $p < 0{\cdot}0001$) among the elderly. Hepatectomy was both more frequently limited (< 3 segments: 52% *versus* 42%, $p = 0{\cdot}0003$) and curative (94% *versus* 91%, $p = 0{\cdot}01$), while the incidence of concomitant extrahepatic disease was similar between the 2 groups. Preoperative chemotherapy was less frequently administered to the elderly (32% *versus* 45%, $p < 0{\cdot}0001$). Peri-operative mortality (≤ 2 months) was increased (4·3% *versus* 1·6%, $p < 0{\cdot}0001$). Overall 5-year survival was lower than that of younger patients (35% *versus* 43%, $p < 0{\cdot}001$).

Conclusion: ≥ 70 years, hepatectomy for CRLM provides 35% 5-year survival, but with increased peri-operative mortality. Five-year survival is lower in the older age group and may represent overall co-morbidity and shorter life-expectancy. In the elderly, repeat hepatectomies add similar benefits. > 70, there is no upper age limit to contraindicate surgery, and well selected octogenarian patients may hope for the same long-term survival.

General – First Class Service 0338

Comparative risk factors for poorer outcome after liver resection for colorectal liver metastases (CRLM) in the elderly. Preliminary data from livermetsurvey, the European colorectal liver metastasis resection registry

C. Nesbitt, R. J. Glendinning, G. J. Poston, L. McKie[1], T. Diamond[1], M. Taylor[1], D. Stell[2], D. Delvart[3], R. Adam[3] on behalf of the members of LiverMetSurvey, the European colorectal liver metastasis resection registry
[1]University Hospital Aintree, Liverpool, Mater Hospital, Belfast, [2]Derriford Hopital, Plymouth, [3]Paul Brousse, Villejuif, France

Background: Elderly patients are increasingly submitted to hepatectomy for CRLM, but questions remain about possible age limits for surgery. LiverMetSurvey is an international registry allowing long-term evaluation of large patient cohorts, avoiding any single-centre effect. The aim of this study was to compare outcomes in participating centres between those ≥ 70 years and those < 70, and identify specific predictive risk factors for poorer outcome in the elderly.

Methods: From January 1991 to July 2006, 3773 patients underwent CRLM resection in 3 UK (296 pts.) centres and 33 (2477 pts.) other European centres. 735 (19%) were aged ≥ 70 years [70–75 years: 469 (12%); 75–80 years: 194 (5%); ≥ 80 years: 72 (2%)], 59 (8%) underwent repeat hepatectomies. The

total cohort of ≥ 70 patients was compared to those < 70. Within those ≥ 70, a multivariate analysis was conducted to determine prognostic survival factors; outcomes were analysed according to the 3 age groups.

Results: 3 factors emerged as independently associated with poorer survival following multivariate analysis: synchronous metastases (5-yr survival: 24 *versus* 39%, $p = 0{\cdot}04$); bilobar distribution (5-yr survival: 23 *versus* 42%, $p = 0{\cdot}006$); presence of concomitant extra-hepatic disease (5-yr survival: 21 *versus* 36% $p = 0{\cdot}01$). ≥ 70 years, 5-year survival post-hepatectomy is 35%, but with increased peri-operative mortality, and was not different between 70–75 years (38%), 75–80 years (32%) and ≥ 80 years (31%), ($p = 0{\cdot}85$). For the entire group, 5-year survival was not different after 1st or 2nd hepatectomy (35 *versus* 31%, respectively, $p = 0{\cdot}07$).

Conclusion: In elderly patients, 3 risk factors could affect the outcome (synchronous disease, bilobar metastases, extrahepatic disease) following hepatectomy for CRLM. > 70, there is no upper age limit in fit patients to contraindicate surgery, and well selected octogenarian patients may hope for long-term survival.

General – First Class Service 0106

The cancer biomarker Tumour-M2-Pyruvate kinase should be incorporated as a prognostic indicator in contemporary management algorithms for pancreatic malignancy

H. R. Hathurusinghe, A. K. Siriwardena

Hepatobiliary Surgery Unit, Manchester Royal Infirmary, Manchester

Background: Recent insights into tumour metabolism have shown that a wide range of human tumours express the enzyme pyruvate kinase, a component of the aerobic glycolysis pathways. Of the four different isoforms found in mammalian tissue, the M2 isoenzyme is strongly over-expressed in cancer states. Tu-M2-PK has been evaluated as a diagnostic marker for pancreatic cancer in a number of small studies. This study draws from the pool of published world literature to select optimal cut-offs for distinction from normal and to select optimal mode of use.

Methods: A computerized search of MEDLINE from January 1950 to August 2006 was undertaken together with searches of EMBASE from 1974 to 2006. After cross-checking of the two pathways, removal of duplicates, case reports or reviews a final study population of 38 original reports was obtained.

Results: These reports provide information on Tu-M2-PK as a diagnostic marker in a pooled population of 499 patients with oesophago-gastric malignancy, 717 with colorectal cancer and 162 with histological-confirmed pancreatic cancer. In pancreas cancer (as in other GI malignancy) the optimum cut-off to distinguish normal values from abnormal is 15 units/ml. The median Tu-M2-PK measured pre-operatively ranged from 10·1 to 58·6 units/ml. The specificity range of pooled data was from 41% to 96·7% with a sensitivity range from 71·4% to 85%. Reports showed that Tu-M2-PK was not affected by pre-operative bilirubin level and thus was a valuable adjunct to CA 19-9. Pre-operative Tu-M2-PK correlated strongly with the finding of metastatic disease with a stepwise association between primary tumor, primary tumor with nodal deposits and primary tumor with regional metastases.

Conclusion: These pooled data are the largest overview of the new protein marker tu-M2-PK to date. In pancreas cancer, pre-operative tu-M2-PK is elevated and has useful sensitivity and specificity. As Tu-M2-PK is unaffected by jaundice and as it correlated strongly with underlying metastatic disease. The test should be incorporated as a prognostic marker into modern management algorithms for pancreatic cancer.

Minimally invasive surgery/ambulatory care

Minimally invasive surgery/ambulatory care 0020

A prospective single-blind non-randomised controlled study of laparascopic transabdominal preperitoneal repair of direct inguinal hernias: A new technique that reduces the development of postoperative seroma

V. Reddy, C. Sutton, L. Bloxham, G. Garcea, S. Ubhi, G. Robertson
Leicester Royal Infirmary, Leicester

Background: Seromas are common early postoperative complications encountered in laparoscopic inguinal hernia repair. Previous anecdotal evidence from our surgical practice suggested a lower incidence of postoperative seroma formation with direct hernia repairs when the lax transversalis fascia (TF) is inverted by tacking to the pubic ramus. We undertook a study to investigate whether inversion of the TF in this way reduces the incidence of postoperative seroma.
Methods: 216 patients undergoing transabdominal preperitoneal (TAPP) inguinal hernia repairs from August 2003 to December 2005 were included in this prospective non-randomised controlled study. Surgeon 1 would routinely invert the TF whereas surgeon 2 would not. At follow-up the presence of postoperative seroma and pain was recorded.
Results: Mann-Whitney U test demonstrated no significant difference in terms of age, sex and time to follow-up between the surgeons' patient groups ($p > 0{\cdot}05$) and chi-square test demonstrated that inversion of the TF in direct hernias is associated with a lower incidence of postoperative seroma ($p = 0{\cdot}043$). There was no significant difference in terms of postoperative pain at follow-up ($p = 0{\cdot}096$). For indirect hernias, there was no difference in incidence of postoperative seroma ($p = 0{\cdot}864$) and pain ($p = 0{\cdot}572$) between the two surgeons.

	Right	Left	Seroma	Pain
Surgeon 1 hernias				
Direct (TF inverted)	51	45	4 (4·17%)	0 (0%)
Indirect	51	46	9 (9·3%)	6 (6·19%)
Surgeon 2 hernias				
Direct (TF not inverted)	20	15	5 (14·29%)	1 (2·86%)
Indirect	16	13	3 (10·3%)	1 (3·45%)

Conclusion: Inversion of the TF is associated with a lower incidence of postoperative seroma without any difference in incidence of pain despite the use of a couple more tacks.

Minimally invasive surgery/ambulatory care 0071

"Every little helps!" The 'Walk in Walk Out' (WIWO) Hernia Clinic1: a study of its cost effectiveness

R. P. Bhutiani, R. A. Khan, S. Renton
NWLH NHS Trust, Middlesex

Background: To assess the cost savings of elective inguinal herniorraphy performed in 'WIWO' hernia clinic, as compared to the cost of operation as a day case or in patient under general anaesthesia (GA).
Methods: This study included all the patients who underwent elective inguinal herniorraphy between March 2005 and February 2006. The cost of outpatient appointments, correspondence, pre-assessment clinics, routine investigations, the anaesthetist session and the hospital bed days were taken into account.
Results: A total of 1106 patients were given a date for elective operation. 497 patients (44·9%) either did not attend (DNA) or their operation was cancelled. The remaining 609 patients (122 in WIWO hernia clinic, 173 under GA as day cases and 314 as inpatients) underwent a standard tension free mesh repair. The total cost of inguinal herniorraphy as a day case under GA is £1440. The same operation in WIWO clinic costs £1029 (saving of £411 per patient and a total saving of £50142 over the year). The patients operated as inpatient, on average stayed for 1·5 nights (an extra cost of £450 per patient). According to the operation notes, almost 90% of all patients were suitable for WIWO hernia clinic. If all these patients underwent their operation in the WIWO clinic, we estimate a potential saving of £233362 (£169246 from inpatient cases plus £64116 from Day Cases). This does not include the potential cost savings of £356349 at the rate of £717 per patient (lost revenue due to DNA/cancellation) due to significant reduction in the DNA/cancellation rate (44·9% as compared to < 3% in WIWO clinic).
Conclusion: Herniorraphy in the 'WIWO[1] hernia clinic is extremely cost effective and is suitable for majority of the patients. This protocol if repeated across all the NHS trusts could show very significant financial savings and release inpatient beds, in these days of financial and bed crisis.

Minimally invasive surgery/ambulatory care 0149

The laparoscopic approach to hepaticojejunostomy for biliary bypass and post-resection is feasible and safe: experience with 10 patients

S. Baghdadi, K. A. Abdul Aziz, B. J. Ammori
Manchester Royal Infirmary, Manchester

Background: Hepaticojejunostomy (HJ) is conventionally constructed at laparotomy either to bypass benign or malignant biliary strictures, or following hepatobiliary or pancreatic resections. The role of the laparoscopic approach to HJ, however, remains under evaluation.
Methods: The feasibility and safety of the laparoscopic approach to HJ were prospectively evaluated.
Results: Between 2002 and 2006, 10 selected patients with a median age of 64 (range, 38–81) years underwent laparoscopic Roux-en-Y HJ (end-to-side, $n = 6$; side-to-side, $n = 4$). The HJ was constructed to bypass benign ($n = 1$) and malignant ($n = 4$; three combined with gastrojejunostomy) biliary strictures, and following laparoscopic Whipple's procedure ($n = 4$) or excision of choledochal cyst ($n = 1$). All procedures were completed laparoscopically. The median operative times for bypass surgery and for pancreatobiliary resections were 320 and 600 minutes respectively. One patient developed a pancreatic fistula. There were no biliary leaks or strictures, no re-operations, and no perioperative deaths. The median postoperative hospital stay after bypass and choledochal surgery was 6 days and after Whipple's was 13 days. No biliary strictures were encountered at a median (range) follow up of 6 (3–36) months.
Conclusion: Laparoscopic HJ is feasible and safe. Expansion of experience is required to refine the operative technique and establish long-term results.

Minimally invasive surgery/ambulatory care 0165

Laparoscopic non-resection suture rectopexy – a twelve year experience

J. Phillips[1], A. Engledow[2], I. Lyons[2], V. Datta[2], A. Privitera[2], R. Motson[1]
[1]Colchester General Hospital, Colchester, [2]University College Hospital, London

Background: Numerous surgical options exist for the correction of rectal prolapse with the optimal choice remaining controversial. The advent of the laparoscopic approach has proved popular and effective. Concern exists about non-resectional rectopexy in the form of intractable post-operative constipation. We present our experience with non-resectional laparoscopic suture rectopexy.

Methods: All patients presenting with a full thickness rectal prolapse between Aug 1994 and Aug 2006 who were fit for a general anaesthetic were offered a laparoscopic repair. Data were entered into a database prospectively and retrospectively analysed. Data recorded included patient demographics, pre-operative symptoms, conversion to an open procedure, length of hospital stay and post-operative complications. Pre-operative Cleveland Clinic Incontinence Scores (CCIS) were also calculated. Follow up was by telephone questionnaire. Post-operative constipation, recurrence and CCIS were noted.
Results: There were 60 patients. 59 female (98%). Median age was 72 years (range 24 to 88 years). Median follow up was 48 months (range 5–144 months). 13 patients were lost to follow up. Median operating time was 98 minutes (range 35–200 minutes). Median hospital stay was 2 days (range 1–29). There were 3 conversions (5%). The mean CCIS was 9·54 pre-operatively and 4·44 post-operatively ($p < 0·05$). There was one post-operative bleed requiring transfusion, one port site abscess requiring incision and drainage, one post-operative retention of urine and one chest infection. Post-operatively, 10 patients (17%) reported occasional constipation not requiring intervention and an additional 10 (17%) reported constipation requiring regular laxatives. No patients suffered debilitating constipation. Of patients with follow up there were 6 (13%) recurrences. There were no post-operative deaths.
Conclusion: Laparoscopic abdominal suture rectopexy without resection is safe and effective in the treatment of full thickness rectal prolapse. CCIS scores improved significantly post-operatively. Severe constipation was not a problem and recurrence rates were low.

Minimally invasive surgery/ambulatory care 0166

Incisional hernia rates in 100 consecutive laparoscopic colorectal resections with long-term follow up

A. Engledow[2], V. Datta[2], A. Privitera[2], T. Arulampalam[1], R. Motson[1]
[1]Colchester General Hospital, Colchester, [2]University College London, London

Background: Published incisional hernia rates in series with adequate follow up after laparotomy are between 11 and 20%, with 60–90% occurring within two years of surgery. This generates a substantial workload for the general surgeon. We review our incisional hernia rates after laparoscopic colorectal resection.
Methods: 108 consecutive patients undergoing attempted laparoscopic colorectal resections were analysed. 8 patients required conversion and were excluded. Data was recorded prospectively into a database. All wounds were closed in a standardised fashion comprising of mass closure with a non-looped no. 1 maxon and a subcuticular vicryl to the skin. All patients were examined in an outpatient setting by a surgeon not involved in the original procedure.
Results: There were 100 patients. 56 female. Median age 68 years (range 20–91). Median incision length 6cm (range 3–11). A total of 6 patients had developed incisional hernias of which two had already been successfully repaired laparoscopically as a day case procedure. Only one of the remaining 4 patients was symptomatic and requesting correction. Median follow up was 34 months (range 14–75)
Conclusion: The advantages of laparoscopic surgery are well documented. Incisional hernia rates would also appear to be lower than with open surgery. This has obvious advantages for both patient and surgeon. Due to the size of the incisions, incisional hernias that do develop are small requiring no further action or suitable for day case laparoscopic repair. In these times of financial constraint these are further advantages of the laparoscopic approach and may play a role in the planning of service provision

Minimally invasive surgery/ambulatory care 0181

The role of percutaneous endoscopic colostomy in colorectal practice: a prospective five year evaluation

W. Baraza[1], S. Brown[2], M. McAlindon[3], P. Hurlstone[3]
[1]The University of Sheffield, Sheffield, [2]The Northern General Hospital, Sheffield, [3]The Royal Hallamshire Hospital, Sheffield

Background: Percutaneous endoscopic colostomy (PEC) has been used for the management of various colonic disorders and the National Institue for Clinical Excellence (NICE) has recently issued formal guidance on its use. Data on the procedure are limited, however, and published series describe the use of PEC in only specific conditions. As a specialist unit, we prospectively analysed the safety and efficacy of PEC for recurrent sigmoid volvulus (RSV), idiopathic slow transit constipation (ISTC) and colonic pseudo-obstruction (PO) in what we believe is the largest series described so far.
Methods: The PEC technique is outlined, adopting a method similar to percutaneous endoscopic gastrostomy placement to site the tubes at specific points in the colon. Inclusion criteria were: patients with RSV requiring sigmoidopexy who were unfit for segmental colectomy ($n = 19$, 58%), patients with ISTC requiring antegrade irrigation having failed conventional therapy and/or refused surgery ($n = 10$, 30%) and patients with PO requiring decompression ($n = 4$, 12%).
Results: 33 consecutive patients underwent 35 PEC insertions between June 2001 and April 2006 (mean follow-up, 35 months). One patient, with RSV and unfit for laparotomy died of peritonitis. Two other patients suffered peritonitis requiring operation. Two patients with ISTC proceeded to colectomy because of complications (urgency and pain). The procedure failed in 4 patients (2 ISTC, 1 RSV, 1 PO). Site infection was the most common complication. 88% of patients had symptom resolution with PEC.
Conclusion: PEC is a safe and efficacious method of treating colonic disorders in selected patients in tertiary referral centres with the appropriate clinical governance framework in place but patients should be warned of the risk of peritonitis.

Minimally invasive surgery/ambulatory care 0225

Short term economic benefits of performing day case laparoscopic antireflux surgery

K. Moorthy, N. S. Balaji, A. Samee, C. V. N. Cheruvu
University Hospital of North Staffordshire, Stoke-on-Trent

Background: The clinical feasibility of performing day case laparoscopic antireflux surgery (LARS) has been demonstrated by us and others previously. However the economic benefit of this strategy has not been explored.
Methods: The procedures were performed by one surgeon over a 2 yr period. Patients in both groups (Day Case- DC and Inpatient- IP) were discharged on a standard regime of post-operative analgesia and anti-emetics. A post-operative follow-up (FU) protocol consisting of telephonic FU by the Day Surgery unit and 3 visits by the district nurse (DN) was established for the DC group. Data on further DN visits and visits to the General Practitioner (GP) was collected. Only short- term direct costs up to the first post-operative follow-up appointment (2 weeks) were included in this study. Costs of hospital stay, procedure including the theatre time, equipment, disposables used and staffing were obtained from the trust's financial directorate. Costs for GP visits and DN visits were acquired from Department of Health reference costs (2003–05).
Results: There were 20 patients in the IP group and 26 in the DC group. Both groups were matched for clinical presentation, endoscopy, manometry and pH findings. The total operative costs were higher in the IP group [(830 (IQR-240·2) v 768·6 (232·5); $p = 0·01$]. The median hospital stay in the IP group was 1 day (range 1–3). There were no readmissions in the DC group. There were a median of 3 (range 3–4) district nurse follow-up visits and 1 (range 0–1) GP visit in the DC group. The median post-operative costs were significantly lower in the DC group compared to the IP group [£352 (IQR-352) *versus* £317 (IQR-24); $P = 0·001$]. The total short-term costs were also significantly lower for the DC group. [1368·6 (522·5) *versus* 1085·6 (244·7); $P = 0·001$].

Conclusion: Day case LARS provides considerable cost benefit in addition to having equivalent clinical outcomes in comparison to Inpatient LARS. This is even after taking into consideration the higher operative costs in the IP group and without the inclusion of indirect cost benefits.

Minimally invasive surgery/ambulatory care 0227

Early UK experience with laparoscopic liver resection

B. Alkari, A. Owera, B. J. Ammori
Department of Surgery, Manchester Royal Infirmary, Manchester

Background: Advancements in surgical technique and technology have facilitated laparoscopic liver resection in selected patients. The aim of this study is to evaluate the feasibility and outcome of laparoscopic liver resection.
Methods: Patients with lesions situated in the anterior and left lateral segments were selected for laparoscopic resection. Data were collected prospectively.
Results: Between 2003 and 2006, 17 patients (8 males) with a median (range) age of 63 (32–83) years underwent 17 laparoscopic hepatic resections for colorectal metastases ($n = 14$) and other indications ($n = 3$). The resections included left hepatic lobectomy ($n = 9$), bi-segmental ($n = 4$), uni-segmental ($n = 2$) resections, and metastatectomy ($n = 2$). All procedures were completed laparoscopically and there was one intra-operative complication of port-site small bowel injury that was managed laparoscopically with no adverse effect. Estimated median (range) blood loss was 100 (25–500) and one patient received a total of two units blood transfusion. One 83-year-old female patient developed a transient left bundle branch block in recovery but recovered with no complications. The median (range) post-operative hospital stay was 3 (1–14) days. The resection margins were clear in 12 of 14 patients with malignant disease; and at a median (range) follow up of 13·5 (5–36) months, 4 patients (29%) had disease recurrence and 12 patients (86%) are alive.
Conclusion: In selected patients with lesions in the anterior and left lateral segments, laparoscopic liver resection is feasible, achieves adequate cancer resection, and is associated with smooth and rapid recovery. Long-term follow up data are required for oncological results.

Minimally invasive surgery/ambulatory care 0234

Metanalysis of recurrence after laparoscopic repair of paraesophageal hernia

M. Rathore, S. Najfi, A. McMurray
Antrim Area Hospital, Antrim

Background: Recurrence & reflux are two most important remote complications of laparoscopic repair of paraesophageal hernia (PEH). However the extent of recurrence remains unknown. The aim of the study was to determine the true incidence of recurrence after lap-PEH repair.
Methods: A metanalysis was carried out. PubMed, Medline, Embase, Cochrane Library, hand search and personal communication were used to access and appraise studies. The inclusion criteria were full-text papers published from Jan 1991 to Feb 2006 describing lap-PEH repair on > 25 pts, at least six-month follow up and addressing the issue of recurrence. 'Wrap migration' papers were excluded. Papers were appraised and the data was isolated on summary sheets. MS Office Excel 2000 was used to plot the results and represented in graphs. Statistical input involved calculating odds, 95ci, heterogeneity and sensitivity analysis.
Results: Thirteen studies were eligible (all retrospective case series). A total of 965 pts with 99 recurrences were noted. The overall recurrence rate (in all pts) was 10·25% and was 13·98% if only the followed up patients ($n = 658/965$) were considered. However when patients with objective evidence (follow-up Ba esophagogram) were used (301/965), the true recurrence rate was 25·58% (i.e. 1 in 4 repairs recurred). Learning curve did not appear to be an issue ($p = 0·1941$). The studies revealed broad 95ci and touching the line-of-no-effect thereby increasing the chance factor. When alternate model was applied, esophageal lengthening (by Collis-Nissen gastroplasty) revealed a significant protective influence ($p = 0·0185$).
Conclusion: The true incidence of lap-PEH recurrence is 25·58%. Learning curve is not an adequate explanation. Mandatory (protocol) follow-up esophagograms at 1y are essential. Subconsciously, two emphasis points in the repair have emerged – hiatoplasty and (superadded) esophageal lengthening.

Minimally invasive surgery/ambulatory care 0236

Intermediate-term results of laparoscopic repair of giant paraesophageal hernia

M. Rathore, E. Nambi, A. McMurray
Antrim Area Hospital, Antrim

Background: This retrospective study was performed to review the intermediate-term results of the laparoscopic repair of giant (> 1/3rd stomach in the chest) paraesophageal hernia (PEH) in the unit.
Methods: This retrospective eight-year case series involved 42 patients. The notes were retrieved, reviewed individually and data collected regarding symptoms, investigation, operative details and follow-up. Microsoft Excel 2003 was used. Statistical analysis involved determinig the age distribution, calculating the odds, and chi-square test for inter-study comparison.
Results: M : F ratio was 1 : 1·8 and median age 64 y. Symptoms included epigastric/chest pain (69%), heartburn (42·8%), dysphagia (38%), vomiting (23·8%), gastric volvulus (19%) and upper GI bleed (16·6%). The repair included reduction, sac excision, esophageal mobilization and cruroplasty. Fundoplication (anterior partial) was done in 18 (42·8%) patients with radiologically documented reflux. Median hospital stay was three days. The complications included esophageal perforation in one (2·3%), gas-forming mediastinal abscess in one (2·3%), small bowel obstruction in one (2·3%) and bilateral basal atelactasis in three (7·1%). One patient (2·3%) died due to duodenal perforation and myocardial infarction. Of the 38 (90·4%) patients followed up (median 18m), 20 (52·6%) patients had follow-up investigation. One patient (2·6%) had post-operative dysphagia and three (7·8%) had postoperative heartburn. Five (11·9%) had recurrence. Symptom outcome was Visick grades I/II (86·8%), III (10·5%) and IV (2·6%).
Conclusion: Laparoscopic repair of PEH resulted in a short length of stay, excellent outcome in almost 87% patients and an overall recurrence rate of 11·9%.

Minimally invasive surgery/ambulatory care 0294

Laparoscopic liver resections: a nine-year experience

L. Spencer, M. Metcalfe, A. Strickland, E. Elsey, G. Robertson, D. Lloyd
Leicester Royal Infirmary, Leicester

Background: This case series aims to describe a developing experience in laparoscopic liver surgery and presents results from 40 procedures including right hemihepatectomy, left lateral lobectomy and microwave ablation therapy.
Methods: Forty patients undergoing laparoscopic liver surgery between September 1997 and November 2006 were included. The data set was collected from medical records and included; operative procedure and duration, intraoperative blood loss, conversion to open operation rates, length of hospital stay, complications, mortality, histology of lesions/resection margins, and disease recurrence.
Results: The mean age of patient was 59 years, 17/40 were male, 23/40 female, 23/40 of lesions treated were benign and 17/40 malignant. Operations included; laparoscopic anatomical resections $n = 15$, non-anatomical resections $n = 11$, microwave ablations $n = 8$ and deroofing of cysts $n = 7$. Median anaesthetic time was 120 minutes (range 40–240 minutes), mean blood loss 78 ml and 1/40 operations were converted to open. Median resection margins were 10 mm (range 1–14 mm) and median length of stay 3 days (range 1–10). Operative and 30-day mortality were zero and there has been no local disease recurrence.
Conclusion: Laparoscopic liver surgery appears safe, effective and is associated with reduced hospital stay. Larger studies are required to confirm it is oncologically sound.

Minimally invasive surgery/ambulatory care 0295

Severe attacks of acute biliary pancreatitis do not increase the operative risk and difficulty of laparoscopic cholecystectomy compared with mild attacks

A. Z. Al-Bahrani, M. Al-Rashedy, N. A. Yassin, M. Charalambous, B. J. Ammori
Manchester Royal Infirmary, Manchester

Background: Although laparoscopic cholecystectomy (LC) following acute biliary pancreatitis (ABP) may be associated with increased operative difficulty and risk, it is unclear whether severe attacks had a greater influence compared with mild attacks.
Methods: Patients who underwent LC for ABP were identified from the theatre log and their clinical data retrieved. Severity was defined according to the Atlanta criteria.
Results: Amongst 87 consecutive patients with a median age of 48 years, 29 patients (33·3%) suffered severe ABP. There was no difference between the severe and mild groups with regard to age, sex, ASA scores, frequency of LC performed during index admission (17% *versus* 24%, $p = 0{\cdot}586$) or within one month of the attack (28% *versus* 38%, $p = 0{\cdot}473$), and the interval between onset and LC (median, 78·5 *versus* 61 days, $p = 0{\cdot}207$). Severe attacks of ABP did not significantly increase the operative time (median, 94 *versus* 82 minutes, $p = 0{\cdot}191$), conversion rate (7% *versus* 5%, $p = 0{\cdot}746$), or postoperative morbidity (17% *versus* 14%, $p = 0{\cdot}800$). There was a trend towards longer postoperative hospital stay in patients with severe ABP (median, 3 *versus* 2 days, $p = 0{\cdot}055$).
Conclusion: Severe attacks of ABP do not appear to increase the operative difficulty or risk of LC compared with mild attacks.

Minimally invasive surgery/ambulatory care 0347

Biological mesh (Surgisis) reduces failures following cruroplasty in laparoscopic repair of large paraoesophageal hiatus hernias

V. Vidyasankar, S. Adjepong, A. Sigurdsson
Shropshire Upper G.I and Laparoscopic Surgical Unit, Princess Royal Hospital, Telford

Background: Laparoscopic repair of large paraoesophageal hiatus hernias (LPOHH) is associated with significant medium term failures (15–40%). Synthetic mesh reinforcement reduces recurrences but reports of visceral erosion, strictures and ulceration questions their long term safety. Surgisis (SIS, Cook) mesh is a bioactive extracellular matrix from porcine small-intestinal submucosa that triggers neovascularisation and forms a bioscaffold for tissue ingrowths. The aim of our study was to assess safety and efficacy of Surgisis in cruroplasty.
Methods: 46 patients with LPOHH underwent laparoscopic repair between March 2003 to December 2006 (23 females, median age 61 years). The cruroplasty was completed with SURGISIS mesh reinforcement as an onlay mesh with *U* shaped configuration. Clinical follow-up was between 1–42 months with barium studies, Gastrointestinal Symptom Rating Scale (GSRS) and Gastroesophageal Reflux Disease Health Related Quality Of Life (GERD-HQRL) questionnaires.
Results: There have been no symptomatic or radiological hernia recurrences so far. No adverse effects of the SURGISIS have been noticed. Good or excellent symptom relief was achieved in over 85% of the patients.
Conclusion: Surgisis reinforcement in cruroplasty appears to be safe and effective and should be considered routinely during laparoscopic repair of LPOHH.

Minimally invasive surgery/ambulatory care 0348

Laparoscopic drainage for all comers with pancreatic pseudocysts requiring surgery

N. Hamza, B. Alkari, B. Ammori
Manchester Royal Infirmary, Manchester

Background: Pancreatic pseudocysts (PP) are traditionally managed by laparotomy. Our experience with the laparoscopic approach for all comers with PP requiring surgical drainage is presented.
Methods: Between 2001 and 2006, 13 consecutive patients (7 male) underwent 14 surgical drainage procedures for PP, all of which were attempted laparoscopically.
Results: The median PP size was 13 (range, 6·5–23) cm. The procedures included cyst-gastrostomy ($n = 12$), Roux-en-Y cyst-jejunostomy ($n = 1$), and an unplanned external drainage due to extensive adhesions ($n = 1$). The approach to cyst-gastrostomy was transgastric ($n = 7$), endogastric ($n = 3$) and exogastric ($n = 2$). Two patients underwent a concomitant cholecystectomy. There were no conversions to open surgery. Pancreatic necrosis was present in 11 patients of whom 8 required debridement. The median operative time was 122·5 (interquartile range, 90–147·5) minutes. There were no postoperative complications and the median postoperative hospital stay was 2 (range, 1–4) days. At a median follow up of 14·5 (range 1–41) months one patient developed a recurrent PP (7·7%) that was drained laparoscopically.
Conclusion: Laparoscopic drainage of PP is a feasible, safe, an effective alternative to laparotomy for all comers with PP that require internal drainage, and is associated with rapid recovery, short hospital stay and a recurrence rate comparable to open surgery.

Minimally invasive surgery/ambulatory care 0427

The laparoscopic approach to gastric and biliary bypass for all comers with gastric outlet and distal biliary obstruction requiring surgical treatment

R. Nadeem, M. Sulieman, Z. Shafeek, B. Ammori
Department of Surgery, Manchester Royal Infirmary, Manchester

Background: To describe the outcomes of laparoscopic gastric and biliary bypass in 'all comers' with malignant and benign disease requiring surgical relief of obstructive symptoms.
Methods: All patients with inoperable malignancy and those with benign duodenal or distal biliary strictures who required surgical relief of obstruction underwent bypass surgery using the laparoscopic approach.
Results: Between 2001 and 2006, 50 patients with a median (range) age of 61 (26–81) years underwent 52 laparoscopic bypass procedures for malignant ($n = 38$) and benign ($n = 14$) disease. Surgery included the construction of a single (gastric, $n = 33$; biliary, $n = 5$) or double bypass ($n = 14$). All procedures were completed laparoscopically. The median (IQR) operating time and postoperative hospital stay were 80 (40–160) minutes and 4 (3–6) days respectively. The morbidity and mortality rates were 12% and 2% respectively. Laparoscopic revision of a post-Whipple's gastroenterostomy was required in one patient. No recurrence of obstructive symptoms was observed in cancer patients during follow up.
Conclusion: The laparoscopic approach to bypass surgery for distal biliary and gastric obstruction is feasible in all patients with benign and malignant disease who are suitable for surgery and carries low morbidity and mortality rates and a short postoperative hospital stay.

Minimally invasive surgery/ambulatory care 0494

The benefits of a minimally invasive approach in ileal pouch anal anastomosis formation

J. Kelly, E. T. Condon, W. O. Kirwan
Cork University Hospital, Wilton, Cork City

Background: Ileal pouch anal anastomosis (IPAA) is the preferred reconstructive option for individuals after colectomy for ulcerative colitis (UC) and familial adenomatous polyposis (FAP).
We propose that a minimally invasive approach confers significant benefits to patients. Safety, feasibility and outcome of a laparoscopic approach to IPAA has been incompletely characterised to date.
Methods: 8 consecutive patients have had laparoscopic IPAA since April 2005. Their intraoperative findings, immediate and early postoperative outcomes are

compared with 8 non-selected patients who had an open IPAA pre April 2005, after case matching for age, gender and body mass index.
Results: A total of 16 patients were studied. The laparoscopic conversion rate was nil. Postoperatively, the laparoscopic IPAA group had a shorter time to ileostomy function (2 *versus* 5 days), had a reduced mean time to regular diet (3 *versus* 6 days), had a mean lesser length of hospital stay (5 *versus* 12 days). Their overall opioid analgesia requirements were 30% that of the open group. These benefits were especially evident in those who had their colectomy performed laparoscopically aswell. There were no reoperations or readmissions in either group. Mean operative time was longer for the laparoscopic group (mean 246 *versus* 165 mins). There was one postoperative morbidity in each group.
Conclusion: Patients undergoing laparoscopic IPAA can expect faster postoperative gastrointestinal recovery, less morbidity and a shorter hospital stay. These results greatly encourage us to continue advancing this technique to enhance patient rehabilitation post colectomy.

Minimally invasive surgery/ambulatory care 0508

Adhesion formation following laparoscopic and open colorectal surgery

H. Dowson[1], A. Skull[1], J. Bong[2], T. Rockall[1]
[1]MATTU, Guildford, [2]Royal Surrey County Hospital, Guildford

Background: Reports have suggested that laparoscopic surgery results in the formation of fewer adhesions than equivalent open surgery. This study aimed to evaluate the incidence of adhesion formation following laparoscopic and open colorectal surgery.
Methods: A prospective cohort study was undertaken comparing patients who had previously either had a laparoscopic or open colorectal procedure, and who were referred for subsequent laparoscopy. The laparoscopies were videoed and scored for adhesion formation according to an adhesion scoring system that has been validated for inter- and intra-observer reliability. Adhesions were assessed at laparoscopy using a 10 point scoring system, based on the severity of adhesion formation at three separate sites (access wound, site of pathology and surgical resection, and any distant sites), the extent of adhesion formation (0–25%, 25–50%, > 50%), and involvement of small bowel.
Results: 20 patients have been recruited to the trial thus far (planned study size of 40 patients, powered to show that a 2 point difference in the adhesion score was significant). 13 patients (65%) have had previous open surgery. 13 laparoscopies were prior to liver resection, and 4 were in patients with inflammatory bowel disease. The mean adhesion score (out of 10) in the open group was 6, and in the laparoscopic group 3, and this is a significant difference ($p = 0{\cdot}013$).
Conclusion: This study has demonstrated that there is a significant difference in the incidence of adhesion formation following laparoscopic and open colorectal surgery. This would suggest that in addition to the short-term benefits of laparoscopic colorectal surgery, there are also longer-term advantages with this approach.

Minimally invasive surgery/ambulatory care 0509

Day case thyroid surgery – A study of patient satisfaction

B. Lieske, G. Howat, M. Sames, A. McLaren
Buckinghamshire Hospitals NHS Trust, High Wycombe & Stoke Mandeville

Background: Day case thyroid lobectomy was introduced into routine practice in our trust following a brief pilot study. All patients listed for thyroid lobectomy and meeting standard day surgery criteria were placed on a day surgery pathway. To assess our service we undertook a patient satisfaction survey. This study was conducted to evaluate clinical outcomes and patient satisfaction with the day surgery approach. To our knowledge this is the first such study to be reported.
Methods: We keep a prospective database of all thyroid procedures with information on demographics, operation type and anaesthesia, histology and post-op complications, and all patients were identified from that database. The patient satisfaction survey was conducted by telephone. We collected information on post operative analgesia requirements, return to normal function, complications, and levels of satisfaction with the service provided.
Results: Over a 22 month period we performed 49 thyroid lobectomies. 36 of these were planned as day cases and 26 were performed as a day case procedure. We were able to interview 25 of these 26 patients. All were aware that they would go home on the same day. The average length of stay was 8·5 (6–12) hours. 19 patients needed to take painkillers at home for an average of 3·5 (1–10) days. Three patients needed to consult their GP for suspected infection (1), hoarseness (1) and indigestion (1), but there were no re-admissions. The majority of patients (90%) returned to work/normal activities within 14 days (average 10 (2–14) days). Patient satisfaction was high, with 23 patients completely happy with the information received about surgery & aftercare and completely satisfied with care and support received. Three patients would have preferred to stay in hospital overnight, but all others were happy to recommend day case thyroid surgery to a friend.
Conclusion: Day case thyroid surgery is effective in routine clinical practice and results in high levels of patient satisfaction.

Minimally invasive surgery/ambulatory care 0530

Single suture gastropexy prevents lap band slippage

R. Singhal, A. Guy, M. Kitchen, S. Ndirika, K. Hunt, P. Super
Heart of England NHS Foundation Trust, Birmingham

Background: Slippage rates of 1–20% are frequently quoted following adjustable gastric banding. This complication can be extremely serious and has contributed to many units offering routinely the more invasive gastric bypass in the management of morbid obesity. We present results of the first 1000 Laparoscopic Bands performed in our unit.
Methods: Between April 2003 and November 2006, 1000 consecutive patients, mean weight 119·7 Kg (range 79–268 Kg), mean BMI 43·7 kg/m^2 (range 35–88) underwent LAGB. An identical surgical technique of one gastropexy suture in addition to the normal 2 routine gastro-gastro tunnel sutures was used in all cases. Fluoroscopy-guided adjustments were performed at 3 and 6 months and fluoroscopic evaluations were performed later if clinically indicated.
Results: There was no mortality and only one major septic complication of gastric perforation one week post-operatively treated conservatively. The mean stay was 1·02 days (range 0–7 days). Excess weight loss at 3, 6, 12 and 18 months was 21+/−11%, 27·3+/−15·4%, 31+/−17·8% and 40·5+/−21·9%. Slippage with urgent readmission occurred in one patient (0·1%) at 5 months. A further partial slippage at 18 months was treated by band deflation and repositioning 6 months later. 6 pouch dilatations were observed between 10 and 24 months postoperatively in separate patients (in all cases dealt with by band deflation and partial inflation).
Conclusion: These results demonstrate that this procedure is successful in producing weight loss and at the same time has a very low slippage and pouch dilatation rate. This difference is most probably due to operative technique. Strict band filling protocols may also contribute but these do not differ from those widely adopted. Our technique largely avoids this dangerous complication of laparoscopic gastric banding.

Minimally invasive surgery/ambulatory care 0557

Laparoscopic distal pancreatectomy and pancreaticoduodenectomy: Experience with 11 patients

S. Al-Hourani, B. Alkari, A. Darwish, B. Ammori
Manchester Royal Infirmary, Manchester

Background: Advances in operative techniques and technology have facilitated laparoscopic distal pancreatectomy (LDP) and laparoscopic pancreaticoduodenectomy (LPD).
Methods: All distal pancreatectomies were attempted laparoscopically, while selected patients underwent LPD.
Results: Eleven patients with a median (range) age of 64 (32–79) years underwent LDP with ($n = 3$) and without ($n = 4$) splenic preservation and LPD

($n = 4$). All procedures were completed laparoscopically. The median operating times for LDP and LPD were 315 and 675 minutes respectively with a median blood loss of 300 and 400 ml respectively. The morbidity, pancreatic fistula, re-admission, re-operation, and mortality rates were 30%, 20%, 20%, 0% and 0% respectively. The median (range) postoperative hospital stay after LDP and LPD was 8 (4–14) and 13 (9–23) days respectively. Tumours were 1·0–10·5 cm in diameter and included endocrine ($n = 5$), adenocarcinoma ($n = 4$), cystadenoma ($n = 1$) and pseudopapillary tumour ($n = 1$). At a median (range) follow up of 5 (2–50) months, one patient has died of brain metastases, while the remainder remain disease-free.

Conclusion: The laparoscopic approach to distal pancreatectomy and pancreaticoduodenectomy is feasible and safe. The pancreatic fistula rate is equivalent to that observed with open surgery. Growth of experience, technique refinements and long-term follow up data are needed.

Minimally invasive surgery/ambulatory care 0641

Laser seal haemorrhoidectomy: good early results from the first dozen

W. Ismail, K. Lahiri, G. Kaur, P. J. Moore, M. Hemadri
Scunthorpe General Hospital, Scunthorpe

Background: We present the early results of our series of laser haemorrhoidectomy using the seal technique.

Methods: Patients with confirmed haemorrhoids after counselling and consent are admitted. Two phosphate enemas are given on admission. The haemorrhoidectomy is performed under local anaesthesia (20 mls of 1% lidocaine with 1 in 200000 adrenaline to the anus and 10 mls of 0·25% bupivacaine to each ischiorectal fossa) and sedation (fentanyl and midazolam). A clamp and excise technique is used for resection of the haemorrhoidal mass. The pedicle is either rubber banded or transfix ligated with vicryl. The edges of the resected haemorrhoids are sealed to each other using a YAG or CO2 laser.

Results: 12 patients (M : F=9 : 3) had laser haemorrhoidectomy between January and June 2006. The ages ranged from 32 to 68 years.
One patient was converted to GA. One patient (the first patient in our series) needed post operative IV analgesia. All patients (except the one who had a general anaesthetic) were discharged from the hospital in approximately 2 hours after the procedure. No patient had to stay overnight. One patient was re-admitted on the fourth post operative day with anal oedema but was discharged after simple reassurance. No other patients were readmitted within 30 days. No patient had any skin tag remnants at 6 weeks. All patients took simple oral analgesics post operatively (ranging from 2 days to 6 weeks)

Conclusion: Laser seal haemorrhoidectomy can safely be performed with local anaesthesia and sedation. The immediate post operative comfort is of a good quality as evidenced by the discharge of patients. Short term results seem to be good, as evidenced by the low re-admission and absence of residual anal skin tags. Our series suggests that evidence is emerging that the laser seal haemorrhoidectomy as performed by us could have better results than conventional haemorrhoidectomy.

Minimally invasive surgery/ambulatory care 0644

Laparoscopic redo fundoplication in a district general hospital

A. Q. Khan, K. Sasapu, M. P. Tilston
Diana Princess of Wales Hospital, Grimsby

Background: Little data exists on the practice of redo surgery after failed nissen fundoplication. The purpose of this study was to review our practice of redo surgery for gastroesophageal reflux disease.

Methods: Retrospectively data was collected regarding the indications of redo surgery, the type of procedure performed, the causes of failure and the outcome following redo surgery.

Results: Two hundred and eighty one laparoscopic fundoplications were performed between May 1998 and August 2006. Nineteen patients (6·67%) required redo surgery. Eight were males (42%). Mean age was 49·1 years (23·9–76·3). Average time to redo surgery was 23 months (4–51). Indications for redo surgery were dysphagia in 12 patients (63%), epigastric and chest pain in 5 (26%) and volume reflux in 2(11%) All operations were performed laparoscopically, none requiring conversion. There were no major complications. Causes of failure identified were: sphincter-mechanism failure to control reflux (4 patients). Three patients had loose wrap and one had wrap slipped distally, and esophageal clearance failure (15 patients). One patient had recurrent hiatus hernia and others had tight wrap. Fifteen patients had their wrap converted from 360^0 to 180^0 posterior. Four patients had revision of 360^0 wrap. Average hospital stay was 3 days (1–6) There were no major complications. Average follow up was 22 months (4–51 months). Thirteen patients were completely asymptomatic, 4 had occasional symptoms but not requiring any medication and 2 were symptomatic requiring medication.

Conclusion: Redo surgery following Nissen fundoplication can be safely performed laparoscopically with good results. In our practice this has been achieved with good clinical outcome.

Minimally invasive surgery/ambulatory care 0655

Bilateral thoracoscopic splanchnotomy for intractable abdominal pain in patients with chronic pancreatitis and pancreatic cancer

S. Baghdadi, M. H. Abbas, B. J. Ammori
Manchester Royal Infirmary, Manchester

Background: Division of the greater and lesser splanchnic nerves is reserved to patients with intractable upper abdominal pain after failed medical therapy.

Methods: Selected patients with opiate-dependent upper abdominal pain secondary to chronic pancreatitis (CP) or malignancy underwent bilateral thoracoscopic splanchnotomy (BTS). Response to surgery was assessed using the visual analogue scale (VAS), and the analgesic requirements were recorded.

Results: Between 2001 and 2006, 20 patients (male, 14) with a median age of 50·5 years who suffered with CP ($n = 12$) or malignancy ($n = 8$) underwent 20 BTS procedures. The median (range) operating time was 30 (20–75) minutes. There were no conversions to thoracotomy, operative complications or mortality. The median (interquartile range) postoperative hospital stay was 1 (1–2·5) days. At a median (range) follow up of CP patients of 36 (1–63) months, the median VAS score declined from 7·5/10 preoperatively to 3/10 postoperatively, while opiates were discontinued in 3 patients, markedly reduced in 5, unchanged in 2, and increased in 2 patients. At a median (range) follow up of cancer patients of 2 (1–15) months, the median VAS score declined from 8/10 preoperatively to 1·5/10 postoperatively, while the opiate requirements were markedly reduced in 5 patients and increased in 2 patients (one patient was lost to follow up).

Conclusion: BTS is a safe and useful minimally invasive approach to palliation of intractable upper abdominal pain with good short-to-medium term results in patients with malignancy and those with CP.

Minimally invasive surgery/ambulatory care 0776

A 6-year single centre experience of intra-operative bile duct stent insertion followed by early ERCP for choledocholithiasis

S. Jacob, N. Barnes, H. Aldean, D. Flook
The Royal Oldham Hospital, Manchester

Background: We report our 6-year single centre experience of intra-operative bile duct stent insertion followed by early ERCP for choledocholithiasis.

Methods: A retrospective casenote analysis was performed of all patients found to have choledocholithiasis during laparoscopic cholecystectomy with routine cholangiography. Data pertaining to complications, operative time, hospital stay and outcomes were acquired and analysed.

Results: We identified 84 patients (18 male : 66 female) in whom intraoperative cholangiography revealed occult choledocholithiasis, treated by intra-operative bile duct stent insertion followed by early ERCP. Of these, 30 had calculi 5 mm or greater in diameter. Median operative time was 105 mins (range 60–255). Median hospital stay was 2 days. Median time interval between surgery and sphinterotomy was 4 weeks (range 2–9 weeks). Bile duct clearance was

achieved in 82 patients. 2 patients incurred major complications (retroperitoneal collection, severe acute pancreatitis) and one developed mild pancreatitis. 30 patients had 1 stent inserted intra-operatively and the remainder had 2 stents. Mean follow up was 22 months. No patients required an open procedure with common bile duct exploration. There was no mortality associated with ERCP. The insertion of two CBD stents became favoured, as these acted as anatomical aids during ERCP and sphincterotomy.

Conclusion: Laparoscopic common bile duct exploration remains the gold standard management for choledocholithiasis, although this is only selectively practiced. Our series demonstrates favourable results using intra-operative biliary stent insertion and early sphincterotomy. We suggest that pre-operative ERCP should be reserved for patients with symptoms or signs indicative of ductal calculi. Furthermore, in centres where laparoscopic choledochotomy and bile duct exploration is not available, intra-operative bile duct stent insertion followed by early ERCP represents a useful and effective stratagem for patients found to have occult choledocholithiasis preoperative ERCP and intraoperative bile duct exploration. reserved for patients with symptoms or signs indicating ductal calculi. Until laparoscopic bile duct exploration becomes routine, endoscopic management of bile duct stones is an important therapeutic option.

Minimally invasive surgery/ambulatory care 0778

Ambulatory parathyroid surgery

S. G. Fisher, I. T. Munday, H. L Simpson, V. K. K. Chatterjee, G. C. Wishart

Addenbrookes Hospital, Cambridge

Background: We have previously shown in a small pilot study ($n = 50$) that focused parathyroidectomy (FP) can be safely performed as a day-case (DC) procedure. We have now developed an algorithm for the surgical management of primary hyperparathyroidism and wished to review the cure rates with regard to surgical approach (FP *versus* bilateral neck exploration – BNE) and surgical setting (DC *versus* in-patient – IP).

Methods: All patients ($n = 188$) with (non-Multiple Endocrine Neoplasia-related) primary hyperparathyroidism operated between November 2000 and August 2006 were included. All patients had pre-operative localisation with ^{99m}Tc-sestamibi scintigraphy +/− neck ultrasound, as well as intra-operative parathyroid hormone measurement. Patients with unifocal disease were offered FP as a DC unless medical co-morbidity necessitated IP stay. DC patients were discharged within two hours of surgery. Patients with negative imaging, multifocal disease or discordant scans were offered BNE as an IP. Cure rates in all three groups (FP/DC; FP/IP; BNE) were compared.

Results:

Approach	Number	% of total group	Number cured with initial surgery	Cure rate
FP (DC)	134	71%	133	99·3%
FP (IP)	16	9%	16	100·0%
BNE	38	20%	37	96·8%
Total	188	100%	186	98·9%

Conclusion: Using a focused approach the majority (71%) of patients with primary hyperparathyroidism can be treated by ambulatory surgery. This algorithm allows appropriate selection of surgical approach (FP or BNE) and setting (DC or IP) with high and similar cure rates in all three groups.

Minimally invasive surgery/ambulatory care 0793

Systematic review of laparoscopic *versus* endoscopic drainage of pancreatic pseudocysts

M. Aljarabah[1], B. Ammori[2]

[1]Cheltenham General Hospital, Cheltenham, [2]Manchester Royal Infirmary, Manchester

Background: The endoscopic and laparoscopic approaches to internal drainage of pancreatic pseudocysts (PPs) are current minimally invasive management options. This review critically appraises the evidence available to their effectiveness.

Methods: A computerised search was made of the MEDLINE, PUBMED and EMBASE databases for English language publications from 1974 to 2005.

Results: Some 620 and 118 patients featured in 27 and 19 reports to have undergone 634 and 118 endoscopic and laparoscopic drainage procedures respectively. Laparoscopic surgery was associated with a higher success rate in achieving resolution of the PPs (98% *versus* 80%, $p < 0·001$), lower morbidity (4% *versus* 14%, $p = 0·002$) and lower recurrence rate (2·5% *versus* 14·5%, $p = 0·001$), but had a shorter follow up compared with the endoscopic series (mean, 13 *versus* 24 months, $p < 0·0001$). Both approaches had low mortality rates (0 *versus* 0·3%).

Conclusion: Although the endoscopic approach enjoyed a five-fold greater application compared with laparoscopic surgery, it was associated with lower success rate, and higher rates of morbidity and recurrence. However, longer follow up data and randomised comparative trials are needed.

Minimally invasive surgery/ambulatory care 0802

Trends in colorectal ambulatory surgery in NHS Trusts between 1998 and 2005

O. Faiz[1], G. Colucci[1], T. Brown[1], A. McGuire[2], R. Kennedy[1], S. Clark[3]

[1]Department of Surgery, St Mark's Hospital, Harrow [2]Department of Social Policy, LSE Health and Social Care, London [3]The Polyposis Registry, St Mark's Hospital, Harrow

Background: Day surgery operating confers considerable patient benefits for appropriately selected cases and reduces demand for limited inpatient resources.

Methods: Operative admission data between 1998 and 2005 were obtained from the Hospital Episode Statistic (HES) database. Procedures were analysed according to OPCS-4 procedure code.

Results: Over the study years a total of 3,119,058 colorectal operative admissions were recorded on the HES database. 1 891 474 (60·6%) were admissions for lower gastrointestinal endoscopies, 527 665 (16·9%) were 'emergency' colorectal operative admissions, 406 368 (14·0%) were elective admissions for surgery and 293 551 (9·4%) were elective colorectal day case admissions. A small overall increase in the elective day surgery rate (from 40·7% to 43·1%) was observed throughout the seven-year period. Commonly performed proctological operations over the seven years included procedures coded to the following OPCS-4 codes: (H51–53) haemorrrhoid procedures ($n = 173,789$), (H59) 'excision of pilonidal sinus' ($n = 40,419$), (H55) anal fistula procedures ($n = 53,880$) and (H56) 'other operations on anus' which included anal fissure procedures ($n = 43,026$). Day surgery rates for "Excision of haemorrhoid" procedures coded to the H51 procedure category increased from 9·1% in the first study year to 26·1% by the last study year. Enhanced Day Case rates were observed for: pilonidal sinus (from 25·2% to 42·0%), anal fistula (from 26·8% to 43·6%) and anal fissure procedures (from 54·6% to 60·3%) throughout the study period. If the day case rate were improved up to 75% for all of the above commonly performed proctological procedures (i.e. H51-53, H55, H56 and H59 procedure codes) at least 20,740 inpatient bed days could be saved annually across NHS Trusts.

Conclusion: Increased ambulatory operating has occurred in colorectal surgery over the last seven years. There is however still significant scope for increased proctological day surgery with a concomitant release of inpatient resources.

Minimally invasive surgery/ambulatory care 0803

Day case laparoscopic Nissen's Fundoplication

C. Jenson[1], A. Gilliam[1], S. Bawa[1], S. Attwood[2], L. Horgan[2]
[1]NUGITS, Ashington, [2]NUGITS, North Tyneside

Background: Nissen's Fundoplication has been performed laparoscopically for over 15 years, being associated with a shorter length of hospital stay (LOS) and fewer complications than conventional open surgery. The objective of this study was to examine the safety and efficacy of day case laparoscopic Nissen's Fundoplication (LNF).
Methods: Notes of all patients under the care of 3 laparoscopic surgeons undergoing LNF in a district general hospital during a four year period (Jan 2003 – Dec 2006) were reviewed to examine LOS, complications, time to perform the procedure and grade of operating surgeon.
Results: During the studied period, 274 LNF were performed. Of these, 65 (24%) were performed as day cases. Day case LNF patients had a median age of 42 years (range 20–68), 62% were male, 63 (97%) had an ASA grade of I-II, and all were discharged to the care of a co-habiting adult. Three (5%) day case LNF were performed by Higher Surgical Trainees.
There were no conversions to an open procedure. Twenty-six patients (40%) had additional simultaneous procedures performed (including adhesionolysis and laparoscopic cholecystectomy). Median operative time was 60 minutes (range 25–120.) One peri-operative complication (port site bleed) was treated without prolonging the LOS.
At a median follow-up interval of 7 weeks (range 2–31) 91% of patients had improvement of all presenting symptoms. There were 3 postoperative complications including 1 wound infection, 1 patient with ongoing regurgitation (requiring laparoscopic division of a gastric band adhesion) and 1 patient with dysphagia (requiring re-do partial fundoplication).
Conclusion: Day case LNF is safe and effective for treating selected patients with GORD.

Minimally invasive surgery/ambulatory care 0840

Day case laparoscopic cholecystectomy in an elderly population

P. Hamilton, C. Jensen, R. Ishak, K. Seymour, NUGITS
North Tyneside General Hospital, North Shields

Background: Laparoscopic cholecystectomy has been performed safely as a day case procedure for many years on low risk patients. Patients over the age of 69 with ASA grades III and IV however often have a longer hospital stay. Various studies have reported safe outcomes in this elderly patient population, but few have looked at the possibility of day case surgery in this patient group. This is the first series examining the safety and efficacy of day case laparoscopic cholecystectomy in elderly patients.
Methods: Case notes of all patients over 69 undergoing a laparoscopic cholecystectomy where the time from operation to discharge was less than 24 hours between January 2005 and April 2006 were examined in this retrospective study. All procedures were performed within one trust.
Results: 71 patients (21 males, 50 females) were included in the study. The mean patient age was 75 years (range 69–91). Five patients had an ASA grade I, 51 patients were grade II, 14 were grade III and 1 was grade IV. 9 (13%) patients had an intraoperative cholangiogram (IOC). The mean operative time was 50 minutes for laparoscopic cholecytectomy and 102 minutes for laparoscopic cholecystectomy with IOC. All procedures were elective. Post operative complications consisted of 2 (3%) patients with acute urinary retention. Within the first 28 days 3 (4%) patients were readmitted, one for a trial without catheter, one with a chest infection and one with jaundice requiring an ERCP. Mean follow up period was 6 weeks. All presenting symptoms were improved at follow up.
Conclusion: Readmission rates in other studies are comparable at 3% and 4·3% in younger patients, to our rate of 4% in elderly patients. Data presented demonstrates that laparoscopic cholecystectomy is suitable and safe as a day case procedure for selected elderly patients with low readmission and complication rates. A small proportion of patients with ASA grades III and IV were also discharged safely in under 24 hours without complications or readmissions. At this institution age alone is no longer an exemption to day case surgery.

Minimally invasive surgery/ambulatory care 0907

Surgical sympathectomy for severe facial blushing

P. Coney, J. Horsnell, K. Poskitt, I. Nyamekye
Worcester Royal Hospital, Worcestershire

Background: Debilitating facial blushing has a variable response to physical masking, cognitive behavioural therapy and B-blockade. Thoracic Endoscopic Sympathectomy (TES) offers a minimally invasive approach for long term cure, with quoted success rates in the region of 85%. We have reviewed outcomes after TES for patients presenting with facial blushing as their primary symptom.
Methods: Patients presenting since 2000 have been studied by interrogation of a prospective database and case note review. All patients underwent TES (sympathetic chain transection on the 2nd rib) under general anaesthesia, with overnight stay. Clinical review was undertaken at 6 weeks postoperatively.
Results: 44 patients were assessed and 24 (55%) had blushing as their main symptom and underwent TES, 23 bilateral and 1 unilateral. Additional presenting symptoms included palmer/axillary hyperhidrosis (5), facial hyperhidrosis (1) and Harlequin Syndrome (1). The median age of operated patients was 35 (range 17–75) and 13 (54%) were men. 23 patients (96%) reported complete resolution of blushing symptoms. 6 patients (25%) reported mild compensatory truncal hyperhidrosis and one had suffered transient axillary nerve palsy, however none regretted the procedure being performed.
Conclusion: TES is an effective surgical treatment for carefully selected patients with debilitating facial blushing. TES induced compensatory sweating remains the major side effect and should be highlighted during informed consent.

Minimally invasive surgery/ambulatory care 0948

Comparison of recurrence rates following laparoscopic totally extraperitoneal inguinal hernia repair using light *versus* heavy weight meshes

D. Akolekar, A. C. de Beaux, S. J. Nixon
Royal Infirmary of Edinburgh, Edinburgh

Background: A new lightweight mesh was introduced for use in laparoscopic totally extraperitoneal (TEP) inguinal hernia repair in our institution. The aim of this study was to compare the outcome following the use of a new lightweight *versus* a standard heavyweight mesh during TEP hernia repair.
Methods: Patients undergoing TEP repair using light weight or heavy weight meshes between March 2004 and March 2006 were identified from the prospectively collected Surgical database. The patients who re-presented with recurrence of hernia were studied in greater details. Date of re-attendance at a clinic with recurrence was used as a surrogate for date of recurrence.
Results: Two hundred and eight patients (302 hernias) underwent a TEP repair using a lightweight mesh while 288 patients (377 hernias) had a repair using a heavyweight mesh. A total of 21 hernias recurred (3·09%), all males, with a median follow up of 389 days (range 150–880 days). Eleven of the 302 hernias (3·6%) of the lightweight mesh category recurred while 10 of the 377 hernias (2·6%) from the heavyweight mesh group recurred. This difference was not statistically significant ($p = 1$, Fisher exact test). Of the 21 hernias that recurred, 14 were bilateral at initial surgery. Early recurrence (0–50 days) was seen more commonly with lightweight mesh; however, this difference was not significant.
Conclusion: Shift from heavyweight to lightweight mesh during TEP has not increased the recurrence rate in the short term. However, early improvement in post-operative pain scores have been shown in patients with lightweight mesh compared to heavyweight mesh and this study has been published previously by this group.

Minimally invasive surgery/ambulatory care 1000

A meta-analysis of ambulatory *versus* inpatient laparoscopic cholecystectomy

N. Z. Ahmad, M. H. Ghous, G. Byrnes, D. O'Ceallaigh, S. A. Naqvi
[1]*Mid-Western Regional Hospital, Ennis.Co Clare*, [2]*St Vincent's University Hospital, Dublin*

Background: Laparoscopic cholecystectomy has become the treatment of choice for cholelithiasis. In the recent years there has been a trend to perform uncomplicated cases on ambulatory basis, reducing the cost of the procedure further. The aim of this study was to examine the effectiveness of day-care laparoscopic cholecystectomy.
Methods: A systematic review of Cochrane, Embase and Medline using the keywords "ambulatory", "laparoscopic" and "cholecystectomy" was performed. Data was extracted for a meta-analysis. Rate of admissions, re-admissions, attendance in the accident and emergency department or a visit to general practitioner either because of immediate or early postoperative complications were compared between the day care and inpatient laparoscopic cholecystectomy groups. Quality of life, patient satisfaction and cost effectiveness was also analysed.
Results: The search process identified 7 randomised controlled trials suitable for meta-analysis. They comprised 598 patients and compared day-care and inpatient procedures. The unplanned admission rate in the ambulatory group was comparable with prolonged hospitalization of inpatients. There was no significant difference in the re-admission rate of both groups. Quality of life indicators were similar in ambulatory and overnight stay patients. Day care procedures were more cost effective because of the shorter mean hospital stay.
Conclusion: Ambulatory laparoscopic cholecystectomy can be performed safely in selected patients without compromising the postoperative recovery. Additionally, it is less expensive and is associated with a high level of patient satisfaction.

Minimally invasive surgery/ambulatory care 1121

Cost effective day case laparoscopic rectopexy in selected patients

A. Zissimopoulos, J. Halbert, V. Vijay, S. Siddiqi, S. Warren
Department of Surgery, Chase Farm Hospital, Enfield

Background: With increasing financial and bed pressures within the UK healthcare system there is a drive towards increasing day care provision. Laparoscopic minimally invasive surgery lends itself well to the day case setting, but is not usually considered in the elderly with full thickness rectal prolapse.
Methods: A retrospective analysis of all the operations for rectal prolapse done over the last 5 years at our institution was performed to assess the cost-effectiveness of day case laparoscopic surgery (DCLR). Patients were selected for DCLR according to home circumstances, general fitness and patient wishes. Patient satisfaction for DCLR was assessed by telephone questionnaire. We calculated in-hospital costs by combining average stay and cost of theatre disposables. Bed occupancy costs £293 per day at our hospital, and the ultrasonic dissector used in the laparoscopic procedures, £250.
Results: Since 2001, 28 patients have undergone procedures for rectal prolapse (12 laparoscopic rectopexy and 16 Delorme's procedure). 5 of the 12 laparoscopic rectopexy patients underwent the procedure as a day case. A table with the baseline data of the patients in the 3 groups is shown.

	Delorme's Procedure ($n = 16$)	In-patient Lap Recto-pexy ($n = 7$)	Day Case Lap Recto-pexy ($n = 5$)
Age in yrs	81 (55–93)	79 (64–88)	68 (59–74)
M : F ratio	All female	All female	1 : 4
ASA grade (1 : 2:3 : 4)	3 : 7:6 : 0	2 : 4:1 : 0	3 : 2:0 : 0
First bowel action (days)	2 (1–5)	2 (1–5)	4 (2–7)
Average Hosp stay	5 (2–14) days	4 (2–6) days	12·6 (4–18) hour
Average in hosp cost	5 × £293 = £1465	4 × £293 + disp = £1422	50% × £293 + disp = £397

4 patients in the Delorme's group developed significant PR bleeding in the post-op period and 2 developed spiking temperatures. 1 patient in the DCLR group had persistent abdominal pain and diarrhoea requiring an A&E visit. There were no complications in the in-patient rectopexy group. The DCLR group are younger, fitter patients whereas the Delorme's are an older unfit group. 4 of the 5 DCLR group had stopped analgesia by the third day, reported their experience as excellent or good and would recommend this as a day case procedure to a friend. Whilst Delorme's and inpatient lap rectopexies cost much the same, there is a clear cost benefit of DCLR in selected patients of approximately £1000 per patient.

Conclusion: Day case laparoscopic rectopexy has never previously been reported. It is safe, feasible and acceptable in selected well motivated patients. When compared to Delorme's and inpatient lap rectopexy groups, it results in a saving of £1000/patient due to an average 3 day decrease in bed occupancy.

Minimally invasive surgery/ambulatory care 1122

The spectrum of rectal polyps referred to a unit offering Transanal Endoscopic Microsurgery (TEMS)

F. Kiernan[1], M. Joyce[1], M. Al Akash[1], N. Dowd[2], C. K. Byrnes[1], P. Neary[1], F. B. V. Keane[1]
[1]*Department of General Surgery, Adelaide and Meath Hospitals, incorporating the National Children's Hospital, Tallaght, Dublin* [2]*Department of Pathology, Adelaide and Meath Hospitals, incorporating the National Children's Hospital,, Tallaght, Dublin*

Background: Complex rectal polyps present a clinical challenge necessitating referral to a specialist colorectal service. Some may be amenable to local surgery in the form of transanal resection (TAR), snare piecemeal polypectomy (SP) or TEMS. Others, because of their morphology or a cancer component, may require formal resection.
Methods: All patients referred to our unit over a six year period with complex rectal polyps were entered prospectively into a database. This was analyzed for referral pattern, histology and surgical procedures performed.
Results: Of 121 patients (55 female, 66 male; median age, 64 yrs, range 24–89), the majority (102) were referred from other consultants (92% from other hospitals) and 19 were referred by their general practitioners. They had 125 procedures and their pathology was as follows:

Procedure	Number of proce-dures	TVA (severe dysplasia)	T1 Cancer	> T1 Cancer	Other
TEMS*	86	70(23)	4	9	3
TAR†	7	6(2)	1		
SP‡	11	9(4)	1	1	
Anterior resection	16	12(4)	4		
Abdomino-perineal	5	3(2)		2	

*3 had 2 TEMS; 1 had 2 TEMS then anterior resection; 2 had TEMS then APR; 4 had AR; 1 had TEMS then TAR. †1 had TEMS as 2nd procedure; 1 had AR. ‡2 had TEMS as 2nd procedure; 2 had AR.

TARS were performed for lesions close to the dentate line and SPs for very large exophytic lesions considered too large for TEMS. Anterior or abdomino-perineal resections for benign lesions were all performed because of extensive polyps, circumferential, multifocal or extending above the rectum. Six patients had no surgery (3 unfit for GA and 3 had no residual lesions).There was one procedure related mortality.

Conclusion: The majority of patients referred to our unit with rectal polyps were appropriate and suitable for TEMS. Whilst offering a TEMS service, it appears necessary to be prepared for a diversity of lesions necessitating a wide range of management options.

Minimally invasive surgery/ambulatory care 1144

Laparoscopic placement of an absorbable mesh to protect small bowel during pelvic radiotherapy

F. Kiernan[1], M. Joyce[1], P. Kelly[2], N. Davarinos[1], C. K. Byrnes[1], P. Thirion[2], F. B. V. Keane[1], P. Neary[1]

[1]Department of General Surgery, Adelaide and Meath Hospitals, incorporating the National Children's Hospital, Tallaght, Dublin [2]Department of Radiation Oncology, St.Luke's Hospital, Rathgar, Dublin

Background: Radiotherapy has significantly improved the outcome for patients with pelvic malignancies. The response to treatment is dose dependent but the presence of small bowel in the radiation field is a limiting factor. Intestinal slings have been developed to suspend the bowel above the pelvis facilitating the delivery of radiation thus improving the potential for oncological cure. These have traditionally been inserted using an open technique. We herein describe the placement of a mesh using a minimally invasive technique.

Methods: The medical records of four patients, who were diagnosed with prostate cancer, were reviewed. Pre-radiotherapy C.T. scans identified small bowel in the radiation field. Dosimetric analysis as per international guidelines identified that the volume of small bowel typically within the radiation field when the patient is supine with no mesh was calculated at 336 centimetre cubes (cc). When placed prone this reduced to 171 cc in contrast to 50 cc with the patient supine with mesh placement. Thus all 4 patients had small bowel extracted from the pelvis with the insertion of an absorbable mesh using a minimally invasive technique. Patients were rescanned following radiotherapy.

Results: There were no complications from laparoscopic mesh placement, and elevation of small bowel from the pelvis. All patients were discharged surgically within 48 hours. All patients received the optimal dose of radiotherapy (70 GY) with a check CT scan confirming dissolution of the mesh at 6 weeks. Using dosimetric analysis, as per international guidelines, the volume of small bowel within the radiation field when the patient is supine with no mesh was calculated at 336 centimetre cubes (cc). When placed prone this reduced to 171 cc in contrast to 50 cc with the patient supine with mesh placement.

Conclusion: Elevation of the small bowel from the pelvis allows dose escalation of radiation, and improved survival from pelvic malignancies. This case series indicates that the use of laparoscopic surgery for mesh placement is feasible. In addition the early recovery and minimal morbidity from the laparoscopic approach allows early initiation of radiotherapy in contrast to an open technique. The use of an absorbable mesh reduces potential for mesh-associated complications.

Minimally invasive surgery/ambulatory care 1156

Acute single stage management of laparoscopic common bile duct exploration

A. Alhamdani, S. Muhmod, S. Caplin, T. H. Brown

Morriston Hospital, Swansea NHS Trust, Swansea

Background: Laparoscopic exploration of the common bile duct (LCBDE) is now an established method in the management of bile duct stones. Most published reports are of elective procedures. We have been operating in both the acute and elective setting for the past 6 years. Our aim is to present our experience of LCBDE in the emergency and elective setting.

Methods: All patients undergoing LCBDE are prospectively entered into a database incorporating demographic and clinical data including mode of admission, indication for surgery, operation details and the clinical outcome.

Results: Between Nov 2000 and Dec 2005 126 patients underwent LCBDE. The male to female ratio was 1:2 and the median age was 57 (22–89). The indications were failed ERCP 27%, obstructive jaundice 18%, gallstone pancreatitis 13·5%, cholangitis 5·5%, pre-operative imaging 13%, intra-operative cholangiogram (IOC) 23%.

The numbers (%) of procedures performed during an acute admission *versus* elective procedures are as detailed in the table below.

	Emergency	Elective	
Transcystic	63	9	72 (57%)
Choledochotomy	37	17	54 (43%)
	100 (79%)	26 (21%)	126

Complication rate was 2/26 (8%) for the elective procedures and 8/100 (8%) in emergency LECBD. Two patients died in hospital in the emergency group, after 61 and 19 days (*metastatic disease)* There was no mortality in the elective group. 7 patients (5·6%) were converted to open ECBD (4 patients in the emergency group and 3 in the elective group). Median post-operative stay was 6 days with emergency surgery and 7 days with elective LCBDE.

Conclusion: Laparoscopic CBD exploration during an initial emergency admission is safe, with a complication rate, hospital stay and conversion rate no greater than with elective admission. We would recommend that LCBDE should be considered as one of the management options for patients presenting acutely with choledocholithiasis.

Minimally invasive surgery/ambulatory care 1162

Open inguinal hernia repair in elderly as day-case: Torbay experience

S. Sinha, G. Srinivas, J. Montgomery, D. DeFriend

Torbay Hospital, Torquay

Background: Day surgery services have expanded over the last decade and are offered to higher-risk population groups like elderly patients. Very few studies are available about the outcome of day-case inguinal hernia repair in elderly patients. We are presenting our experience in the day-case inguinal hernia repair in the patients aged 70 and above. The aim was to present the outcome of day-case open inguinal hernia surgery in patients aged 70 and above and compare it with patients below 65 years in same period.

Methods: Patients who had day-case open inguinal hernia repair between Jan 96 and Dec 04 at Day surgery unit (DSU), Torbay Hospital were prospectively followed. Data regarding different patient's variables and 24-hour postoperative telephone follow-up, and readmission were collected. Outcome of patients 70 years and above were compared with patients below 65 years operated in same period.

Results: A total of 588 patients were studied. Out of which 282 patients were aged 70 years or above and 306 patients were below 65 years. Number of patients with ASAIII was significantly more in elderly group (9·54% and 2·28% respectively). Percentage of patients operated on general anaesthesia was more in below 65 groups compared to above 70 yrs group (97% and 87·9% respectively). Average operating time and theatre time were similar in both group (31·4/47 min & 32·5/48 min respectively). Same day readmission in both group were 12·5% & 9·5% respectively ($p - 0{\cdot}43$). Patient's satisfaction on 24 hours postoperative telephonic follow-up was similar. 94·2% in elderly group and 93·8% patients in younger group.

Conclusion: Day-case open inguinal hernia repair is safe in patients aged 70 and above. Same day unplanned admission rate were comparable in both groups (12·5% & 9·57%) and well within the range of 2 to 15% as revealed by commission for healthcare audit and inspection for day surgery[1], 2005. Majority of patients in both groups (94·2% & 93·8%) described their experience as very satisfied. Although few patients did complain of pain, nausea, vomiting, oozing from wound and dizziness, majority were free of symptoms.

Minimally invasive surgery/ambulatory care 1173

Indications for an open approach in colorectal surgery

L. Soden, C. K. Byrnes, M. Joyce, D. O'Riordain, F. B. V. Keane, P. Neary
Adelaide & Meath Hospital, Dublin

Background: Laparoscopic colorectal surgery is rapidly being adopted by many specialised colorectal units. The documented patient benefits include reduced length of stay, rapid recovery and oncological equivalency to the traditional open approach. We examined our recent practice to determine reasons for open surgery in a unit performing the majority of resections laparoscopically.
Methods: We carried out an analysis of all colorectal procedures over 16 months. Patient demographics, indications for surgery and operative details were obtained from chart review, theatre registries, and hospital information systems, paying particular attention to those whom required an open operation, or were converted from a laparoscopic procedure.
Results: Including elective and emergency procedures, 133 cases were assessed. There were 73 females and 60 males of mean age 55years. 78% (104) of all cases were undertaken laparoscopically. The conversion rate was 5·8% (6). A de novo open approach was adopted in 29 patients (22%). 17/29 (59%) of the open procedures were in the emergency setting (11 perforations, 5 obstructions and one toxic megacolon). The 12 elective open procedures were performed for salvage surgery or tumour recurrence in four patients, suspected T4 disease in two, pouch surgery in three, complex Crohn's disease in one, extensive prior abdominal surgery in one, and patient preference in one. Reasons for conversion to open operation after an initial laparoscopic approach included four tumours appearing to invade adjacent organs and two complex inflammatory masses.
Conclusion: With appropriate preoperative planning only 22% of colorectal resections require an open approach. Open surgery is still required in most emergency colonic resections.

Minimally invasive surgery/ambulatory care 1178

Prior abdominal surgery does not preclude laparoscopic colonic resection

L. Soden, C. K. Byrnes, M. Joyce, D. O'Riordain, F. B. V. Keane, P. Neary
Adelaide & Meath Hospital, Dublin

Background: Previous open abdominal surgery is generally considered to be a relative contra-indication to laparoscopic surgery. We reviewed our patients whom underwent a laparoscopic colorectal procedure, under a single surgeon, to evaluate the impact of previous abdominal surgery on the feasibility of this approach.
Methods: Patients whom underwent a laparoscopic colorectal procedure over a 16 month period were identified. Data were retrieved from patients' charts, hospital information systems, and direct contact with patients themselves. Detailed information pertaining to past surgical history, and its effect on the current procedure was obtained.
Results: 91 patients underwent a laparoscopic colorectal procedure, with a de novo open approach in an additional 29 patients. 33 of the 90 laparoscopic patients were identified as having had at least one previous intraperitoneal operation. Of these, 18 had undergone one or more major laparotomies. An additional 6 had a previous appendicectomy and 3 an intraperitoneal gynaecological procedure through a pfannensteil incision. 6 patients had had a prior minimally invasive procedure including 3 laparoscopic subtotal colectomies as part of a three stage restorative panproctocolectomy. One patient underwent open surgery when a pneumoperitineum could not be established due to dense adhesions from multiple prior open procedures. A total of 6 patients were converted (6·5%). These conversions to open surgery were for suspected advanced malignant disease (4), an inflammatory mass and a markedly dilated colon.
Conclusion: All patients due for major colorectal procedures should be considered for a laparoscopic approach, regardless of previous abdominal surgery.

Minimally invasive surgery/ambulatory care 1208

Laparoscopic surgery for benign colorectal disease

E. Nugent, C. K. Byrnes, M. Al Akash, D. O'Riordain, F. B. V. Keane, P. Neary
Adelaide & Meath Hospital, Dublin

Background: Laparoscopic approaches are increasingly employed and accepted in the treatment of colonic diseases. This may lead to reduced complications and a shorter postoperative hospital stay. We report our recent experience during its introduction into our unit.
Methods: Patients with benign colorectal pathology requiring surgery were reviewed over a one year period. Both laparoscopic and open surgical procedures were examined. Data were obtained from theatre registries, clinical records and hospital information systems.
Results: A total of 73 patients, 30 male and 43 female underwent surgery during the study period. 33 had an open procedure and 40 a laparoscopic procedure (22% of whom were converted to open). There was no significant difference between the two groups for age or proportion of emergencies. Indications for surgery were diverticular disease, inflammatory bowel disease, rectal prolapse and benign polyps (table). Median post operative length of stay was shorter in the laparoscopic group than in the open group (7 days *versus* 14; $p < 0{\cdot}001$). Complications included 1 anastomotic leak in the open group and small bowel infarction in the laparoscopic group, there were 2 port site hernias requiring repair.

Indication for surgery	Laparoscopic	Open
Diverticular Disease	18	5
Ulcerative Colitis	4	9
Crohn's Disease	9	11
Benign Polyps	3	0
Rectal prolapse	3	0
Ischaemia	0	4
Other	3	4
Total	40	33

Conclusion: The introduction of laparoscopic surgery has not resulted in an increased morbidity in our unit. Patients undergoing laparoscopic resection can expect to go home a week earlier than their open counterparts.

Perioperative care/nutrition/metabolism

Perioperative care/nutrition/metabolism 0010

Peri-operative intravenous fluid administration: practice and perceptions

J. Manson, D. M. Gore
St Mark's Hospital, London

Background: Correct peri-operative intravenous (IV) fluid prescription is important for optimal clinical outcome in surgical patients. Randomised controlled trials have demonstrated that peri-operative salt and water restriction in patients undergoing elective colorectal resections results in quicker return of gastro-intestinal function with shorter inpatient stay and lower morbidity and mortality.
Methods: A retrospective analysis of IV fluid administration was performed in elective patients undergoing primary colorectal resection in a tertiary referral centre in a three month period from August 2005. As a consequence, a survey of anaesthetic and surgical staff was carried out to establish their knowledge and IV prescribing habits. Doctors were questioned about their preferred intra-venous fluid for maintenance and the reasons for their choice. They were also asked about the sodium content of commonly used intravenous fluids and whether they thought that the amount of salt administered would have any effect on recovery.
Results: Patient data ($n = 20$): A median of 798 mmol sodium was administered on the day of surgery, and a median daily equivalent of 210 mmol administered on days 1 to 3 post-operatively. Salt and water administration did not significantly correlate with urine output, time to passage of faeces or inpatient stay. IV prescriber survey ($n = 46$): Surgeons preferred 0·9% normal saline but anaesthetists preferred Hartmann's solution. The more senior the prescribing doctor, the more knowledge was demonstrated with regard to the composition of IV fluids. Of trainee doctors, 50% or more did not recognise that there was an adverse effect of salt administration on recovery.
Conclusion: Excessive amounts of water and salt are routinely prescribed by both anaesthetic and surgical staff. The lack of correlation with urine output *et cetera* is consistent with salt loading. Trainees lack knowledge of the composition and physiological effects of IV fluids.

Perioperative care/nutrition/metabolism 0135

Postoperative fluid management: Current practice and trainees perceptions

S. Kumar, M. Oommen, M. M. Lambertz, S. P Balasubramanian
Rotherham District General Hospital, Rotherham

Background: The 1999 UK 'National Confidential Enquiry into Perioperative Deaths' report suggested that fluid imbalance negatively influences postoperative outcomes and recommended that "training in fluid management, for medical and nursing staff, is required to increase awareness and spread good practice". The aim of this study was to determine trainees understanding of postoperative fluid and electrolyte requirements and assess current practice of postoperative fluid management in a single hospital.
Methods:
1. Questionnaire survey of trainee doctors ($n = 47$) which included a hypothetical clinical scenario to evaluate respondents' fluid prescription practices and perceived need for further training.
2. Retrospective review of early postoperative fluid and electrolyte management of patients ($n = 51$) who underwent laparotomy over a three month period.

Results: Both the survey and the retrospective study suggest that trainees tend to over prescribe sodium and water and under-prescribe potassium for stable postoperative patients. Survey: the median (range) amount of fluid, sodium and potassium per day thought to be necessary in a 70 kg stable postoperative patient was 3 litres (1·2–4), 240 mmol (75–450) and 40 mmol (0–140) respectively. Over 40% of doctors received no training on fluid/electrolyte management and 40% of those who received training thought that it was inadequate. Retrospective study: of the 51 records available for analyses, documentation of fluid balance was not available in 43% of records and only in 52% of the remainder were the charts complete and in accordance to fluid prescribed. Analysis of prescription practices in stable patients (not on substantial oral intake) showed that daily fluids, sodium and potassium were prescribed at a median (range) of 3 litres (1–5), 300 mmol (150–480) and 0 mmol (0–80) respectively. 18 of the 51 patients (35·3%) had documented evidence of hypokalemia by the end of the first week.
Conclusion: Current fluid and electrolyte prescription practices leave considerable scope for improvement. This is probably due to a lack of awareness of fluid and electrolyte requirements and demonstrates a need for increased education.

Perioperative care/nutrition/metabolism 0189

Stimulant laxative use and the return of bowel function after elective colorectal resection in an enhanced recovery programme

U. Ihedoiha[1], J. T. Jenkins[1], G. MacKay[1], R. G. Molloy[2], P. J. O'Dwyer[1]
[1]Western Infirmary, Glasgow, [2]Gartnavel General Hospital, Glasgow

Background: Evidence has established the role of "Fast track" recovery programmes after major abdominal surgery. We aimed to ascertain whether the use of a stimulant laxative, Bisacodyl; expedited the return of bowel function within a multimodal rehabilitation program.
Methods: Patients undergoing elective colorectal resection between September 2005 and October 2006 were recruited to the study. A "fast track" protocol with early feeding, mobilisation and fluid restriction was applied to all patients. Outcomes included return of gastrointestinal function, pain scores, hospital stay and peri-operative complications. A p value of $< 0·05$ was considered significant.
Results: Sixty patients (34F : 26M) were recruited to the study. [Median age: 72 years (IQR 63–79)]. Surgery was open and laparoscopic-assisted in 38 and 22 (1 conversion to open procedure), respectively. [Median hospital stay: 7 days (IQR 6·0–8·5)]. [Overall median time return of GI function: 3 days (IQR 2–4)]. 28 patients received Bisacodyl. Stimulant laxative use was neither associated with total hospital stay [BISACODYL: 6 days (IQR 6·0–7·8); NO BISACODYL: 7 days (IQR 6·5–9·5); M-W test $p = 0·051$] nor with return of bowel function (days) ($p = 0·272$). Post-operative pain scores in the first three days were not, in general, associated with bisacodyl use however; bisacodyl use was associated with less pain on the third day post-operatively at rest (morning; $p = 0·029$; evening; $p = 0·011$). A significant increase in the morphine requirement was noted in the group receiving bisacodyl [BISACODYL: Median dose 57 mg (IQR 30–83); NO BISACODYL: Median dose 28 mg (IQR 21–46); M-W test; $p = 0·001$] No other significant associations were identified.
Conclusion: The use of bisacodyl does not enhance the return of bowel function in an enhanced recovery programme.

Perioperative care/nutrition/metabolism 0191

The relationship of incision length and short-term outcomes after elective colorectal resection in an enhanced recovery programme

U. Ihedoiha[1], J. T. Jenkins[1], G. MacKay[1], R. G. Molloy[2], P. J. O'Dwyer[1]
[1]Western Infirmary, Glasgow, [2]Gartnavel General Hospital, Glasgow

Background: For appropriately selected patients undergoing elective colorectal resection, enhanced recovery programmes have produced significant reductions in total hospital stay. At present, it is unclear whether reduced length and improved orientation of abdominal incisions within an enhanced recovery

programme may further reduce hospital stay and promote more rapid return to normal activity.
Methods: A prospective study of patients undergoing elective "fast track" colorectal resection between September 2005 and October 2006 was conducted. Incision length was prospectively recorded and categorised as: incision > 10 cm; midline: incision < 10 cm; Pfannensteil for left colon/upper rectum; right upper quadrant transverse incision for right/transverse colon lesions. Incision length was analysed as a continuous and categorical variable.
Results: Of the 60 recruited patients, 19 had incision < 10 cm and 41 had incision > 10 cm. Median age was equivalent in both groups (M-W test; $p = 0{\cdot}598$). In the group > 10 cm, median incision length was 16 cm (IQR 16·5–21·0). Incision length was weakly correlated with post-operative pain score on the morning of Day One post-op at rest (Spearmanns' rho = 0·274; $p = 0{\cdot}034$) but no other post-operative pain parameters including total post-operative morphine dose (Spearmanns rho = 0·069; $p = 0{\cdot}598$). The time to first bowel movement (days) was not correlated with incision length (Spearmanns rho = 0·191; $p = 0{\cdot}147$). Where the incision length was categorised as < 10 cm or > 10 cm, we noted no significant associations with any pain scores at any point in the first three post-operative days or post-operative morphine use [$p = 0{\cdot}556$ (M-W test)] and time to first bowel movement.
Conclusion: The use of smaller, targeted incisions does not appear to enhance recovery in a multimodal rehabilitation regime. Large randomised trials are required to confirm these findings.

Perioperative care/nutrition/metabolism 0281

Formal cardiopulmonary exercise testing is of limited value prior to oesophagectomy

M. J. Forshaw, D. C. Strauss, A. R. Davies, D. Wilson, B. Lams, A. Pearce, A. J. Botha, R. C. Mason
St Thomas' Hospital, London

Background: Measurements derived from cardiopulmonary exercise (CPX) testing may identify patients at high risk of postoperative cardiopulmonary morbidity and mortality following major surgery. Its role prior to oesophagectomy remains undefined. The aim of this study was to assess CPX testing prior to oesophagectomy.
Methods: 97 patients (81 males, median age = 66 years, range = 40–81 years) diagnosed with benign and malignant disease of the oesophagus and oesophagogastric junction (January 2004 – September 2006) underwent CPX testing. Measured variables included anaerobic threshold (AT), maximum oxygen transport at peak exercise (V02max) and % predicted V02 max. Outcome measures were postoperative morbidity and mortality, length of hospital stay and unplanned ITU admission.
Results: Surgical resection was only performed in 78 patients with 19 patients either being medically unfit, incorrectly staged, offered non-surgical forms of treatment or unresectable at surgery. There was one in-hospital death (1·3%). Cardiopulmonary and non-cardiopulmonary complications occurred in 33 (42%) and 19 patients (24%) respectively. 13 patients (17%) were admitted to ITU on an unplanned basis. There was no significant difference in the incidence of cardiopulmonary complications when the patients were stratified according to whether a thoracotomy was performed. Only V02 max was significantly lower in patients with postoperative cardiopulmonary morbidity ($p = 0{\cdot}04$). The area under a ROC curve for % predicted V02max was 0·58 (95% CI 0·45–0·71), for V02max was 0·63 (95% CI 0·50–0·76) and for AT was 0·62 (95% CI 0·49–0·75). V02max and AT were clinically poor predictors of cardiopulmonary morbidity at a range of cut offs. There was no association between the variables and non-cardiopulmonary morbidity, length of hospital stay or ITU admission.
Conclusion: Measurements derived from CPX testing are of limited clinical value in predicting postoperative cardiopulmonary morbidity in patients undergoing oesophagectomy. The use of an AT cut off of 11ml/kg/min was not helpful.

Perioperative care/nutrition/metabolism 0282

Regional anaesthesia as an alternative to general anaesthesia in high risk individuals undergoing colorectal surgery

J. Skipworth, A. Srilekha, S. Siriwardhana, R. Navaratnam
North Middlesex University Hospital, London

Background: A prospective study was undertaken to review the use of regional combined high spinal epidural anaesthesia in high-risk patients that underwent colorectal surgery between 2004 and 2006.
Methods: 11 high-risk patients underwent surgery between 2004 and 2006 using a regional anaesthetic technique. All patients were classified as high risk based on their anaesthetic assessment (ASA 3 or 4). They were given a thoracic (T6–T8) epidural using premixed 0·2 mg/ml fentanyl + 0·1% bupivacaine, together with a lumbar subarachnoid (L2–L4) block using 2ml of heavy bupivacaine + 3 ml of normal chirocaine + 0·3 mg diamorphine. Outcome was assessed based on post operative pain relief, need for ITU, need for intubation, length of hospital stay and morbidity/mortality.
Results: The 11 patients were aged 38–98 yrs (Mean 80·2 yrs) with a sex ratio of 5M : 6F (1 : 1·2). 8(72·7%) patients presented as emergencies, with only 3(27·3%) elective procedures being undertaken (see below). All 11(100%) patients rated their post-operative pain relief effective. 30 day mortality was 1(9·1%). All patients were transferred to HDU directly from theatre, and only 1(9·1%) patient required delayed ITU support. None of the patients required intubation at any stage. There were 2(18·2%) minor complications (wound infections) and 1(9·1%) major complication (bilateral pneumonia). Length of stay was 4–42 days (11·2 days mean). 2(18·2%) patients had delayed discharge for social reasons.

Emergency ops	Elective ops
Laparotomy + Adhesion Release (x3)	Laparoscopy-Assisted R Hemicolectomy
Formation of Loop Ileostomy (x2)	Laparotomy and Reversal of Ileostomy
Open R Hemicolectomy	Mesh Repair of Hernia
Open Appendicectomy	
Laparoscopic Appendicectomy	

Conclusion: This study supports the role of regional high spinal epidural anaesthesia in the management of patients undergoing colorectal surgery. This cohort of patients demonstrated early postoperative recovery, with effective analgesia and minimal complications. Using this technique, patients were managed appropriately in HDU and the surgical ward, without the need for ITU admission and without affecting their overall length of hospital stay.

Perioperative care/nutrition/metabolism 0305

Predicting postoperative morbidity and mortality in aortic surgery using a combination of stress echocardiography and cardiopulmonary exercise testing (CPET)

A. Carter[1], D. Atkinson[2], J. Eddleston[2], N. Turner[1], A. Halka[1], J. Kirton[1], M. Murphy[1], N. Abidin[3], R. Khattar[3], V. Smyth[1], M. Walker[1]
[1]Department of Vascular Surger, Manchester Royal Infirmary, Manchester, [2]Deprtment of Anaesthetics, Manchester Royal Infirmary, Manchester [3]Department of Cardiology, Manchester Royal Infirmary, Manchester

Background: Neither clinical findings nor static preoperative investigations add prognostic information to those patients of intermediate risk undergoing major surgery. Dynamic investigations such as stress echocardiography and cardiopulmonary exercise testing (CPET) are increasingly used in this group. They have been shown to correlate with cardiac outcome. It is unclear however, as to which indices or combination of indices, provide the most

useful information. This study aims to determine which indices of CPET and cardiac stress testing are most useful in assessing the intermediate risk patient.
Methods: All patients undergoing aortic aneurysm repair were included. Patients underwent stress testing with either dobutamine echocardiography or stress myoview followed by symptom limited CPET.
Results: 46 patients have undergone infrarenal aortic surgery. Left ventricular ejection fraction failed to correlate with either exercise tolerance or outcome. 40% of patients had myocardial ischaemia on stress testing with 33·9% of these patients developing cardiac complications postoperatively. Of those patients with an Anaerobic Threshold (AT) < 11, 16·7% died, 33·3% developed cardiac complications, 22·2% pulmonary complications and 11·1% suffered multi-organ failure. 70% of patients with high ventilatory equivalents developed respiratory complications.13 of the patients in our cohort had demonstrable myocardial ischaemia and an AT < 11. Two thirds of these suffered cardiac complication postoperatively.
Conclusion: Results for AT, ventilatory equivalents and presence of ischaemia on stress testing appear to be the three main determinants of postoperative morbidity and mortality. CPET and cardiac stress test results can be used to stratify intermediate risk patients and to aid the selection of postoperative destination.

Perioperative care/nutrition/metabolism 0381

An audit of antibiotic prophylaxis for emergency and elective general surgery

N. Braha, C. Ingham Clark
The Whittington Hospital, London

Background: Antibiotic prophylaxis is recommended for surgical procedures where there is a significant risk of bacterial contamination of the wound during the procedure, or where the consequences of infection would be severe. The aim of this study was to compare the actual practice of antibiotic prophylaxis for emergency and elective general surgery with the existing hospital guidelines.
Methods: Case note review was conducted for 90 patients having general surgical procedures; 30 emergencies, 30 elective in-patients and 30 day-cases. All were in one hospital between September and November 2006. Prophylactic antibiotic usage, timing and drug prescribed were compared with the recommendations of our existing evidence-based hospital guidelines.
Results: There was a higher proportion of men than women in the emergency and day surgery groups, but not the elective in-patient group. The average age of the elective in-patient group was 69 compared with 43 for emergency patients and 44 for day cases.

Patient group	Correct prophylaxis	Required treatment not prophylaxis*	Inappropriate departure from guideline
Emergencies	13%	27%	60%
Elective in-patients	33%	0	67%
Day cases	53%	0	47%

*= active infection found before or during operation
Deviation from the guidelines was most commonly due to incorrect timing, with administration of the antibiotic taking place during rather than before the procedure in more than half of the emergency and elective inpatients.
Conclusion: In a significant proportion of our general surgical patients antibiotic prophylaxis was not being used appropriately. This has been fed back to all general surgeons and will be re-audited in association with an assessment of the incidence of post-operative infection.

Perioperative care/nutrition/metabolism 0395

Preoperative assessment of patients undergoing colorectal surgery using cardiopulmonary exercise testing

I. Nikolopoulos, V. Patel, M. George, E. Carapeti
St Thomas' Hospital, London

Background: Colorectal surgery is associated with significant morbidity and mortality. This study examines the usefulness of preoperative Cardiopulmonary Exercise Testing (CPX) in identifying high risk patients undergoing colorectal surgery, so that perioperative management can be optimized to reduce morbidity and mortality.
Methods: All patients undergoing colorectal surgery over a two month period were scheduled to have CPX. Expired gas analysis was used during bicycle ergometer exercise to establish Anaerobic Threshold (AT) as the most important measure of cardiopulmonary functional capacity. An AT of less than 11 ml/min/kg was taken as a marker of cardiac ischaemia and failure. Patients were divided in two groups; (group A: AT < 11ml/min/kg and group B: AT > 11 ml/min/kg) and the complication rate for each group was assessed.
Results: Twenty four out of twenty six patients successfully completed CPX. There were 14 patients in group A (mean AT 14·23; sd +/− 1·84) and 10 patients in group B (mean AT 9·85; sd +/−1·34). Postoperative complications were significantly higher in group A (6 patients) compared to group B (1 patient) ($p = 0·009$; Fishers Exact test). Complications included wound dehiscence (3), septicaemia (2) anastomotic leak (1), and death (1). The cause of the mortality was myocardial infarction and the patient had an AT of 7·5 ml/min/kg.
Conclusion: This small study demonstrates that an Anaerobic Threshold of less than 11ml/min/kg is associated with increased morbidity and mortality. Preoperative evaluation using CPX testing allows the identification of high risk patients and appropriate selection of perioperative management.

Perioperative care/nutrition/metabolism 0417

Serum magnesium should be perioperatively monitored in colorectal resection

M. D. Evans, K. Barton, E. J. Williams, G. A. Pritchard, S. S. Karandikar
[1]*Princess of Wales Hospital, Bridgend* [2]*Heartlands Hospital, Solihull*

Background: Magnesium (Mg) is the fourth most common mineral salt in the body. Hypomagnesemia is thought to cause cardiac arrythmias. This was a prospective study to assess the impact of bowel preparation alone in patients undergoing colonoscopy and surgery with bowel preparation, on serum Mg and its effect on perioperative cardiac events.
Methods: 61 patients receiving 2 sachets of Picolax bowel preparation prior to colonoscopy ($n = 31$) and elective colorectal resection ($n = 30$) were recruited. Mg, routine electrolytes and haematocrit (Hct) were measured and means compared: a) prior to bowel preparation, b) at colonoscopy or surgery and c) 24 hours after surgical resection. Operation length and cardiac complications were also recorded.
Results:

	Mg (mmol/l)	Ur (mmol/l)	Hct (%)
Pre bowel prep. (colonoscopy)	0·82*	6·1†	39·9
At colonoscopy	0·98*	5·4†	40·3
Pre bowel prep. (surgery)	0·84†	5·6†	39·3‡
At surgery	0·93†	4·8†	37·2†‡
24 hours post op	0·78†	5·9†	31·5†

Paired *t*-test *$P = 0·02$, †$P =< 0·01$, ‡$P = 0·04$.

There was no statistically significant change in sodium, potassium, creatinine or calcium after bowel preparation or surgery. Five patients experienced a post operative cardiac event (3 arrythmia and 2 myocardial infarction). Post operative cardiac events were associated with a lower pre-op Mg ($p = 0·04$) & higher creatinine ($p = 0·03$) and higher post-op urea ($p = 0·03$) & creatinine

($p = 0{\cdot}05$) & lower post-op Hct ($p = 0{\cdot}007$) and operation length ($p = 0{\cdot}03$), (*Mann Whitney U test)*.

Conclusion: Mg levels increased significantly post bowel preparation and dropped significantly post-op. Low pre-op. Mg levels were also associated with post-op. cardiac events. Routine monitoring and replacement of Mg in the peri-operative period is therefore recommended.

Perioperative care/nutrition/metabolism 0808

A single serum albumin on admission to the surgical high dependency unit predicts mortality in critically ill patients with gastrointestinal pathology

E. F. Leitch[1], E. J. Dickson[1], A. McBain[1], S. Robertson[2], C. W. Imrie[1]

[1] University Department of Surgery, Glasgow Royal Infirmary, Glasgow [2] Department of Internal Medicine, Pulmonology and Critical Care, Johannesburg Hospital, Johannesburg, South Africa

Background: Pre-operative hypoalbuminaemia is well established as a marker of poor outcome in surgical patients with gastrointestinal pathology. Albumin in this context functions as a marker of nutritional status and the inflammatory response. However, in the critically ill surgical patient it is the pro-inflammatory state and subsequent endothelial dysfunction with capillary leak which results in low serum albumin. Current markers of outcome in critically ill patients, such as organ failure scores, require serial measurements and complex calculations to predict mortality. This results in delayed identification of the high risk patients who are most likely to benefit from early intervention. Our aim was to evaluate a single albumin measurement on admission to the Surgical High Dependency Unit as a marker of the magnitude of endothelial injury, and correlate this with mortality.

Methods: In a prospective study conducted in a Surgical High Dependency Unit (SHDU), 66 consecutive emergency patients were evaluated. Full Ethics Committee approval was obtained. Serum albumin was measured on admission to the HDU and was evaluated with respect to in-hospital mortality.

Results: Serum albumin on admission to SHDU discriminated survivors from non-survivors ($p = 0{\cdot}013$, ANOVA). The mortality in patients with an albumin of less than or equal to 25 g/dl ($n = 50$) was 24%. All of the patients with an albumin of greater than 25 g/dl ($n = 16$) survived ($p = 0{\cdot}030$, Chi-Square). The mean albumin in survivors was 21·3 g/dl, and 16·0 g/dl in those who died ($p = 0{\cdot}013$, Student's T Test).

	Alb > 25 g/dl	Alb < 25 g/dl	*p*-value
In-hosp. mortality	0%	24%	$P = 0{\cdot}030$ (Chi^2)

Conclusion: Albumin is a significant predictor of mortality ($p = 0{\cdot}013$) in critically ill surgical patients with gastrointestinal pathology. This is probably related to the degree of inflammatory insult and subsequent endothelial failure. A single serum albumin measurement on admission to the critical care facility may be used to identify the high risk patient and allow earlier intervention to restore physiological stability.

Perioperative care/nutrition/metabolism 0986

Gut specific nutrients in patients undergoing elective surgery: A prospective randomised trial

M. M. Rao, M. Gatt, R. Kallam, J. MacFie

Combined Gastroenterology Research Unit, Scarborough General Hospital, Scarborough

Background: The aims of this study were to assess the tolerance of a commercially available gut-specific nutrient (GSN) preparation containing glutamine, multivitamins and antioxidants (Intestamin®) in a prospective double blind, randomised trial.

Methods: Consecutive patients undergoing elective abdominal surgery were randomised to receive 500ml/day of Intestamin® or placebo via a nasogastric tube within 1 hour of completion of surgery and subsequently 400mls orally daily until return of gut function. Data recorded included volume of supplement tolerated daily until return of normal gut function, morbidity, intestinal permeability, body composition and length of hospital stay. Results are presented as median (interquartile range).

Results: 50 patients (M : F of 35 : 15, age 61 (55–73) years) were recruited. 26 patients were randomised to receive Intestamin® and 24 to placebo. Intestamin® was well tolerated with a median intake of 500 ml/day. There were no complications related to the administration of GSN's. The median time to the return of normal gut function was respectively 5 (4–5) days *versus* 5 (5–7·5) days ($P = 0{\cdot}135$). There was no detectable difference in length of hospital stay between the two groups (respectively 5 (5–9) days *versus* 8 (6–11) days, $P = 0{\cdot}247$).

Conclusion: . No clinical benefits associated with GSNs were identified in this pilot study. However, Intestamin® was well tolerated immediately after surgery and there were no adverse events. There are, therefore, no contraindications to further research.

Sepsis/immunity

Sepsis/immunity 0035

Use of a double rhomboid transposition flap in the treatment of extensive complex pilonidal sinus disease

S. El-Tawil, E. A. Carapeti
St Thomas' Hospital, London

Background: Rhomboid transposition flaps are safe and successful in treating recurrent, complex pilonidal disease. There is little data on treatment of very large (> 12 cm) pilonidal sinuses. We describe a new technique using two simultaneous rhomboid flaps to achieve primary closure following extensive wide-excision.
Methods: With antibiotic prophylaxis, the sinus is excised en-bloc as a parallelogram (two adjacent rhomboids). Two rhomboid fasciocutaneous flaps are transposed to close this defect over suction-drains. Sutures are removed at 14 days.
Results: Seven patients (six male) were treated with this technique (median age 26 yrs; range 22–35 yrs). All had very extensive and recurrent disease, having had multiple previous procedures. Median drain-duration was 2d (range 2–5d) and post-operative stay was 2d (range 0–5d). One complication arose: a wound partial dehiscence which healed with conservative treatment. No recurrence or further complication arose in a 33 month follow-up (range 6–41 mth).
Conclusion: This is the first description of the use of two simultaneous rhomboid flaps for very large recurrent pilonidal disease. It is a relatively simple and safe alternative to major plastic reconstruction which is often resorted to in such large-scale disease.

Sepsis/immunity 0136

Protective effects of verapamil on lipopolysaccharide-induced acute lung injury involves both p38 MAPK and NF-κB signaling pathways *in vivo*

G. Li, X. Qi, J. Li, Z. Xu, X. Wu, Z. Sun, P. Li
Department of General Surgery, Jiangsu Cancer Hospital, Jiangsu Institute of Cancer Research, Nanjing, Jiangsu, China

Background: The lung is usually the first organ to fail in the period of sepsis-induced MODS. Regulation of pulmonary inflammation involves an intricate balance of both pro- and anti-inflammatory mediators. Recently, studies reported that verapamil could suppress LPS-induced production of pro-inflammatory cytokines and mortality, and increase expression of anti-inflammatory cytokines in serum in LPS-treated mice. Meanwhile, the principal pathways described in both experimental models, as well as human studies of acute lung injury are the NF-κB and p38 MAPK pathway. However, few studies have investigated any protective effect and the mechanism of verapamil on the inflammatory response in LPS-induced acute lung injury during endotoxic shock *in vivo*. Thus, we investigated the mechanism of verapamil in LPS-induced acute lung injury.
Methods: Adult male Sprague-Dawley rats were randomly divided into seven groups of eight rats each: control rats treated with saline (0·9% NaCl); rats treated with saline and then challenged with LPS (10 mg/kg); rats challenged with LPS and then treated with verapamil (10 mg/kg); rats treated orally with SB203580, a inhibitor of p38 MAPK (25 mg/kg) and then challenged with LPS; rats treated intraorally with SB203580 and then challenged with LPS and injected with verapamil; and rats treated only with verapamil or SB203580. TNF-α, IL-6, IL-10, phosphor-p38 MAPK, and NF-κB, in the lung tissue were investigated one hour after verapamil injection. Lung injury was estimated by neutrophil counts in BAL fluid and corroborated by histopathology of H&E stained lung sections.
Results: Verapamil could improve the acute lung injury. The concentration of TNF-α, IL-6, the counts of neutrophil in BAL, and the levels of phosphor-p38 MAPK and activated NF-κ B induced by LPS in the lung were down-regulated by verapamil and SB203580. Interestingly, the level of IL-10 was up-regulated by verapamil, and down-regulated by SB203580.
Conclusion: Verapamil attenuated LPS-induced lung injury by balancing pro- and anti-inflammatory cytokines expression. The inhibition of verapamil on pro-inflammatory cytokines was possibly through p38 MAPK- NF-κ B pathway. However, the up-regulation of IL-10 was more complicated, and still required to elucidate the details of the mechanism.

Sepsis/immunity 0162

Male gender predisposes to infective complications of major abdominal surgery

Y. Bhatt, S. Rhodes, V. Kenyon, S. Hughes, A. Ogden, I. Anderson, N. Lees, N. Scott, D. Watson, G. Carlson
Department of Surgery, Hope Hospital, Salford

Background: Hospital acquired infections are major causes of morbidity and mortality after abdominal surgery. Animal and clinical studies in severe trauma have identified a significant sexual dimorphism, with male gender predisposing to sepsis but it is unclear whether this is also true after elective surgery. The aim was to determine whether male gender predisposes to infective complications after major abdominal surgery.
Methods: A prospective database on outcome up to 6 weeks following hospital discharge was established for patients undergoing colorectal resection for cancer. Key outcome measures were infective (wound, chest, intra-abdominal, urinary) and non-infective (cardiovascular, thromboembolic, haemorrhage & other) complications. Effect of gender, age, site of surgery (pelvic *versus* abdominal), presence of a stoma and urgency of surgery on outcome were studied by logistic regression analysis. Data were summarised as odds ratios (OR) with 95% confidence intervals (CI).
Results: Data were available for 1055 ($n = 588$, 55·7% male), consecutive patients, 254 of whom sustained one or more infective (24·1%) and 87 (8·0%) non-infective complications. Unadjusted analysis revealed that infective complications were significantly more common in male ($n = 156$, 27·0%) than female ($n = 98$, 21·0%) patients, (OR 1·35, CI 1·01 to 1·80, $P = 0·040$). Adjusted analysis revealed a significant interaction between gender and elective surgery with a significantly higher risk of infective complications for males than females (OR 1·55, CI 1·10 to 2·19, $P = 0·015$) in patients having elective surgery. The presence of a stoma (OR 2·09, CI 1·51 to 2·90, $P < 0·001$) also appeared important in determining the risk of infection. There was no difference between sexes for infective complications after emergency surgery (OR 0·63, CI 0·33 to 1·20), or for non-infective complications (OR 1·01, CI 0·64 to 1·56).
Conclusion: Male gender predisposes to hospital acquired infection after elective colorectal cancer resection, independent of other risk factors. The mechanisms are unclear but may provide an opportunity for novel preventative therapies.

Sepsis/immunity 0482

Angiotenin-1 converting enzyme (ACE) gene transcription, and the functional insertion/deletion polymorphism in elective surgery

J. Lee, P. Ng, P. Boulos, S. Hollingsworth
Department of Surgery, University College Hospital London, London

Background: Angiotensin-1-converting enzyme (ACE) is the key mediator of the renin-angiotensin system modulating endothelial function and fluid balance. ACE has been recognised as a co-ordinator of the inflammatory response but its gene transcription response to surgery has not been investigated in the same

way as other cytokines. The insertion/deletion (I/D) polymorphism in the ACE gene is associated with disease states but its relevance in the surgical response is unclear. ACE transcription and I/D polymorphism were therefore investigated in patients undergoing elective surgery for colorectal cancer.
Methods: Venous blood was collected pre-operatively and 24 hours post-operatively, and nucleic acids were extracted from peripheral blood mononuclear cells. From DNA, ACE genotype was determined by PCR, and classified as insertion allele homozygotes (I/I), deletion allele homozygotes (D/D) and heterozygotes (I/D). From RNA, RT-PCR amplified total ACE transcripts, which were analysed by scanning densitometry (measuring optical density, OD), with levels determined by ratio to GAPDH-3.
Results: There were 17 males with a median age of 73 (range, 43–87) yrs and 12 females with a median age of 69 (55–81) years. ACE I/D polymorphism was in Hardy-Weinberg equilibrium, 7 (24%) were I/I, 15 (52%) I/D and 7 (24%) D/D patients. A significant post-operative rise in levels of ACE gene transcription was observed at 24 hours following surgery (0·345 ± 0·036 *versus* 1·186 ± 0·098 OD, $p < 0·001$). The magnitude of this rise demonstrated a definite genotypic pattern, with D/D homozygotes showing the greatest response [65 (0–265) *versus* 302 (105–703) *versus* 812 (548–1545) %, I/I *versus* I/D *versus* D/D, $p = 0·002$].
Conclusion: There was a definite rise in ACE gene transcription which was dependent on I/D genotype following elective surgery. This response may influence surgical outcome, and so opens the possibility of ACE inhibitor therapy for modulating the ACE response to surgery.

Sepsis/immunity 0493

Clostridium difficile infection of the small bowel: new threat from an old friend

M. Naqvi[1], S. Addison[1], P. Taniere[2], J. Fielding[1], D. Alderson[1]
[1]Department of General Surgery, University Hospital Birmingham, Queen Elizabeth Hospital, Edgbaston, Birmingham, [2]Department of Histopathology, Universisty Hospital Birmingham, Queen Elizabeth Hospital, Edgbaston, Birmingham

Background: Clostridium difficile is a common cause of colitis in patients receiving antibiotics. The distribution of pseudomembrane formation is generally restricted to the colon. Only 14 patients with C. difficile ileitis have been described with a reported mortality of 57%. The aim of this study was to identify clinical features and outcome in patients with proven C. difficile ileitis from a single surgical centre.
Methods: Patients were identified over a 12 month period (Jan–Dec 06) from a clinical data base. Diagnostic criteria used to confirm C. difficile ileitis included small bowel histopathology showing pseudomembranous ileitis or ileostomy effluent positive for C. difficile toxin.
Results: C. difficile ileitis was diagnosed in ten patients (5 patients by histology, 5 by microbiology). Mean (range) age was 54·4 (34–76) years. M : F ratio was 2 : 3. All patients had undergone planned abdominal surgery and all but one had received antibiotics during the same inpatient episode, prior to developing small bowel C. difficile infection. Mean (range) length of time from onset of symptoms to diagnosis was 4·8 (0–14) days. Seven patients developed systemic upset without diarrhoea. Three patients had diarrhoea alone. Nine patients were prescribed specific antimicrobial therapy against C. difficile either alone or in conjunction with further surgery. Seven patients (all of whom had systemic upset) underwent re-operation with four (57%) deaths. The three patients with diarrhoea resolved with antimicrobial therapy alone.
Conclusion: C. difficile ileitis usually presents with severe systemic upset and not with diarrhoea. It has a high mortality. The nature of this presentation emphasises the need for prevention of C. difficile infection in surgical patients.

Sepsis/immunity 0882

The impact of HIV infection on the presentation of patients to the surgical ward in a rural hospital in Zambia

R. B. Bethune[1], M. Nthele[2], S. J. Cawthorn[1]
[1]Frenchay Hospital, Bristol [2]St Francis Hospital, Eastern Province, Zambia

Background: HIV/AIDS is one of the most important and difficult challenges facing health care delivery in sub-saharan countries, such as Zambia. The prevalence (similar to other East African countries) in Zambia is 16·5%. The impact on medical patients is obvious, with up to 75% of admissions to medical wards being HIV positive, and in most cases the reason for admission. However, little is known about the prevalence of HIV on surgical wards in Sub-saharan Africa, and the influence HIV has on the types of presenting complaints. This study attempts to address these two issues.
Methods: Over a two month period three sets of data were gathered; the general ward prevalence, the rate of patients with conditions that were thought to be high risk and the rate for those who were thought to be low risk. These statistics were then compared using a Chi Squared test.
Results: The overall HIV rate was 27·2%, and the rate in high risk group was 47·1%, both these statistics were significantly different to the population rate of 16·5%. In the low risk group there was no significant statistical difference.
Conclusion: The rate of HIV on surgical wards is much higher than would be expected from the population prevalence. Where patients present with infective causes (or other HIV related conditions) then almost half will have HIV infection. If resources allow all surgical patients should have HIV tests, both as a screening tool and also to help with management of their surgical conditions.

Sepsis/immunity 1017

Gastric colonisation in surgical patients

R. R. Kallam, B. S. Reddy, M. Rao, M. Gatt, C. J. Mitchell, J. Macfie
Combined Gastroenterology Research Unit, Scarborough Hospital, Scarborough

Background: The commensal microflora of the gut is increasingly being recognised as an essential component of the gut barrier mechanism. Due to acidic pH and swift peristalsis in the upper GI tract, bacterial concentrations are sparse and mainly consist of acid tolerant lactobacilli and streptococci. The aim of this study was to assess whether or not, the presence of *Enterobacteriaceae*, multiple organisms or Fungi in the upper GI tract represents altered barrier function in surgical patients.
Methods: Nasogastric aspirates were obtained from 502 surgical patients. Several pre-operative variables were recorded and assessed using multivariate logistic regression analysis to recognise factors that influenced gastric colonisation. Barrier function was evaluated by identifying bacterial translocation (BT) and post-operative septic morbidity.
Results: A total of 241 (48%) patients had a positive culture. 78/241 (32·4%) had *Enterobacteraceae* group of organisms, 156/241 (64·7%) had fungi (*Candida* species) and 124/241 (51·5%) had more than one (multiple) organism. Gastric colonisation ($p = 0·012$ & 0·05), presence of *Enterobacteraceae* ($p = 0·010$ & 0·001) or multiple organisms ($p = 0·003$ & 0·001) was associated with BT and post-operative sepsis. Inflammatory bowel disease was associated with presence of *Enterobacteraceae* ($p = 0·028$). Pre-operative TPN was associated with presence of fungi ($p = 0·022$).
Conclusion: Changes in the gastric microflora can be used to identify patients with altered barrier function and predict patients susceptible to sepsis. Patients with inflammatory bowel diseases may have *Enterobacteraceae* and patients on TPN can have fungal colonisation in the upper GI tract although this may not always represent altered barrier function.

Sepsis/immunity 1117

The association between the acquisition of MRSA in hospital and postoperative wound infections

N. A. Stephens, R. Mofidi, J. A. Murie, R. T. A. Chalmers
Royal Infirmary of Edinburgh, Edinburgh

Background: MRSA infections can be devastating particularly in patients undergoing surgical procedures. This study aimed to determine if MRSA acquisition whilst in hospital compared to MRSA colonisation led to an increase in post operative wound infections.

Methods: All admissions to the vascular surgery unit over two years were included. Prospectively collected hospital admission and microbiology data were analysed and the case notes of all MRSA positive patients reviewed.
Results: There were 1981 admissions with 214(10·80%) being MRSA positive. 107 patients were positive for MRSA on admission and 107 acquired MRSA whilst in hospital. 68(63·55%) colonised patients underwent operation compared to 96(89·72%) in the acquired group. Patients in the acquired compared with the colonised group tended to have longer hospital stay (median 29 *versus* 18 days), more emergency admissions (79·17% *versus* 67·65%), multiple (2 or more) operations (29·17% *versus* 20·59%) and were more frequently admitted to ITU (15·63% *versus* 5·88%). Interestingly, more patients who were colonised were transferred from other hospitals (22·06% *versus* 19·79%) or had been admitted to hospital within the previous one month (19·12% *versus* 14·58%). There was a statistically significant difference in post operative wound infection rates with 6(8·82%) having documented wound cellulitis/infection in the colonised group compared with 40(41·67%) in the hospital acquired group (Fishers Exact Test $p < 0·0001$). 3 patients (4·41%) in the colonised group died compared to 10 patients (10·42%) in the hospital acquired MRSA group, including one from MRSA sepsis.
Conclusion: Hospital acquired MRSA is associated with a higher incidence of postoperative wound infections and patient mortality. This may reflect an increased susceptibility to infections in this group of patients due to a greater severity of clinical illness and immunocompromise. However, it emphasises the continued importance of good clinical care and Listerian ward practice.

Surgical audit

Surgical audit 0018

Appendicectomies: who's doing them and how?

K. T. J. Khoo, F. Mohamed, J. Guest
Wansbeck General Hospital, Ashington

Background: Compliance with the New Deal and European Working Time Directive (EWTD) have enforced full shift rotas for surgical trainees. Introduction of laparoscopic techniques have further reduced trainee exposure to open surgery. Our aim was to assess the impact of these changes on operative experience in appendicectomy.
Methods: Full shift rotas were adopted by our hospital trust in August 2002. We studied 44 month periods prior to and post shift introduction. Operation type, grade of operating surgeon and first assistant were analyzed for all appendicectomies performed during the study period from a prospective electronic database.
Results: 1327 appendicectomies were performed over the study period, 571 (519 open, 52 laparoscopic) pre-shift and 756 (312 open, 444 laparoscopic) post-shift. For open appendicectomies, trainees operating as primary surgeon decreased from 74% (382/519) pre-shift to 57% (177/312) post-shift and as first assistant from 15% (79/519) to 11% (35/312). The proportion of laparoscopic appendicectomies performed by a Consultant operating as primary surgeon remained constant at 63% (33/52) pre-shift and 59% (264/444) post-shift with a trainee as first assistant in 79% (26/33) of these cases pre-shift but only 33% (86/264) post-shift. The proportion of laparoscopic appendicectomies performed by a trainee increased only slightly from 37% (19/52) pre-shift to 41% (180/444) post-shift.
Conclusion: The combination of changes in working time and introduction of laparoscocopic techniques have resulted in a reduction in surgical trainee exposure to appendicectomy. Innovative strategies are required to ensure surgical trainees maintain competence in both open and laparoscopic appendicectomy.

Surgical audit 0036

Correlations between surgeons' grade, reoperation rate, degree of haemorrhoid, analgesia requirement and haemorrhage following haemorrhoidectomy

D. Debnath, R. K. Choudhary, R. Sridhar, S. Debrah
Newham General University Hospital, London

Background: Little is known about associations between post-haemorrhoidectomy haemorrhage, and grade of surgeon, reoperation rate, degree of haemorrhoid, and ever analgesia requirement. We aimed to assess any such association.
Methods: All haemorrhoidectomies performed between 01-September-1999 and 31-August-2004 was studied. Severity of haemorrhage was classed as- mild (< 100 ml), moderate (100–300 ml) and severe (> 300 ml). Degree of haemorrhoid was- grade II (large but nonprolapsing), grade III (prolapsing but reducible) and grade IV (prolapsing and irreducible). Surgeons were graded as- consultants and trainees.
Results: A total of 262 patients underwent haemorrhoidectomy. Thirty four (13%) patients developed haemorrhage postoperatively [mild (28); moderate (3) and severe (3)]. Three patients required blood transfusion. Incidence of haemorrhage was significantly more amongst the operations performed by trainees ($n = 15$; 21·1% of 71), compared to consultants ($n = 19$; 9·9% of 191) [$p = 0·02$]. Occurrence of reoperation during the same admission was significantly more amongst those who developed haemorrhage ($n = 3$; 100% of 3), than those who did not ($n = 31$; 12% of 259) [$p < 0·00001$]. Postoperative haemorrhage had marginally significant association with degree of haemorrhoid e.g., grade II ($n = 4$; 26·7% of 15), grade III ($n = 16$; 9·5% of 168) and grade IV ($n = 14$; 17·7% of 79) [$p = 0·054$]. Ever analgesia requirement was not significantly different amongst patients who experienced haemorrhage ($n = 33$; 97·1% of 34), compared to those who did not ($n = 219$; 96·1% of 228) [$p = 0·78$].
Conclusion: Post-haemorrhoidectomy haemorrhage had significant associations with grade of surgeon and reoperation rate, borderline association with degree of haemorrhoid and insignificant association with ever analgesia requirement. These findings have training and management implications.

Surgical audit 0055

The personal cost of incisional hernias: who can afford it?

H. Lambie, N. S. Ambrose
St. James's University Hospital, Leeds

Background: Although there is evidence of the cost of incisional hernia to the NHS there is little if any evidence regarding the cost to the individual. We have attempted to do this by retrospective questionnaire.
Methods: Patients having incisional hernia repair were identified from PAS records between 2000–2002. Patients under the age of 60 were chosen in whom more than 2 years follow up was available to assess the impact on their earning capacity. 127 patients were mailed a questionnaire of which 57 replied.
Results: Previous surgery included Transplant 9, upper G/I 16, Lower G/I 14, HPB 7, miscellaneous 11.
Of these, 12 were students, unemployed, retired or housewives. 2 were in retail, 5 worked in the NHS, 7 were professional (non health), 7 were clerical, 3 were in business and 21 were manual workers. The duration of their hernias ranged from 2 weeks to 10 years. 18 had been off work preoperatively. At the time of reporting only 31 had returned to work. Those that returned to work took between 2 weeks and 36 months to do so. Seven did not return to the same job. Three patients said the repair effectively ended their earning life. Only 17 identified their preoperative salary/wage (£30 p.w.–£28 k per year). Only 16 patients identified their postoperative salary/wage. Twenty nine patients identified a change in their earning capacity for the worse. One patient reported being better off. Losses ranged from £1–200 to an estimated £25 k. Those earning more to begin with lost more in the long term.
Conclusion: It is clear that the impact of incisional hernia repair is more than just financial to the individual. Many fail to receive benefit, some lose their jobs, but there is also considerable financial loss associated with repair of incisional hernia.

Surgical audit 0064

An audit of orthopaedic referrals via multi professional triage teams

B. Rogers, C. Kabir, N. Bradley
Royal Surrey County Hospital, Guildford

Background: Multi Professional Triage Teams (MPTTs) created to enable appropriate and hopefully more rapid access to secondary orthopaedic care and this prospective study evaluates referrals made to a district general hospital orthopaedic department from a lower limb MPTT clinic.
Methods: Over a one year period, over 103 patients referred from the MPTT clinic completed questionnaires concerning that consultation. The time from GP referral to MPTT clinic and hospital appointment was recorded along with the perceived profession of who reviewed them at the MPTT clinic and the diagnosis made. A further 132 referrals not made via the MPTT clinic were also assessed.
Results: Patients were seen in the MPTT clinic 52·6 days (19–135 days) following their GP referral and subsequently seen in the orthopaedic clinic 88·4 days (18–255) later. This delay was significantly longer ($p < 0·05$) than the 62·4 (17–176) days identified for patients not seen in MPTT clinic. One third

of patients reported they had previously seen an "orthopaedic consultant" at the MPTT clinic when they had in fact been seen by a physiotherapist; whilst 84% incorrectly identified the healthcare professional they saw. The incorrect or absent diagnosis was identified by the reviewing orthopaedic consultant in 28% of the patients seen in the MPTT clinic.
Conclusion: Patients seen at the MPTT clinic wait significantly longer to see an orthopaedic consultant, are often unsure of the healthcare professional at the consultation and a quarter have an incorrect or absent diagnosis made.

Surgical audit 0068

Are parathyroid hormone (pth) levels useful in predicting postoperative hypocalcaemia following parathyroidectomy?

N. Smart, J. Morgan
North Bristol NHS Trust, Bristol

Background: Patients undergoing parathyroidectomy routinely stay in hospital postoperatively due to the risk of hypocalcaemia. There is no reliable way of predicting whether transient mild hypocalcaemia will progress, necessitating treatment. Frequent serum calcium checks remain the only way to ensure that hypocalcaemia does not go untreated. Prescribing calcium and Vitamin D supplements for all patients would over treat a significant proportion of patients. The objective was to establish whether intra and perioperative PTH levels could predict the occurrence of postoperative hypocalcaemia in patients undergoing parathyroidectomy.
Methods: The study was carried out prospectively from January 2005 to March 2006. All patients undergoing parathyroidectomy within this period were eligible. Venous blood samples were taken preoperatively, post-induction, post-mobilisation of the gland(s), 5 minutes post-excision, 10 minutes post-excision, 6 hours postoperatively and 20 hours postoperatively and analyzed for serum calcium and PTH levels. The end point of interest was biochemical hypocalcaemia (corrected calcium $< 2{\cdot}20$ mmol/L) within 48 hours of operation.
Results: 45 patients undergoing parathyroidectomy for either primary (32 patients) or secondary (13 patients) hyperparathyroidism (HPT) were identified. 1 patient (3%) with primary HPT became hypocalcaemic secondary to severe acute pancreatitis. 9 patients (69%) with secondary HPT became hypocalcaemic. The proportion of patients with secondary HPT who became hypocalcaemic was significantly different ($p < 0{\cdot}0001$) compared to primary HPT. In patients with secondary HPT, there was no significant difference in mean PTH levels at any time when comparing those who did develop hypocalcaemia with those who did not.
Conclusion: Perioperative PTH levels are not useful in predicting postoperative hypocalcaemia following parathyroidectomy. Patients with secondary HPT are at high risk of developing hypocalcaemia whereas patients with primary HPT rarely develop this condition.

Surgical audit 0069

Are parathyroid hormone (pth) levels useful in predicting postoperative hypocalcaemia following total thyroidectomy?

N. Smart, J. Morgan
North Bristol NHS Trust, Bristol

Background: Patients undergoing total thyroidectomy may stay in hospital for several days postoperatively because of the risk of hypocalcaemia, which necessitates frequent serum calcium level checks. A reliable test for predicting postoperative hypocalcaemia may enable many patients to have day case surgery. Recent studies suggest that perioperative PTH levels may be useful in identifying those at risk of hypocalcaemia. The aim of the study was to establish whether intra and perioperative PTH levels could predict the occurrence of postoperative hypocalcaemia in patients undergoing total thyroidectomy.
Methods: The study was carried out prospectively from January 2005 to March 2006. All patients undergoing total thyroidectomy were eligible for entry into the study. Venous blood samples for PTH and serum calcium assay were taken preoperatively, post-induction, post-excision of the thyroid, 6 hours and 20 hours postoperatively. The end point was hypocalcaemia (corrected calcium $< 2{\cdot}20$ mmol/L) within 48 hours of surgery.
Results: 22 patients were eligible and results were available for 20 patients, with every patient having a 6 hour postoperative calcium and PTH level available. 10 out of 20 patients (50%) developed hypocalcaemia of $< 2{\cdot}20$ mmol/L within 48 hours of surgery. 6 patients (30%) had a PTH level 6 hours postoperatively of < 1 pmol/L of whom 3 (15%) had hypocalcaemia that definitely required treatment. 4 patients (20%) with a postoperative PTH level of > 1 pmol/L developed hypocalcaemia and in all cases this was mild and transient. No patient with a 6 hour postoperative PTH level of > 1 pmol/L required treatment for hypocalcaemia.
Conclusion: Perioperative PTH levels may be useful in predicting postoperative hypocalcaemia following total thyroidectomy. Consequently, changes in service provision from an inpatient basis to a day case unit with the facility to admit patients could reasonably be considered with the aim of saving money and beds whilst improving patient care.

Surgical audit 0119

Higher hospital volume is associated with better survival in elective colorectal cancer surgery

D. W. Borowski[1], A. A. Ratcliffe[2], D. M. Bradburn[5], B. Bharathan[1], R. G. Wilson[3], S. J. Mills[4], S. B. Kelly[1]
[1]Northumbria Healthcare NHS Trust, North Tyneside, Tyne & Wear [2]Woolfson Research Institute, University of Durham, Durham, [3]James Cook University Hospital, Middlesbrough, [4]Northern Region Colorectal Cancer Audit Group (NORCCAG), Newcastle, Tyne and Wear [5]Northumbria Healthcare NHS Trust, Wansbeck General Hospital, Ashington

Background: Beneficial effects of hospital caseload in colorectal cancer surgery have been observed in the USA, but not to similar extent in Europe. This study examined a population-based surgical audit for an association between hospital volume and surgical outcomes.
Methods: Data on patients undergoing surgery for colorectal cancer between 1998 and 2001 in 17 hospitals in the North of England were collected. Using multivariate linear, logistic and Cox' regression analysis to adjust for independent predictors at patient level, the effect of hospital volume on anastomotic leaks, length of stay, operative mortality and overall survival was investigated.
Results: 7411 patients underwent surgery with an anastomotic leak rate of 2·9% and operative mortality of 8·0%, neither was significantly related to hospital caseload. Hospital stay was shortest with an average of 11·4 days in the group of six low-volume units (≤ 68 colorectal cancer operations annually) compared to 12·6 in medium (68–94 operations) and 11·9 days in high-volume institutions (> 94 operations). Three-year survival was best in high-volume hospitals (59·1% *versus* 57·6% in low- and 55·1% in medium-volume units, $p = 0{\cdot}016$). Adjusted for case-mix and surgeon caseload, the risk of death was reduced with increasing hospital caseload amongst elective patients (HR 0·90, $p = 0{\cdot}02$ in high-volume units), with no significant differences amongst emergencies. Survival following curative resection was also better in high-volume units, but differences were not significant.
Conclusion: Long-term survival was better in high-volume units following elective surgery. Hospital caseload was not a significant predictor of anastomotic leaks and mortality following colorectal cancer surgery.

Surgical audit 0138

The 2-week-wait system has failed to improve earlier diagnosis of oesophageal malignancy

S. R. Smith, A. Wong, M. Harvey, C. Wright
Broomfield Hospital, Court Road, Chelmsford

Background: Over 14,000 people die from oesophagogastric malignancy in the UK each year. The 2-week-wait system aims to reduce the waiting time for patients with suspicious symptoms and ultimately improve survival. Patients'

with stage I or II disease at diagnosis have a much better prognosis than those with stage III or IV disease.
Methods: This is a retrospective study of 103 patients identified on a histopathological database as having an upper gastrointestinal malignancy in a UK district general hospital in 2003. 96 patients had notes available for review. Patient demographics, referral method, presenting symptoms, diagnosis and staging information were recorded on an Excel spreadsheet. Analysis of the data was performed using Chi Squared Tests with Yates' correction for continuity.
Results: 53 patients had a primary oesophageal malignancy and 23 a primary gastric malignancy. Of the 76 patients with primary oesophagogastric malignancy, only 10 patients (13%) were referred by the 2-week-wait system. 23 patients (30%) presented to A&E, 20 patients (26%) were direct access endoscopy referrals and 9 patients (12%) were referred directly to a consultant. 47 patients with oesophageal carcinoma could be accurately staged but only 15 patients with gastric adenocarcinoma. A comparison between presenting symptoms and stage of disease for patients with oesophageal adenocarcinoma is shown in the table below. (abbr. 2WW: 2-week-wait)

Stage at presentation	2WW symptoms	Non-2WW symptoms
Stage I or II	15	6
Stage III or IV	24	2

For patients presenting with stage I or II oesophageal malignancy only 29% (6/21) had 2-week-wait symptoms, compared to 8% (2/26) of patients with stage III or IV disease ($X2 = 5{\cdot}22$, $P < 0{\cdot}025$).
Conclusion: Few patients were referred by the 2-week-wait system. The 2-week-wait system detected patients with later disease (stage III/IV). Patients with stage I/II disease often presented with non-specific symptoms, which did not fall within the fast-track criteria. The 2-week-wait system is poorly utilised and fast-tracks patients with advanced disease and poor prognoses.

Surgical audit 0163

Laser depilation: preventing recurrent pilonidal sinus disease

N. Kandamany, F. Conroy, P. Mahaffey
Laser Treatment Centre, Bedford Hospital, Bedford

Background: Pilonidal sinus disease of the natal cleft is a painful and debilitating condition which often recurs despite multiple surgical undertakings. We describe the long pulsed alexandrite laser for hair depilation and the role of meticulous personal hygiene, which is often overlooked when treating this disease, as an adjunct to preventing recurrent pilonidal sinus disease.
Methods: A review of 14 patients who underwent laser hair depilation in the natal cleft following pilonidal sinus surgery. Majority of patients had recurrent disease and had undergone numerous surgical procedures (range1–5, mean 2·07) All of the patients were given advice regarding meticulous personal hygiene at time of consultation.
Results: 12 patients received the full course of treatment (3 treatments, 6 weekly intervals) followed by 'top-up' treatments as required (mean number of treatments 3·9). None of the patients developed recurrent disease at 1-year follow-up and to date, none have required further surgery.
Conclusion: Laser hair depilation is a useful adjunct in preventing the recurrence of pilonidal sinus disease and should be offered routinely to all patients. This coupled with patient education regarding personal hygiene reduces the risk of developing recurrent pilonidal sinus disease.

Surgical audit 0174

An audit of medium term results after modified Karydakis operation

E. L. Court, M. Z. Fazel, M. J. Dworkin, B. V. Praveen
Southend General Hospital, Southend

Background: Surgical treatment of pilonidal disease is controversial. The commonest treatment for acute exacerbation of pilonidal abscess is incision and drainage, but high recurrence rates suggest this technique is not curative in most cases. Here, we describe our experience with a modified Karydakis procedure, in which a 'D' or 'sickle-shaped' incision is made which encompasses the pilonidal complex, allowing excision of the tissue down to the fascia, with undercutting to create a short thick flap to advance across the midline.
Methods: Thirty patients (23 male) with pilonidal disease who underwent a modified Karydakis procedure performed by a single surgical firm over a 4 year period were identified from theatre logs. Details of the nature and duration of symptoms, previous treatment, and post-operative course were obtained from case notes.
Results: Twenty-four patients had received previous treatments for pilonidal disease. Immediate post-operative course was uneventful in 29 cases, with only 1 patient requiring wound care. Duration of hospital stay ranged from day-stay in 9 of 11 day-cases (2 failed due to anaesthetic difficulties), overnight stay in 5 of 19 in-patient cases, and a mean duration of stay for the remaining 14 in-patient cases of 4 days (range 2–6 days), due to our initial inexperience with this technique and the use of drains at a time before facilities to discharge patients with drains existed locally. The median time off work was 3 weeks, with regular analgesia required most frequently for a 7 day period. At 4 week follow up, 3 patients were prescribed antibiotics, 2 for persistent discharge from the wound, and one for surrounding erythema and pain. All 3 cases resolved without further intervention. At the discharge appointment, 90% of patients were asymptomatic, with no further problems. There was only 1 recurrence, which required incision and drainage 20 months post-operatively. Twenty-eight patients were contacted for follow-up by telephone, ranging from 2–52 months post-discharge from clinic. Of those contacted, 26 patients remained asymptomatic.
Conclusion: Our results indicate that the modified Karydakis procedure is an effective day-case treatment for pilonidal disease, with minimal risk of complications, and is curative in a high proportion of cases.

Surgical audit 0201

Increased mortality and morbidity, financial costs while on waiting list for cholecystectomy

S. Chaudhry, Q. Iqbal
Hillingdon Hospital, London

Background: To reduce Mortality, Morbidity, patient suffering, Accident & Emergency visits and costs by reducing the waiting time for Cholecystectomy.
Methods: Patients between 01/01/2002 and 31/12/2005 621 patients were studied. Collection of data was from various sources. Inclusion criteria were patients who had cholecystectomy or patients died due to severe Gall stone pancreatitis on re-admission. Exclusion criteria was patients transferred from other hospitals with Gall stone pancreatitis for ITU management, patients not for surgical management due to co-morbidity or treated with biliary stent or ERCP as final episode, patients removed from waiting list or had surgery elsewhere, patients died on waiting list due to any other cause and 1st admission cholecystectomy or gall stone Pancreatitis.
Results: 621 patients were studied. 29 were emergency cholecystectomy and 2 were patients with ERCP as end point. 590 patients went on to have elective cholecystectomy. Male: female ratio was 5 : 22 and mean age was 59 and 51 respectively. Mean days to operation were 174 (2–944). 3 patients developed obstructive jaundice requiring ERCP, 3 patients developed mild-moderate gall stone pancreatitis and 5 patients developed severe gall stone pancreatitis admitted to ITU. 3 out of 5 died with mortality of 60%. Mortality due to complications of biliary disease was 0·51% (3/590) and overall morbidity due to biliary disease was 1·86%(11/590). There were 133 visits to A&E by patients with bilary colic. 104 re-admissions in 83 patients were noted with diagnosis of mild-moderate gall stone pancreatitis(3), severe gall stone pancreatitis(5), biliary colic(21) and cholecystitis(75). Re-admissions utilised 727 ward days and 176 ITU days. 68% were within 12 weeks of going on waiting list and 20% of admissions within 2 weeks. Total cost of hospital days on these patients is calculated as £580, 516 on the basis of £508 per day including USS and £1200 per day for ITU.
Conclusion: By reducing the waiting time, mortality and morbidity, patient suffering, costs to NHS could be reduced. If operated within two weeks of 1st

presentation, 80% of costs could be saved i.e. £126, 000 per year. If operated within 12 weeks, savings are £71, 000 approximately.

Surgical audit 0208

Breast cancer imaging and core biopsy to select patients most likely to benefit from sentinel lymph node biopsy – a prospective study

M. Muttalib, M. Stahnke, S. A. Bradley, D. W. England
Queen Elizabeth Hospital, Birmingham

Background: Axillary lymph node metastases remain the most important prognostic factor in breast cancer. Sentinel lymph node biopsy (SLNB) has become the standard for staging the axilla, but there are currently no national guidelines for patient selection. SLN negative patients can avoid axillary clearance and its associated morbidity. From large-series of retrospective data, tumour size and specimen histological grade are known independent predictors of axillary involvement.
A simple prospective protocol based upon imaging size and core biopsy grade was chosen with the aim of achieving a $\geq 75\%$ node negative rate.
Methods: 67 consecutive women (symptomatic and screening breast cancers) without palpable axillary nodes were studied. Inclusion criteria at multidisciplinary meeting discussion: ultrasound or mammographic tumour size ≤ 20 mm; core biopsy Grade 1 or 2 invasive cancer or DCIS with microinvasion. Sentinel nodes were identified using a combined Nanocoll Tc-99 and patent blue dye technique and evaluated histologically, with the breast specimen.
Results: SLNB was successful in 66/67 patients; age range 30–78 years; mean 58·8 years. Overall SLN positivity = 8/66 (12%). Patients not selected for SLNB who had axillary node clearance had node positive rate of 47%. Regardless of tumour grade, none of the 31 tumours < 10 mm size on imaging were SLN positive. Core biopsy under-graded five grade 3 tumours (all SLN negative).
Conclusion: Patients with tumours < 10 mm on imaging, could benefit the most from SLNB as they were all node-negative. Tumour grade on core biopsy is a less helpful selection factor. This protocol identifies a cohort of patients in which $< 25\%$ will require axillary treatment. We are continuing our series to refine this selection protocol.

Surgical audit 0210

Colorectal surgeons don't practise what they preach when they experience rectal bleeding!

D. Coull, A. Jones, D. Melville
St. George's Hospital, London

Background: In a medical era in which colorectal cancer screening in the UK is imminent, we were interested to audit whether consultant colorectal surgeons with rectal bleeding, subjected themselves to examination and further investigation by other clinicians?
Methods: The method employed was a postal questionnaire sent to 200 consultant colorectal surgeons on the Royal Society of Medicine Section of Coloproctology database. Information was obtained concerning; whether they had bled per rectum, who they sought a medical opinion from, which investigations they underwent and which diagnoses were reached.
Results: Responses were received from 140 surgeons (70%). Ten of these were female. 79 surgeons (56%) reported symptoms of rectal bleeding, at an average age of 50 years of age. Only 18 (23%) of surgeons with rectal bleeding sought medical attention from another clinician; four attended their GP, six visited a gastroenterologist and eight sought the opinion of a fellow colorectal surgeon. The following number of procedures were recorded: rectal examination 10, proctoscopy 3, rigid sigmoidoscopy 4, barium enema 2 and colonoscopy 6.
Four surgeons were treated for haemorrhoids (1 injection sclerotherapy, 2 band ligation, 1 haemorrhoidectomy). One underwent lateral internal sphincterotomy for anal fissure. One surgeon required an anterior resection for rectal cancer. 56 of the surgeons who reported rectal bleeding (71%), performed self-diagnosis only (haemorrhoids 47%, anal fissure 16%) and did not seek a further clinical opinion.
Conclusion: Despite the association of rectal bleeding with colorectal cancer, particularly in those aged 50 years and over, 77% of colorectal surgeons did not seek any medical examination or investigation for this symptom. Some of these surgeons may have an undiagnosed rectal cancer whilst choosing to investigate the majority of their patients who are referred with the same symptom. In short, colorectal surgeons do not practise what they preach.

Surgical audit 0240

Prospective study audit of the use of cell salvage in major surgical procedures

A. Mushtaq, G. Kuhan, P. Dunning
Lincoln County Hospital, Lincoln

Background: Cell salvage (CS) involves collecting blood lost during surgery and returning it to the patient. The risk of HIV, hepatitis and other transfusion-acquired infections is making autologous transfusions more common. Transfusion also holds other risks, including reactions and immunosuppression. We aim to assess the effectiveness of intra operative cell salvage in major surgeries carried out and compare the use of blood products in the similar period where CS was not used.
Methods: Prospective data of 40 patients was obtained in whom cell salvage was used during major surgeries in one year (May 05–06). This data was compared with the data of patients who did not receive cell salvage during major surgical procedures in the previous year. Data of the volume saved, cost of consumables, adjunct blood products used pre operative and post operative Hb, Hct were collected. The cost saved by CS was calculated for each patient and then the whole year. The cost effectiveness was compared within various surgical subspecialties.
Results: There were 33 male patients and seven female patients. Median age was: 59 yrs (19–84). Majority 62% had undergone vascular surgery and 75% procedures were elective. Mean ICU stay was 6 days (2–24). Mean preop Hb & postop Hb were 13·1 (9·9–15·8) and 9·3 (5·7–12·7) respectively. Mean preop/postop Hct. were 0·371 (·312–·478) and 0·286 (·173–·362) respectively. There were total eighty units of blood saved saving 7896 pounds. Cost saved for various sub specialities were as follow vascular 6455£, spinal 777£, trauma 295, obs/gyn – 387. During previous year 44 units (5720£) could be saved.
Conclusion: Red cells are an expensive commodity that are increasing in cost and may soon be more difficult to obtain. Our results show cell salvage for emergency and major elective surgery is a cost effective strategy. The effectiveness of CS is more pronounced in Vascular, polytrauma and spinal surgery.

Surgical audit 0286

Satisfaction is high in implant based breast reconstruction despite poorer cosmesis

A. Koruth, U. Sridharan, C. Holcombe
Royal Liverpool University Hospital, Liverpool

Background: To measure cosmesis and patient satisfaction in breast reconstruction.
Methods: We have defined 4 domains of quality, patient satisfaction, cosmesis, complications and cost, which are added to give a 'global' score of quality. We have scored a series of 150 patients. Cosmesis was assessed using post-operative photos. Patient satisfaction was assessed using a questionnaire.

Results:

Procedure	Patient satisfaction	Cosmesis	Complication	Cost	Global
1 implant $n = 51$	47.8	39.6	4.5	−7.0	84·8
2 implant $n = 15$	55.3	51.6	5.1	−5.1	107·1
1 LD $n = 24$	49.6	44.6	3.6	−8.7	88·8
2 LD $n = 18$	44.4	37.6	3.2	−9.1	76·1
1 TRAM $n = 29$	58.2	69.4	4.0	−6.2	123·6
2 TRAM $n = 13$	54.8	52.6	5.0	−9.4	99·2

Conclusion: In this series patient satisfaction and cosmetic outcome scores were best in primary TRAM flap reconstruction. While patient satisfaction decreased with implant based reconstruction it is still high despite the markedly reduced cosmetic score. This makes implant based reconstruction a good choice for those who do not want or cannot have a flap based breast reconstruction.

Surgical audit 0353

Recurrence of umbilical and paraumbilical herniae

A. Burdess, P. Jenkins, G. Tse, S. Nixon, A. de Beaux
Royal Infirmary of Edinburgh, Edinburgh

Background: Umbilical hernias are a common presentation to general surgical clinics and a reason for acute admission. The use of mesh to augment repairs has increased. The aim of this paper is to assess the recurrence rate following suture and mesh repair of these hernias.
Methods: The Lothian Surgical audit is a prospective database of general surgical activity in the Lothian region of the UK. All operations for umbilical and paraumbilical herniae at the Royal Infirmary of Edinburgh and the Western General Hospital's surgical units between 1993 and 2005 were examined. Re-operation rate was calculated and the following variables were collected from operation notes: mesh, position, suture used, objective and subjective size.
Results: There were 889 primary hernia repairs of which 668 (75%) were repaired with sutures compared to 193 (22%) with a mesh. 546 (61%) were female. 59 (6·6%) of the primary repaired were obstructed at admission while 12 (1·3%) had evidence of infarction. In the suture repair group 56 recurred (8·4%) compared to 14 (7·3%) in the mesh repair group ($p = 0·34$). The use of mesh became more common during the period, rising from 13% in 1994 to 62% 2005.
Conclusion: The use of mesh in primary umbilical hernia repairs has increased during this time. There was no difference in the recurrence rate in either group repaired with suture or mesh, although this may represent the appropriate use of mesh in select subgroups. Further randomised prospective trials are necessary to determine the indications and superiority of mesh augmentation of such repairs.

Surgical audit 0354

Primary epigastric hernias – Recurrence and repair technique

A. Burdess, P. Jenkins, G. Tse, S. Nixon, A. de Beaux
Royal Infirmary of Edinburgh, Edinburgh

Background: Primary epigastric hernias are a relatively common abdominal wall hernia. However, unlike inguinal and incisional hernias, where mesh repair has been demonstrated to reduce recurrence, there are no specific evidence based guidelines for the best surgical management of epigastric hernias. Our aim was to assess the recurrence rate following primary epigastric hernia repair in relation to surgical technique.
Methods: The Lothian Surgical audit is a prospective database of general surgical activity in the Lothian region. The database was examined for all surgery performed for epigastric hernias only, at the Royal Infirmary of Edinburgh and the Western General's surgical units between 1993 and 2005. Risk of re-operation was compared in relation to primary repair technique. Non-parametric statistical analysis was performed.
Results: In a 12 year period there were 314 primary epigastric hernia repairs, of which 65% were in males. (An additional 9 recurrent cases had primary surgery out-with Lothian). 10 presented with strangulation or incarceration. Of the primary procedures performed, 250 (80%) were suture repairs and 64 (20%) were mesh. The re-operation rate was 6·4% ($n = 16$) for primary suture repairs and 6·25% ($n = 4$) for mesh, odds ratio 0·99 (95% CI 0·0–3) non-significant. The median time until recurrence was 17 months for suture repair and 38 months for mesh. The relative number of primary repairs by mesh increased over the study period.
Conclusion: This is the largest data series of primary epigastric hernia repair reported in the literature. Our results demonstrate no significant reduction in re-operation rates when mesh is used in comparison to suture. Although there was a trend for primary suture repairs to fail earlier than mesh repairs, this did not reach statistical significance. This may be related to the small number of recurrence cases, especially in the mesh group.

Surgical audit 0371

Has the value of endoscopic ultrasound for clinical decision making in oesophageal cancer changed in the era of routine neo-adjuvant chemotherapy?

J. Hughes, D. Monk, J. Evans
Countess of Chester NNHS Foundation Trust, Chester

Background: The current standard for the staging of oesophageal tumours is the combination of endoscopic ultrasound (EUS) and CT of the thorax and abdomen. The stage of the disease is determined by histo-pathological examination of the specimen removed at surgery 8–10 weeks after the performance of the EUS following neo-adjuvant chemotherapy. The aim of this study was to establish the value of EUS in clinical decision making in the management of patients with oesophageal cancer.
Methods: This was a retrospective study examining the results of pre and post chemotherapy CT scanning, EUS and histopathology of all gastro-oesophageal cancers assessed for surgery in Chester from December 2002 to February 2006.
Results: There were 53 EUS requests identified that fitted the inclusion criteria. However, only 35 patients underwent both EUS TNM staging and complete resection of their cancer. EUS estimation of T stage, was correct in 20 (57%) out of 35 patients, with overstaging occurring in 26% (unweighted Kappa = 0·24, where kappa > 0·2 demonstrates fair concordance). Accuracy in tumour staging by EUS increases with increasing T stage, so that 79% of T3 lesions were correctly staged. Nodal stage correlated correctly in 21 (60%) out of 35 EUS results, with 14% overstaged, all false positives, (unweighted Kappa = 0·25).
Conclusion: The accuracy of EUS in this study is poorer than in published studies. There appeared to be a tendency to overstage tumours, which may be interpreted as an indicator of success of the neo-adjuvant chemotherapy that patients received. Overall, this did not affect clinical decision making adversely, but makes the quality assurance of the EUS reports more difficult.

Surgical audit 0387

Royal College of Surgeons operation note guidelines are achievable

I. J. D. McCallum, K. Cole, D. M. Bruce, R. Ravindran, S. D. Oglesby
Aberdeen Royal Infirmary, Aberdeen

Background: Best practice and current guidelines suggest that all post-operative patients should have a typed operation note, with a minimum dataset, available on the day of operation. A previous audit(A) at our institution revealed that in the majority of cases this was not achieved. In order to improve this, an intuitive, web based operation note system(OpNote) has been installed into all our operating theatres and a re-audit(B) undertaken. It is our belief that computerised systems should be easy to use without extensive training. For this reason, no staff training in the use of the system was provided.

Methods: Over a 4 week period, all general and vascular operations were subject to audit B. The case records of all patients undergoing a surgical procedure were reviewed at 6pm on the day of operation. The presence and content of operation notes were checked against Royal College of Surgeons of England guidance.
Results: 312 notes were reviewed during audit B. Typed operation notes were available in 5·9% of cases in audit A and 64% in audit B. All other notes were either handwritten or dictated for later typing. Data completion rates were higher in audit B than audit A, particularly in the subset of notes created with OpNote. Example data are summarised in the table.

	Audit A	Audit B	Audit B (OpNote)
Cons Anaesthetist	1·5%	59·0%	92·3%
Blood loss	14·9%	57·4%	89·6%
Postop instructions	23·1%	65%	99·5%

Conclusion: It is possible to produce contemporaneous, comprehensive, legible operation notes which accompany the patient to the recovery room. This is a recommendation of the Royal College of Surgeons of England. In the majority of cases, no training is required. A well designed computer system, allied to targeted training, may well ensure that this ideal is achieved in all cases.

Surgical audit 0391

Prolene Hernia system for inguinal hernia repair: early and long term outcomes

P. Sanjay, A. Woodward
Royal Glamorgan Hospital, Llantrisant

Background: Prolene Hernia System (PHS) has recently been introduced as an option for tension free inguinal hernia repair. However, there are minimal data regarding its feasibility under local anaesthesia (LA) and patient acceptability. This study aims to analyse the outcome of PHS repair performed under general anaesthesia or LA in a series of patients.
Methods: All patients who underwent PHS repair over a 5 year period were studied retrospectively. The outcome measures were type of anaesthesia used, early and late postoperative complications, recurrence and patient satisfaction.
Results: 93 PHS repairs were performed during the study period. The median age was 55 (range 20–86). 75% of the repairs ($n = 70$) were performed under LA and 25% ($n = 23$) under general anaesthesia (GA). The number of patients with a BMI > 30 were 24% and 27% respectively in the LA and GA group ($p > 0{\cdot}05$). Day case rates were much higher in the LA group compared to GA group (91% *versus* 52%, $p < 0{\cdot}05$). No significant difference was noticed in incidence of urinary retention, haematoma and wound infection rates. 26% in the GA group developed chronic groin pain while 19% developed chronic groin pain in the LA group ($p > 0{\cdot}05$). No patient developed recurrent herniation in the study group after a median follow up period of 3 years (range 2–5 years). 98% of the patients were satisfied with a LA repair and 95% of the patients would have the procedure performed under LA if needed on the opposite side.
Conclusion: PHS repair is associated with negligible recurrence rates and high patient satisfaction. Surgery performed under local anaesthesia is associated with higher day case rates compared with repair under general anaesthesia. Complications were few and independent of type of anaesthesia.

Surgical audit 0456

Parastomal hernia – is the routine placement of a prosthetic mesh justified?

J. Witherspoon[1], M. Speirs[1], I. Robertson[1], D. Hughes[1],L. Donnelly[2], A. Macdonald[1]
[1]Department of Surgery, Monklands Hospital, Airdrie, [2]Department of Clinical Effectiveness, Monklands Hospital, Airdrie

Background: Parastomal hernia is a common complication following colostomy/ileostomy formation. Placement of a prosthetic mesh during the primary operation may decrease the incidence but may increase per-operative infection, stricture and fistula formation. The aim of this study is to assess prospectively, the incidence and morbidity of parastomal hernias and discuss the appropriateness of prophylactic mesh placement.
Methods: All patients undergoing formation of an end colostomy/ileostomy Between August 1997 and June 2001 were studied prospectively (minimum 5-years follow-up). Patients were reviewed, routinely at 6 months, one year and then annually. The development of parastomal hernia and its effects on the stoma appliance was recorded on a designated, computer-based audit system.
Results: One hundred and two patients had end stomas sited between August 1997 and June 2001. Forty-nine patients (mean age of 60·6 years (range 48–89)) had surgery for malignancy; 53 patients, (mean age 58·5 years (range 20–84)) had surgery for non-malignant disease. 41 patients died within the 5-year follow-up. Nineteen patients (males – 7, females 12, (mean age 70·2 years)) developed a parastomal hernia within 5 years of their surgery (mean time to diagnosis of 19·1 months): end ieostomy – 3; colostomy – 16 (malignant disease – 9). 5 of 9 hernia patients (malignancy group) were dead by the 5-year follow-up (mean survival – 24 months). 2 of 7 hernia patients (benign group) were dead at 5 years (mean survival 47 months). 3 of 34 patients undergoing emergency surgery developed a parastomal hernia: 15 died at follow up, mean survival – 9 months. 10 of 19 patients had a large hernia (interference with stomal appliances occurred in 2 of these).
Conclusion: Parastomal hernia after stoma formation is common. However, "all cause" 5 year mortality in stoma patients of 41% is high. 37% of patients developing a parastomal hernia will be dead in 5 years. Routine per-operative placement of a mesh in stoma patients may not be indicated.

Surgical audit 0541

Needle stick injuries (NSI): Sharp talk on our knowledge, attitude and practices

K. Osman, P. Singh, K. Rhame, A. Osman, J. Eccersley
Queen's Hospital, Burton-on-Trent

Background: Needle stick injuries (NSI) are the second most commonly reported adverse incident within the NHS in spite of being under-reported by 50%. They represent a major hazard for transmission of blood-borne viruses. The occupational health departments have invested considerable resources in the prevention of these injuries with minimal success. The aim of the audit is to assess the vaccination, knowledge, attitude and practices in our hospital and to find a simple, robust, and effective ways for staff training and reporting of needle stick injuries.
Methods: 100 confidential questionnaires were distributed randomly to health care workers between June and September 2006 in our 559-bedded hospital. Eighty (80%) responded to the questionnaire (43 doctors and 37 nurses).
Results: All the respondents were vaccinated against Hepatitis B and forty of them (50%) were tested for Hepatitis C (34 doctors and 6 nurses). Only 33 of the respondent (41%) wore gloves when performing venipuncture, however, 12 of them practiced the recapping of needles after use. The knowledge of the risk of transmission of viruses after accidental inoculation from a contaminated source was poor, only 16 (20%) of the respondents gave the correct answer. 47 (59%) of the respondent had information about NSI before starting their job. 20 (25%) of the respondents had NSI in the last 12 months (18 doctors and 2 nurses) only 9 (45%) of them had the incident reported. The needle stick injury protocol was followed in all the 9 workers who reported it; however, only 4 of them received counselling. 45 (56%) of them had information about post exposure prophylaxis (PEP) and that it is readily available within the hospital for use in case of NSI.
Conclusion: There were significant deficiencies in several aspects of knowledge, reporting and safe practices of universal precautions in our hospital; this is in keeping with the practices across the NHS. We recommend the use of 'hands-on' workshops instead of lectures to train the staff and the introduction of needle stick injury pack, which will make the reporting simple, easy, and robust.

Surgical audit 0580

Is drain colonisation in breast surgery associated with subsequent wound infection?

J. Winstanley, H. Malik, H. Bishop
Royal Bolton Hospital, Bolton

Background: The use of drains following breast surgery is very common and various protocols exist for their subsequent management. One concern over drains is that they act as a portal for subsequent wound infection. The aim of this study was to establish what proportion of breast drains were colonised by bacteria at the time of removal and was this associated with subsequent wound infection.
Methods: Patients undergoing breast surgery which included mastectomies, wide local excisions and reconstructions over a period from June 2005 to December 2005 were entered into the study. At the time of removal drains inserted into the breast or axilla the tip was removed and sent for culture in much the same way that the tip of a CVP line would be cultured. The results of culture were correlated with subsequent wound infection in either breast or axilla.
Results: A total of 82 patients were involved in the study with a mean age of 57·8 years. A total of 148 drains were inserted in the 82 patients. A total of 34 patients developed wound infection of which twenty-two patients (72%) had drains colonised by bacteria. Staphylococcal organisms accounted for 61% of the organisms cultured.
Conclusion: Wound infection is becoming an increasing problem in surgical practice. It is not possible to say from this study whether the presence of drains acted as a source of infection in these cases. However it does suggest that use of drain tip culture may be a means of identifying patients in danger of wound infection and allow early intervention before a fully established infection develops.

Surgical audit 0604

An investigation into the delayed presentation of rectal cancer in younger population

M. A. Parvaiz[1], G. Yasin[2], R. Hafeez[3]
[1]New Cross Hospital, Wolverhampton, [2]Jinnah Hospital, Lahore, Pakistan, [3]King's Mill Hospital, Mansfield

Background: A study was conducted to assess the factors responsible for the delayed presentation of the rectal cancer in younger population, under the age of 40 years.
Methods: All 30 patients with a new diagnosis of rectal cancer, younger than 40 years, admitted over an 18-month time period were included in this study. Presenting symptoms, prevalence including socio-economic strata & education level and stage at presentation were assessed.
Results: Mean age at presentation among these patients with rectal cancer was 32·9 years, with a range of 7–40 years. Male to female ratio was 14 : 16. A statistically significant proportion ($p < 0{\cdot}05$; 63%) belonged to the below poverty socio-economic group. Studying the education levels showed that 22 patients were completely illiterate, while 8 had some sort of formal education (maximum to year 10). Most of the tumours (54%) were diagnosed in the modified Duke stage C, 26% in stage B and 20% in stage D. None was seen in stage A. Duration of these symptoms ranged from 22 to 365 days (mean 58 days).
Conclusion: The preponderance of advance stages at the time of presentation of rectal cancer in younger population indicates that the public awareness at its early stage is non-existing. This is attributable to illiteracy, ignorance, shyness and low socio-economic status. A comprehensive cancer education & awareness programme should be executed. Genetic & family screening protocols must be adapted to achieve early diagnosis at a potentially treatable stage.

Surgical audit 0640

Accuracy of OPCS coding of general surgical operations

V. V. Chandrabalan, R. Rajasekaran, S. K. Ganapathi, R. J. Delicata
Nevill Hall Hospital, Abergavenny

Background: To determine the accuracy of OPCS-4 coding of general surgical operations at a District General Hospital and to determine the possible causes and remedies.
Methods: A retrospective audit of a series of consecutive general surgical procedures was conducted. Operation records stored on a database were queried. The OPCS-4 code and description recorded for each procedure was compared with the actual operation as described by the surgeon.
Results: 500 procedures were analysed. 245(49%) procedures were coded correctly. Of the remaining 255(51%) procedures, 209(82%) of these had alternate, more suitable codes. The most common cause for inaccuracy was when multiple procedures were performed on the same patient and only one of the procedures was coded ($n = 61{,}23\%$). The second most common procedure to be coded inaccurately was hernia repairs ($n = 23{,}{\cdot}9\%$). 32 (12·5%) were recorded as 'awaiting code from surgeon'. 24(75%) of these had alternate codes while the others did not. We found multiple reasons for the inaccuracies. The codes were entered by secretarial or nursing staff when a patient was booked for surgery as the software used by the hospital made this compulsory. The codes were not subsequently checked by the operating surgeon. The actual operation was different or additional procedures were performed.
Conclusion: Error in coding of operations has implications in retrieval of data for administrative or academic purposes. The operating surgeon should ensure that the procedure has been coded correctly while recording the operation note. Software used to record operation notes should incorporate a system to ensure that the correct code has been entered. The importance of coding procedures correctly should be highlighted to all junior doctors, secretarial and theatre staff.

Surgical audit 0658

An audit of blood usage in patients undergoing elective oesophagectomy for cancer

A. Ayantunde, M-Y. Ng, S. Pal, N. Welch, S. Parsons
Nottingham City Hospital, Nottingham

Background: Oesophagectomy for cancers is a major operation with significant blood loss and blood usage. Concerns exist about the side effects of blood transfusion, cost and availability of donated blood. The cost of blood transfusions to the National Health Scheme (NHS) in 2000/2001 was estimated to be £898 millions, representing a 256% increase since 1994/1995 in the UK. The demand for blood and blood products has been predicted to increase by 4·9% by 2008.
This study aimed to audit the pattern of blood crossmatch and factors predictive of transfusion requirements in oesophagectomy patients.
Methods: Data was collected from the database of all patients who underwent oesophagectomy for cancer over a 2-year period. This audit covered the period when the routine preoperative crossmatching by our Oesophagogastric unit for oesophagectomy was 4–6 units.
Results: A total of 145 patients with a male to female ratio of 2·5 : 1 and mean age of 67 (40–85) years were audited. The mean preoperative haemoglobin (Hb) was 13·0 g/dl. 37% of males (Hb < 13·0 g/dl) and 29% of females (Hb < 11·5 g/dl) were anaemic preoperatively. A total of 1241 blood units were crossmatched and 316 units were transfused to 71 patients. Seventy four patients (51%) did not require blood transfusion during their hospital episode. 846 blood units not used for oesophagectomy patients were reused for other patients and 79 units were wasted. The overall crossmatch to transfusion ratio was 4 : 1 and reuse and wastage rates were 65·2% and 6·3% respectively. The independent predictors of blood transfusion include age > 70 years, Hb level < 11·0 g/dl, T-stage, presence of postoperative complications and anastomotic leak.
Conclusion: The cohort of patients audited were over-crossmatched. The identified independent predictors of blood transfusion should be considered in preoperative blood ordering for oesophagectomy patients. This study has

directly led to a reduction in the maximum surgical blood-ordering schedule for oesophagectomy to 2 units and a reaudit is underway.

Surgical audit 0761

Auditing outcomes of referrals to the young person's breast clinic

R. Saif, P. K. Wright, S. Gupta, A. Evans, C. D. M. Griffith, T. W. J. Lennard
Department of Breast Surgery, Royal Victoria Infirmary, Newcastle-Upon-Tyne

Background: BASO (British Association of Surgical Oncology) estimates that a Breast Unit will typically receive approximately 40 new symptomatic breast referrals per week, excluding screen-detected cases. Many referrals as "suspected cancers" are inappropriate, particularly in young patients. In our unit, breast referrals up to the age of 30 years are seen in a designated clinic, the Young Person's Breast Clinic. From its inception in August 2000 to July 2005, a total of 1254 patients have been referred to this clinic. Our objective was to audit referrals over a 20 month period to assess the workload, diagnoses and final outcome.
Methods: Medical records were retrospectively analysed for all patients attending the Young Person's Breast Clinic from 1st December 2003 to 31st July 2005. All patients received a clinical examination, breast ultrasound scan and FNAC (fine needle aspiration cytology) if appropriate.
Results: During this time period a total of 491 patients were referred to the clinic and there were 129 follow-up attendances. Diagnoses included invasive ductal carcinoma (2), lymphocytic lobulitis (1), abscess (5), fibroadenoma (35), phyllodes tumour (1), lipoma (1), duct ectasia (1), fat necrosis (1), epidermal cyst (1) and nodularity/other benign diagnoses (443). Surgical treatment comprised mastectomy (2), Hadfield's operation (1), fibroadenoma excision (5), wide local excision (1) and epidermal cyst excision (1). Two patients required drainage of a breast abscess under ultrasound guidance.
Conclusion: The Young Person's Breast Clinic is a safe useful service. As well as detecting patients requiring treatment it also provides reassurance to many women with benign diagnoses. Additionally, this clinic allows concentration of outpatient resources towards older women in a higher risk group for neoplasia.

Surgical audit 0771

What do patients really think about their experience in hospital?

S. Gupta, V. Reid, J. Hernon, S. Huddy
The Ipswich Hospital, Ipswich

Background: The aim of this study was to assess how patients perceived their stay as a hospital in-patient, and in particular to identify any areas where problems occurred.
Methods: The PPE-15 patient experience questionnaire was used. All patients admitted under the care of the colorectal team were given the questionnaire on the day of discharge and asked to complete it prior to going home.
Results: The response rate of the questionnaires was 76·5%. Areas where particularly good scores were achieved were doctor communication (85%), respect and dignity (96%) and pain management (91%). Areas where concerns have been identified include not being sufficiently involved in their management (39%), not enough opportunity for family to speak with medical (31%) and nursing staff (30%), and insufficient information about side effects (31%) and complications (57·1%) after discharge. 23% of patients received conflicting information from staff. 77% of patients felt that their fears and anxieties were discussed with medical staff and 73% with nursing staff and 76% of patients found someone to talk to about their concerns.
Conclusion: The results of the questionnaire have been important in highlighting areas where patients feel their management could be improved. This gives us a starting point to focus our attention on how to address these issues and put measures in place to improve things for future patients. As well as highlighting problems, the results of the questionnaire have shown us the areas where we are performing well, and the comments many patients wrote at the end of the questionnaire offer a morale boost to ward and medical staff.

Surgical audit 0779

Accelerated recovery following surgery for colorectal cancer in an inner city university teaching hospital: a case control study

M. Hammond, R. Wilkin, R. Nayar, S. Pathak, S. Roy, I. Khattak, M. Paraoan, U. Gur, P. Carter, M. Goulden, P. Rooney
Royal Liverpool and Broadgreen University Hospital Trust, Merseyside

Background: There is variation in length of stay (LOS) following major colorectal surgery. Novel peri-operative management strategies claim to shorten LOS with improved outcomes.
Methods: A specialist unit and protocol was created to encourage accelerated recovery of patients following colorectal resection, employing regional anaesthesia and early enteral nutrition. We undertook a case control study of 43 colorectal cancer patients (median age 68, M : F 25 : 18, median ASA 2) admitted to the accelerated colorectal recovery unit (ACRU). The data were compared with age-matched controls. The primary endpoint evaluated was median LOS. Secondary endpoints were morbidity, mortality and readmission rates.
Results: The overall median LOS was significantly reduced in the ACRU group (7 *versus* 14 days, Mann Whitney $p = 0{\cdot}0001$, $u = 240$). Median LOS is shown in the table. Complication rates were similar, with 1 anastomotic leak and 2 re-laparotomies in each group. There were 2 readmissions in the ACRU group and 4 in the control group. There were no deaths in the ACRU group.

	ACRU (range)	Controls (range)	*p*
Median LOS	7(4–20) ($n = 43$)	14 (6–77) ($n = 43$)	0·0001
Age < 70	7(4–20) ($n = 26$)	14 (6–77) ($n = 27$)	0·0001
Age > 70	7(5–15) ($n = 17$)	15·5(9–41) ($n = 16$)	<0·0001
ASA2	7(4–15) ($n = 23$)	13 (11–43) ($n = 17$)	<0·0001
ASA3	9(4–20) ($n = 19$)	15 (10–41) ($n = 18$)	<0·0001
ASA4	17 ($n = 1$)	23 (14–29) ($n = 3$)	NS
Right Hemi	7(4–13) ($n = 12$)	11 (9–41) ($n = 11$)	0·0001
Left Hemi	7(4–20) ($n = 14$)	12 (6–16) ($n = 11$)	0·03
Ant/AP resection	9(4–17) ($n = 17$)	16 (11–29) ($n = 21$)	0·0001

Conclusion: The accelerated recovery programme is safe in patients undergoing colorectal resection for carcinoma. LOS can be significantly reduced in all patient groups, including those over 70 yrs and ASA 3. The readmission rate was acceptably low. Further input is required to reduce LOS to levels comparable with other units.

Surgical audit 0781

An audit of pre-operative localisation for the surgical management of primary hyperparathyroidism

S. G. Fisher, K. K. Balan, H. L. Simpson, V. K. K. Chatterjee, G. C. Wishart
Addenbrookes Hospital, Cambridge

Background: Pre-operative imaging determines the surgical approach for parathyroidectomy in the management of primary hyperparathyroidism. Several methods of imaging are available – 99 m Tc-sestamibi scintigraphy (MIBI), Ultrasound scanning (USS) and thyroid scintigraphy. In this study we audited groups of patients that had historically received various combinations of pre-operative imaging.
Methods: 4 groups were included: MIBI at 200 MBq, MIBI at 600 MBq, MIBI at 600 MBq and USS, MIBI at 600 MBq and USS ± thyroid scintigraphy. The sensitivity of each imaging group to correctly predict the surgical findings was assessed.

Results:

Imaging	*n*	Sensitivity
MIBI @ 200 MBq	12	67%
MIBI @ 600 MBq	17	76%
MIBI @ 600 MBq & USS	11	82%
MIBI @ 600 MBq & USS ± thyroid scintigraphy	148	85%

Conclusion: By continuous audit we have shown that increasing the dose of technetium and the addition of neck ultrasound ± thyroid scintigraphy increases the sensitivity of pre-operative localisation.

Surgical audit 0784

Antibiotics in appendicitis: who advises, who prescribes, who receives – does audit help?

T. Mitchell, C. Jones, S. Chaudhri, B. Taylor
North Cheshire Hospitals NHS Trust, Warrington

Background: Antibiotic therapy in appendicitis is prophylactic if the appendix is normal (1–3 doses) or therapeutic (3–5 days) if the appendix is inflamed. Appendicitis is the commonest cause of acute abdomen and accounts for a significant proportion of emergency surgical admissions in the UK. In an era of increasing nosocomial infections, we audited our antibiotic prescribing in appendicitis with a view to rationalising our hospital antibiotic policy.
Methods: An initial retrospective audit was performed of patients undergoing an appendicectomy in the first six months of 2005. Case notes including the drug kardex were used to record data regarding the surgeon, clinical findings, post-operative instructions regarding antibiotics, histological confirmation and duration of antibiotics received by the patient. Following the audit a hospital policy for antibiotics in appendicitis was formulated and a protocol introduced requiring the surgeon to advise and prescribe antibiotics based on operative findings. Subsequently the audit loop was completed by re-auditing the process in 2006.
Results: 44 patients (26 Males : 18 Females; Median age 26 yrs Range 12 yrs–38 yrs) were selected for the initial audit in 2005 and 35 patients (19 Males: 16 Females; Median age 22 yrs Range 9 yrs–36 yrs) for re audit in 2006. Overall, 64/79 patients (81%) had appendicitis diagnosed at operation, and 65/79 (83%) confirmed on histology. In the initial audit (2005), antibiotics were advised by 21/44 surgeons (47%) post-operatively but only 16/44 patients (36%) received the antibiotics prescribed for the duration stated in the post-operative instructions. Only 10/44 surgeons (22%) prescribed antibiotics on the drug kardex, and 28/44 patients (63%) did not receive appropriate antibiotic therapy. On re-audit in 2006, 34/35 surgeons (97%) advised antibiotics post operatively and 33/35 patients (94%) received the antibiotics prescribed for the duration stated in the post-operative instructions, while 21/35 surgeons (60%) prescribed antibiotics on the drug kardex. More importantly 28/35 patients (80%) received appropriate antibiotic therapy after introduction of the protocol and education of surgical staff.
Conclusion: Antibiotic therapy in acute appendicitis is often overlooked. Antibiotic prescribing in appendicectomy should be the responsibility of the operating surgeon, guided by operative findings and current hospital policy. Our audit has illustrated that with introduction of a protocol combined with education of surgical staff, we can improve medical practice.

Surgical audit 0821

Is preoperative endoscopic sphincterotomy (ES) associated with an increased conversion rate in patients with gall stone pancreatitis (GSP)?

S. Pandanaboyana, S. Yee Ting, C. Whigham, H. Judson, F. Polignano, I. Tait
Nirwells Hospital and Medical School, Dundee

Background: Recent studies report that preoperative ES is associated with an increased conversion rate during laparoscopic cholecystectomy (LC). This study evaluates the conversion rates in a clinical cohort of patients with GSP under going LC.
Methods: Retrospective case note review of consecutive patients who presented with gall stone pancreatitis over a 4 year period (2002–2005). Number of cholecystectomies, preoperative ES, timing of ES, conversion rates and reasons for conversion were collected.
Results: 100 patients presented with GSP. 75 patients were suitable for LC. 34 procedures were performed by consultants and 41 by registrars. 30/75 patients under went preoperative ES prior to LC. 2/75 patients required conversion to open surgery due to intraoperative bleeding and CBD stones. The median time between ES and LC was 6 days (range 1–134 days). The conversion rate with and without preoperative ES was 3·3% and 2% ($p > 0·05$) respectively. No significant difference was noticed in the median postoperative stay between the 2 groups (3 days *versus* 3 days) ($p > 0·05$). LC performed by junior trainees did not significantly increase the conversion rates.
Conclusion: Preoperative ES does not increase conversion rates in patients with GSP and does not affect the postoperative stay. This study suggests that preoperative ES is not a significant factor affecting conversion rates as previously thought and therefore should not influence decision making with regards to timing of cholecystectomy for GSP.

Surgical audit 0828

Interval cholecystectomy is a reasonable alternative to Index cholecystectomy in patients with severe gallstone pancreatitis (GSP)

S. Pandanaboyana, Y. ting Sim, C. Whigham, H. Judson, F. Polignano, I. Tait
Ninewells Hospital and Medical School, Dundee

Background: Current guidelines for GSP advocate definitive treatment during the index admission or within 2 weeks of discharge to prevent recurrent attacks. However, this may not always be achievable, and therefore this study reviewed local practice and evaluated the risk associated with Interval cholecystectomy for those with GSP.
Methods: All patients who presented with GSP over 4 year period (2002–2005) were stratified for disease severity (APACHE II). Patient demographics, time to definitive therapy (index cholecystectomy/sphincterotomy; Interval cholecystectomy), and readmission rates were observed.
Results: 100 patients admitted with GSP. Median age 64 (range 20–90). Disease severity Mild - 55 patients; severe - 45 patients. 22/100 patients (median age 81) unsuitable for surgery underwent endoscopic sphincterotomy as definitive treatment with no readmissions with GSP during follow-up. 78 patients underwent cholecystectomy. 40/78 patients (58%) underwent index cholecystectomy, and 38/78 patients (42%) underwent interval cholecystectomy. Number of patients with severe pancreatitis in the index cholecystectomy group was 10 (25%) and in the interval group was 30 (79%) ($p = 0·04$). Median APACHE score 4 [SD 3·8] for index cholecystectomy; and 8 [SD2·6] for Interval cholecystectomy ($p < 0·05$). Time period was 7·5 (2–30) days for index cholecystectomy, and 63 (13–210) for Interval cholecystectomy. 2/38 (5%) patients were readmitted with acute cholecystitis and acute pancreatitis respectively whilst awaiting Interval cholecystectomy. No mortality in either group.
Conclusion: This study concludes that 62% of patients with GSP have definitive therapy during the Index admission. However 79% with severe GSP had interval cholecystectomy within 6 months. This approach was associated with minimal morbidity and readmission rates and therefore would seem a reasonable alternative to index cholecystectomy in patients with severe GSP.

Surgical audit 0862

Audit of IVC Filter use and management

T. Richards, R. O'Neill, N. Bullen, S. Whitaker
Queens Medical Centre, Nottingham

Background: IVC filters are used to prevent pulmonary embolism (PE). International guidelines[1] suggest; absolute, relative and prophylactic indications for IVC filters in 3–11% of all patients with venous thromboembolism (VTE). IVC filters should be removed once the risk of PE has passed. We wished to audit our institutions use of IVC filters. Firstly the indications and management of IVC filters, and secondly who is recommending treatment and managing these patients.
Methods: IVC filter placement was assessed at a regional vascular centre, where over 600 new cases of VTE are see each year. All patients who underwent IVC placement were reviewed. Indication for IVC filter, concurrent management and duration of placement were assessed. Secondly consultants and registrars in acute medicine and surgery were assessed by a questionnaire on indications and management of IVC filter use.
Results: In five years 36 IVC filters were placed, significantly lower than the anticipated 90–330. The majority were for absolute indications; contraindication to anticoagulation (12) and recurrent VTE (6). Relative indications (8) were mostly iliac or IVC thrombus. Ten were prophylactic for patients with trauma or about to undergo surgery. Seven different specialities managed follow up. Most cases could have undergone later IVC filter removal. Only 12 filters (30%) were removed from patients; following prophylactic indication (7), once risk of PE had reduced (2) or anticoagulation could be started (3). Questionnaire results showed confusion over indications and management of IVC filters.
Conclusion: IVC filters are inserted in line with international guidelines however they are probably under-used in PE prevention. Recommendation, management and follow-up, in particular IVC filter removal, should be coordinated by one speciality.

Surgical audit 0905

Pseudomembranous Colitis: an emerging surgical problem? An audit into Clostridium difficile associated disease in surgical patients in a district general hospital

F. J. McNicol, J Hughes, D. N. Monk, J. Croall, M. Johnson
Countess of Chester Hopsital Hospital, Cheshire

Background: *Clostridium difficile* associated disease (CDAD) is a nosocomial infection associated with antibiotic use. Recent reports suggest increased incidence, frequent recurrence and more severe outcomes. A number of recent cases of fulminant pseudomembranous colitis requiring surgery at COCH prompted us to audit the incidence, causation, morbidity and mortality of this important healthcare problem.
Methods: This was a retrospective audit examining the case notes of patients diagnosed with *Clostridium difficile* between 1st March and 31st August 2006. Diagnosis was based on positive stool immunoassay for toxins A and B. Cases were classified into community or hospital acquired disease (diagnosis within 24 hours of admission = community acquired), and infection either secondary to prophylaxis or treatment. We examined which antibiotics were implicated. Morbidity and mortality were determined including length of stay, emergency surgery and death.
Results: There were 195 cases of *Clostridium difficile* March-August 2006. 13% were in surgical patients, 7% in orthopaedic and 80% in medical patients. 185 (95%) cases were hospital acquired and 95% had a history of antibiotic usage. 16% of infections in surgical cases were associated with perioperative antibiotic prophylaxis. Cefuroxime was most commonly implicated (23%), then Augmentin (16%) and Ciprofloxacin (8%). 16% of cases were associated with prolonged courses and 8% with multiple antibiotic regimes. The median increase in length of stay was 5·6 days. 5 patients died: in 3 of these CDAD was a major contributing factor. 3 patients underwent emergency colectomy for fulminant colitis. Fulminant colitis was diagnosed on a combination of clinical signs, X ray and CT imaging, and confirmed on histological examination of the resection specimen. All those requiring emergency surgery survived.
Conclusion: CDAD is common in surgical patients, occurring after antibiotic prophylaxis as well as treatment. Ceforoxime, Augmentin and Ciprofloxacin were the most coomonly implicated antibiotics. The mortality and morbidity associated with *Clostridium difficile* in this group of patients is considerable and strict control of antibiotic usage is vital to minimise the impact of this increasing problem. Prompt surgery in fulminant colitis is shown to save lives.

Surgical audit 0906

The reporting of needlestick injuries sustained in theatre by surgeons: are we under-reporting?

E. Au, J. Gossage, S. Bailey
Maidstone Hospital, Kent

Background: Surgeons frequently sustain needlestick injuries when operating. The aim of this study was to evaluate the incidence and reporting rate of needlestick injuries at one institution.
Methods: A questionnaire was distributed anonymously to 69 surgeons of all grades and specialties in a district general hospital in the UK.
Results: The questionnaire was returned by 42 surgeons (60·9%). Seventy-three percent of surgeons did not routinely use double gloves when operating, mainly because of decreased hand sensation. There were 840 needlestick injuries over two years, out of which 126 caused bleeding. Senior surgeons who spent more hours operating per week had a higher rate of needlestick injuries compared with junior surgeons (29·1 *versus* 6·59 injuries per surgeon over two years). Of the total number of injuries, 19 (2·26%) were reported to Occupational Health, according to the surgeons questioned. However, only 6 reported incidents were found in the Occupational Health records. Junior surgeons were significantly more likely to report needlestick injuries than senior surgeons (9·82% *versus* 1·10% of injuries reported, $P = 0{\cdot}0000045$). The main reasons for failure to report needlestick injuries were due to the lack of time and excessive paperwork.
Conclusion: The rate of needlestick injury reporting by surgeons, at this institution, is extremely low. Previous studies have shown a higher reporting rate suggesting that despite awareness of blood-borne infections, surgeons are still not following recommended protocols.

Surgical audit 0911

Change in practice following prospective oesophago-gastro-duodenoscopy audit for emergency patients

M. Dordea, M. Gok, I. Bain
University Hospital of North Durham, Durham

Background: Clinical impression of dyspepsia has low sensitivity for diagnosing organic disease even in emergency patients unless alarm symptoms are present. Clinical scores for distinguishing causes of dyspepsia are cumbersome, controversial; and a poor predictor of the need for invasive investigation. NICE/BSG produced specific gastroscopy guidelines. Adherence to these guidelines has been shown to be clinically and cost effective. Inpatient emergency oesophago-gastro-duodenoscopies were performed inappropriately necessitating weekly "mop up" lists and competing for colonoscopy time slots. We decided to audit current practice against the guidelines, then re-audit after education.
Methods: Prospective analysis of gastroscopy referrals over a 7-month period (October 2005–April 2006). Evaluation of diagnostic findings and outcome from gastroscopy referral forms and electronic endoscopy database. Statistical testing was carried out by Chi Squared (χ^2) test with $p < 0{\cdot}05$ as being significant (Mann Whitney U).

Results:

	1st Audit ($n = 71$)	2nd Audit ($n = 65$)	χ^2 test (p value)
Age (yrs)	61·24 ± 1·735	62·11 ± 1·657	Not significant
Surgical : Medical (n)	38 : 33	41 : 24	—
Surgical +ve OGD (n)	17	22	Not significant
Surgical −ve OGD (n)	21	19	
Medical +ve OGD (n)	24	18	< 0·05
Medical −ve OGD (n)	9	6	
Surgical +ve OGD (alarm symptoms excluded) (n)	15	19	< 0·05
Medical +ve OGD (alarm symptoms excluded) (n)	8	6	
Inappropriate OGD (n) (Surgical Only)	12 (35%)	5 (12%)	< 0·05
Surgical Stay (days)	3·868 ± 0·2750	3·073 ± 0·2192	< 0·05

Conclusion: As admissions with alarm symptoms are by enlarge triaged to medical admissions, gastroscopy yields very little pathology in emergency surgical inpatients. As a consequence management plans are not affected. Adherence to guidelines for oesophago-gastro-duodenoscopy in emergency surgical admissions eliminated the need for extra weekly lists. Hospital stay was shortened by 0·7 days. Audit can change practice.

Surgical audit 0926

A 'rolling' audit to improve quality of case note entries

P. Nandhabalan, F. Rehman, S. Hilton, H. Chant
Royal Cornwall Hospital, Cornwall

Background: A *'first class service'* requires high quality case notes and clinicians should strive to improve and maintain standards set by existing national guidelines. In response to concerns over standards of record keeping, we assessed the value of a continuous, 'rolling' audit in maintaining the quality of medical case note entries.
Methods: We conducted 4 audits over 18 months. Each audit started on a Friday at 7 : 30 pm and consisted of a review of notes for all current surgical inpatients. Patient identification (name, date of birth, hospital number) and details from the most recent surgical entry (date and time of entry, printed name, signature, contact number) were recorded. The presence or absence of a plan for weekend management was noted.
The results were then presented to the surgical staff to highlight strengths and failings in the quality of note keeping approximately four weeks before the next audit.
Results: In total 353 case notes were reviewed. We recorded an improvement in patient identification (79·5 to 90·5%), timing of case note entry (30·6–75·0%), printed doctors name (22·3–71·4%) and presence of a weekend plan (15·4–60·7%). There was no clear change in the use of a signature (94·8–95·2%), a contact number (66·9–66·7%) or the date of the entry (95·9–91·6%).
Conclusion: This study demonstrates that improvements in quality of case note entries can be achieved by repeated audit cycles and education of junior doctors. With the current high turnover of junior surgical staff, this approach is an effective method of reminding staff to maintain accurate case note entries.

Surgical audit 0938

HSC205 referrals for suspected colorectal cancer; does automatic listing for sigmoidoscopy improve time to diagnosis?

R. P. Jones, E. Barrow, J. Hill, A. J. M. Watson
Manchester Royal Infirmary, Manchester

Background: Under the HSC205 system, patients with certain symptoms suspicious for colorectal cancer should be reviewed by a specialist within 14 days.
We audited all referrals received over a two month period. Following this initial audit, the system by which referrals were handled was altered. All patients were automatically booked for flexible sigmoidoscopy prior to consultant review. We re-audited to see if this new processing system improved the time to diagnosis.
Methods: All referrals over 2 months were collected prospectively. This data was supplemented by retrospective notes analysis. The audit was repeated with referrals being handled by the new booking system. Referrals were assessed for appropriateness of referral, time from referral to specialist review, number of cancers detected, time to diagnosis.
Results:

	Oct/Nov 2005	Feb/Mar 2006
Number of referrals	37	44
Number of referrals analysed	34 (92%)	39 (87%)
Number fulfilling HSC205 criteria	30 (88%)	28 (72%)
Number seen within 14 days	30 (100%)	28 (100%)
Number found to have cancer	7 (23%)	4 (10%)
Days to diagnosis	25 (14–65)	19 (13–45)

Conclusion: The vast majority of referrals received were appropriate. All patients were seen within 14 days. The change to immediate listing of flexible sigmoidoscopy prior to Consultant review did not result in a statistically significant decrease in time to diagnosis ($p = 0·09$).

Surgical audit 0977

Time to audit. . .

E. Smyth, Z. Martin, K. Mealy
Wexford General Hospital, Wexford

Background: Public and political pressures are increasing on doctors and in particular surgeons to demonstrate competence assurance. While surgical audit is an integral part of surgical practice, its implementation and delivery at a national level in Ireland is poorly developed. Limits to successful audit systems relate to lack of funding and secretarial support. In Wexford General Hospital we have a comprehensive audit system which is based on the Lothian Surgical audit system.
Methods: We wished to analyse the amount of time required by the Consultant, NCHDs and clerical staff on one surgical team to run a successful audit system. Data was collected over a calendar month. This included time spent coding and typing endoscopy procedures, coding and typing operative procedures, and typing and signing discharge letters.
Results: The total amount of time spent to successfully run the audit system for one Consultant surgeon for one calendar month was 5168 minutes or 86·1 hours. The overall amount of time spent by each individual is noted in the table below.

	Time in hours	% of standard working week
Consultant	2·7	2·06%
SpR	1·7	1·1%
Registrar	1·95	1·25%
SHO	6·8	4·4%
Intern	20	13%
Secretarial Staff	52·5	38%

Conclusion: An integrated comprehensive audit system requires very little time input by Consultant surgeons. Greater than 90% of the workload in running the audit was performed by the junior house doctors and secretarial staff. This has major financial implications at an administrative level and would have serious implications for any implementation of the European Working Time Directive in Ireland.

Surgical audit 0998

Trends in incidence and surgery for Clostridium Difficile Infection

S. N. Reddy, P. J. Driscoll, P. Kalima, A. Lessels, D. N. Anderson, B. J. Mander

Department of Colorectal Surgery, Western General Hospital, Lothian University Hospitals Trust, Edinburgh

Background: Recently, there has been increased interest in hospital-acquired infections. Our aim was to review trends in Clostridium difficile (C.difficile) incidence, pathogenicity and surgical treatment within adult patients presenting to a university hospitals trust over a 7-year period (1999–2006).
Methods: Patients were identified by cross-referencing microbiology, pathology and surgical audit databases. Retrospective analysis of prospectively collected outcome data was then performed.
Results: Over the study period a total of 32987 faecal samples were tested with a detailed breakdown shown below.

Year (analysis period in months)	Faecal samples tested	C. difficile positive samples	C. difficile positive patients	Patients diagnosed with PMC	Patients treated with surgery
1999 (5)	255	72	44	9	2
2000 (12)	532	150	98	7	1
2001 (12)	1185	273	175	17	5
2002 (12)	3767	653	463	10	0
2003 (12)	6833	980	612	9	2
2004 (12)	6600	998	687	9	5
2005 (12)	7841	1237	806	16	5
2006 (9)	5974	823	586	6	3

Of 3471 patients testing positive for C.difficile, 83 patients were diagnosed with pseudomembranous colitis (PMC) with only 23 patients undergoing surgery.
Conclusion: Over the study period, there has been an increase in the diagnosis of C.difficile. In contrast, the number of patients progressing to fulminant pseudomembranous colitis demanding surgical intervention appears to have not increased. This suggests that timely medical therapy is highly effective in most cases.

Surgical audit 1036

Conservative surgery for paediatric Crohn's disease: should we be more radical?

L. J. Cook, E. Al-Hendawi, AI Haq, A. Bates, C. Salvestrini, M. Malik, F. Torrente, R. Heuschkel, A. A. M. Lewis

Royal Free Hospital, London

Background: This cohort review studies the outcome of a limited ileo-colonic resection in children with localised Crohn's disease. It has been our policy since 1995 to confine first resection for ileo-caecal disease to the minimum necessary to remove macroscopic disease. The aim was to determine whether such patients go on to develop an early peri-anastomotic recurrence, and therefore whether there is a case for adopting a more radical approach at least at the initial operation.
Methods: The records of all children and adolescents diagnosed with Crohn's disease and operated on for ileo-caecal disease between 1995 and 2005 were reviewed, and consolidated onto an anonymised SPSS v.11 database.
Results: 38 children underwent limited ileo-caecal resection for localised Crohn's disease. Of these 28% required re-laparotomy during the period of follow-up. Over half of these were for post surgical fibrotic adhesions with no evidence of recurrent disease. In only one patient would recurrent new disease have been removed by an initial standard right hemicolectomy. As previously described, the presence of disease in the resection margins was not predictive of disease recurrence.
Conclusion: This review does not support the case for more extensive surgery. It suggests that disease recurrence requiring surgery is usually not at the anastomotic site, but colonic in origin.The most frequent indication for further laparotomy was post-surgical adhesions.This result suggests that strategies to reduce the risk of adhesions are warranted in this group of patients to improve outcome. The advent of laparascopic surgery may well reduce this risk as well as the additional benefits of a faster recovery and smaller wounds in a population likely to require re-operation in the future.

Surgical audit 1083

Administration of regular medications in general surgical emergency admissions that are 'nil by mouth'

R. P. Veettil, M. Zammit, V. Khandeparkar, C. Harris

Royal Blackburn Hospital, Lancashire

Background: NCEPOD report 2000 stated that many patients do not receive their regular medications perioperatively. Sudden withdrawal of medications increases morbidity and mortality in surgical patients. Our aim was to assess whether general surgical emergency admissions are administered their regular oral medications while they are being kept nil by mouth (NBM).
Methods: Emergency general surgical admissions that were kept NBM are included in this prospective study. Patients not previously on any medications were excluded. Data collected included past medical history, drug history and differential diagnosis for current admission. For patients not given their medications, duration of non-administration and reasons for this was recorded. Medications were grouped into 4 British National Formulary drug groups for analysis.
Results: 50 patients are included in the study. 26 (52%) had a history of cardiovascular disease, 19 (73%) of which were not given their medications. Of 10 (20%) patients with respiratory disease, 4 (40%) were not given their medications. 17 (34%) were on central nervous system medications, of which 12 (71%) did not receive their medications. 20 (40%) were on gastrointestinal medications, 9 (45%) of these did not receive their medications. Overall 29 (58%) did not receive at least one of their medications. In all cases the nursing staff documented NBM as the reason for non-administration of drugs. Medications were recommenced within 24 hours in 20 (69%), after 2 days in 3 (10%), after 3 days in 5 (17%), and after 5 days in 1 (3%).
Conclusion: Emergency surgical admissions are frequently not given their regular medications. Guidelines for nursing staff or a change in terminology (e.g. medications only orally) may help to change this inappropriate practice.

Surgical audit 1133

Family risk assessment clinics for breast cancer: our experience so far

J. Lee, J. Mulsow, V. Lee, J. Rothwell, J. G. Geraghty
Adelaide and Meath Hospital, Dublin

Background: In women who develop breast cancer approximately 15–20% have a family history and 5–10% a genetic predisposition. Appropriate screening and early detection can improve prognosis in this group. With this in mind we established a specialist nurse led family risk assessment clinic in May 2005 to assess individual patient risk and initiate appropriate surveillance. Women at medium to high risk according to NICE guidelines were deemed suitable for referral.
Methods: Family history was assessed by telephone interview, collation of family history and consultant assessment. Data was entered prospectively into a database. Patient risk factor profiles were calculated using Manchester and Claus scoring. BRCA1/BRCA2 gene mutation screening was undertaken when indicated and individual surveillance programmes initiated following assessment.
Results: Of 412 patients referred to date, 312 (76%) were referred from our rapid diagnostic clinic, 40 from other hospitals, 43 from GP's, and 4% from other sources. Formal assessment of risk has been performed in 101 patients. 85% and 80% were found to be at medium or high risk according to Manchester and Claus scoring respectively. 26 have been referred for genetic screening. Of 15 patients with confirmed BRCA1/BRCA2 gene mutations 3 have undergone risk reducing surgery, 3 are undergoing assessment for surgery, and 9 have opted for intensive screening.
Conclusion: Our initial experience of a family risk assessment has shown there to be a significant demand for this service. Appropriate assessment of patients allows us to provide individuals with accurate risk profiles and allows them to make informed choices regarding their follow-up and management.

Surgical audit 1152

Surveillance of arteriovenous fistulas – experience in a District General Hospital

J. Thorpe, J. Davies, R. Chandrasekar, P. McClelland, S. Lea
Arrowe Park Hospital, Wirral

Background: It is commonly accepted that regular surveillance of arteriovenous grafts, with high thrombosis-rates, detects subclinical dysfunction. This enables detection of flow-limiting lesions leading to intervention, to maintain patency of these grafts. However, regular surveillance of arteriovenous fistulas is generally thought to be unnecessary. We report the results of our surveillance programme, using a ultrasound dilution technique, in a District General Hospital where (95%) of patients with permanent vascular access have arteriovenous fistulas.
Methods: All patients undergoing haemodialysis between January 2002 and December 2005, through either a fistula or a graft, were included in the study. The Dialysis Access Co-ordinator (JD), who collected the data prospectively in a structured database, carried out the surveillance at 3 monthly intervals or earlier when required.
Results: In total 228 patients underwent haemodialysis during the study period. Of these, in 28 (12%) patients (22 fistulas and 6 grafts) abnormal flows were detected by surveillance. In all patients a fistulogram confirmed the lesion/s. A total of 50 interventions were performed to maintain patency – 36 angioplasties (24 in fistulas and 12 in grafts), 13 surgical interventions and 1 thrombolysis. Complications of angioplasty included rupture (2) and one thrombosis occurring within five days. The surgical interventions included revision of anastomoses (9), patch angioplasties (3), and interposition vein grafts (1). There were a total of 6 unexplained thromboses in the whole series.
Conclusion: Surveillance, to detect subclinical dysfunction, has an important role to maintain the patency of arteriovenous fistulas. Such a dedicated surveillance programme reduces the rates of thrombosis of the 'life-line' of a patient undergoing haemodialysis.

Surgical audit 1165

The use of biliary drainage after laparoscopic common bile duct exploration

C. Moore, A. Hamouda, Y. Goh, I. Eid, A. H. Nassar
Monklands District General Surgery, Airdrie

Background: T-tubes are usually used after choledochotomy. They are associated with a 5% morbidity rate. Transcystic drains are often used as an alternative but are not without their problems. We aim to establish the difficulties faced by a prospective group of patients who had external biliary drainage placed at laparoscopic ductal exploration.
Methods: We operate a protocol of routine operative cholangiography and subsequent bile duct exploration for all comers with ductal stones, using a choledochotomy if the transcyctic approach is unfavourable. In the majority of choledochotomies the biliary system is drained with a transcystic tube (TCT) or a t-tube if TCT insertion is impossible or the CBD is markedly dilated. Transcystic drainage is used in selected cases undergoing transcystic clearance. The patient is discharged at day 2–4, usually after a tube cholangiogram and returns to the ward 2 weeks postoperatively for tube removal assuming there are no retained stones.
Results: 377 patients had laparoscopic bile duct exploration between 1992 and 2006: 76 patients had T-tubes (20%) and 127 had transcystic tubes (33·6%). Minor drain related complications occurred in 5·3% (4) and 7·9% (10) in the T-tube and TCT group respectively. More serious complications occurred in 6 (7·9%) of the T-tube patients including 3 bile leaks after slippage or inappropriate early removal, resulting in 2 post-operative ERCPs and 1 repeat laparoscopy. There was 1 readmission with cholangitis necessitating ERCP and 2 readmissions with significant acute pre-renal failure in patients with hypertension on diuretics and ACE inhibitors. Overall readmission rate was 10·5% and 6·3% in the two groups. The presence of a biliary drain allowed detection of residual filling defects in 13 cases and in 2 cases this was successfully dealt with using IV glucagon and saline flush via the tube in the X Ray department.
Conclusion: The main problems we have encountered are tube displacement and re-admissions with acute pre-renal failure, probably precipitated by concurrent nephrotoxic medication use. Carefully securing the tube and a clear protocol of management notified to the patient and nursing staff are vital. We must be vigilant when using biliary drains in patients sensitive to the effects of fluid depletion and advise them appropriately.

Surgical audit 1172

The Association of Coloproctology operative mortality score can be used to predict long-term survival in patients undergoing curative surgery for colorectal cancer

T. Salem[1], M. Simpson[1], A. Rowan[1], S. Leonard[2], L. Donnelly[2], L. Giles[2], A. Macdonald[1]
[1]Department of Surgery, Monklands Hospital, Airdrie, [2]Department of Clinical Effectiveness, Monklands Hospital, Airdrie

Background: The Association of Coloproctology (ACPGBI) operative score for 30 day mortality predicts reliably the 30 day mortality rate in patients undergoing elective/emergency colorectal cancer surgery. In a practice with high social deprivation and medical co-morbidity the actual 30 day mortality of 7·8% falls within the 8·2% predicted. It seems intuitive that those patients discharged from hospital following curative surgery will remain subject to their predictive score by virtue of their ongoing co-morbidity. This study examines the relationship between ACPGBI operative score and long-term survival
Methods: Data on all patients undergoing surgery by a single operator between Jan 1999 and Dec 2005 was collected prospectively on a designated database. Age, Dukes stage, curative intent, elective/emergency status and ASA grade were recorded. Survival (all causes of death) was compared to the pre-operative ACPGBI score using the Log Rank (Mantel Cox) test with $p < 0{\cdot}05$ considered significant
Results: Of 271 patients undergoing surgery (76 Palliative procedures) 191 underwent curative surgery of whom 177 were discharged from hospital. There

was a negative correlation between pre-operative ACPGBI score and long term survival, $p < 0{\cdot}001$. Of 96 patients with a score in the 3rd and 4th quartiles (high scores) 45% and 24% were alive at 2 and 5 years respectively compared with 73% and 49% in those patients in the 1st and 2nd quartiles (low scores) $p < 0{\cdot}001$ at each time point.

Conclusion: These results indicate that patients retain their pre-operative risk beyond their surgery and their survival (all causes of death) can be predicted at the time of their surgery.

Surgical audit 1175

Prospective audit of thromboprophylaxis in surgical patients

P. Nastro, P. Giordano
Whipps Cross University Hospital, London

Background: Correct deep venous thrombosis (DVT) risk assessment and prophylaxis for surgical patients is fundamental. However practice is not well standardised and can varies widely. A prospective audit of DVT risk assessment and prophylaxis for surgical patients was undertaken. Re-audit one year after implementing changes was also carried out.

Methods: Prospective analysis of clinical notes and drug charts of all elective and emergency surgical admissions over a period of seven weeks. The main outcome measures were: admission type, diagnosis, surgery, risk assessment, thromboprophylaxis prescribed and given, contraindication to surgical thromboprophylaxis and thromboembolic risk factors.
Set standards were local guidelines for patient risk stratification and prophylaxis and an independent protocol of a different UK institution based on national recommendations.

Results: There was a significant discrepancy between local guidelines and national recommendations. 169 surgical admissions were reviewed. DVT prophylaxis was prescribed in 90% of patients but risk assessment only performed in 9%. Compared to national recommendations 51·5% of patients received correct DVT prophylaxis, 13% received over- and 35·5% under-prophylaxis. Change of practice: local risk assessment and DVT prophylaxis guidelines were modified according to national recommendations. A protocol with the risk assessment and prophylaxis policy was developed and made available for all doctors admitting patients both electively and via A&E. Re-audit: risk assessment was carried out in 60% of patients ($p < 0{\cdot}05$) and correct prophylaxis prescribed in 68% of cases ($p < 0{\cdot}05$).

Conclusion: The implemented change in practice improved the DVT prophylaxis but still 29·5% of patients received an under-prophylaxis.
Further action plan: All junior doctors and A&E staff members must be introduced to the local guidelines and the protocol should become an integral part of the drug chart. Regular audits are necessary to ensure that improvement of practice is mantained.

Surgical audit 1193

The implementation of 'enhanced recovery after surgery' colorectal programme in a district general hospital

E. Tjiang, M. Johnson
Countess of Chester Hospital, Chester

Background: The practice of "Enhanced recovery after surgery (ERAS) has been promoted with encouraging results. ERAS has been implemented in our District General hospital (DGH) over the past two years. Endpoints of post-operative length of stay (LOS), mortality, readmission rate and leak rate were investigated. Data from the Association of Coloproctology ACPGBI showed median LOS for 2001 was 12 days.

Methods: Retrospective study of consecutive patients underwent major elective colonic surgery under the care of a single colorectal surgeon over a 26-months period. Data was collected from the MEDITECH electronic integrated healthcare information support system and diary.
Emergency surgery and minor surgery were excluded.

Results: 94 patients, 48 female and 46 male, mean age (SEM) of 63 (1·6) with range of 22-85. The operations comprised of 31% anterior resection, 11% abdomino-perineal resection/completion proctectomy, 9% subtotal colectomy/panproctocolectomy, 14% left hemicolectomy/sigmoid colectomy and 5% reversal of Hartmann's procedure. Median LOS was 8 days, with range of 3-110 days. 44% discharged within 7 days and 19% discharged within 5 days. The first 12 months data was compared with the later 14 months. The discharge rate within 7 days was 26% *versus* 58% and the discharge rate within 5 days was 12% *versus* 25%. No mortality was recorded over this duration. Re-admission rate of 2·1% and anastomotic leak rate of 3·2%.

Conclusion: There was a learning curve with the implement of ERAS. The team became confident and aggressive in implementing the programme with time, It reduced LOS, with very low readmission rate and morbidity/mortality.

Surgical audit 1213

An audit of polyp surveillance colonoscopy in order to improve the efficiency of endoscopy units

G. Kaur
Scunthorpe General Hospital, Scunthorpe

Background: In recent years there has been an increase in the demand for colonoscopy in all endoscopy units across the United Kingdom. This is anticipated to further increase with the advent of the national bowel screening program. Individual units therefore need to develop novel techniques to improve their efficiency and throughput. We found that apart from cancer diagnosis, most of our unit's demand for colonoscopy was due to repeat procedures for polyp surveillance. We therefore performed a retrospective audit of polyp surveillance requests to determine our adherence to British Society of Gastroenterology (BSG) guidelines for polyp follow-up in an attempt to reduce the number of unnecessary procedures performed.

Methods: All patients undergoing colonoscopy as polyp follow-up during the period July to December 2005 were included in the study – 115 were identified, of which 88 were finally included. The sample source was the endoscopy department database, the method retrospective and the data source the case notes.

Results: 42 patients were classified as low risk, 8 as intermediate risk and no patient belonged to the high risk category (BSG guidelines). Of the 42 low risk category patients, only 2 had appropriate follow-up; the remainder had unnecessary repeat procedures (43% at less than a year, 33% at 1, 7% at 2 and 12% at 3 years). Only 1 of the 8 intermediate risk category patients had appropriate follow-up; the remainder had unnecessary repeat procedures (37% at less than a year, 37% at 1, 13% at 2 and 13% at 3 years). Where no polyps had been found (14 patients), 13 had repeat colonoscopy. Where metaplastic polyps (19 patients) or diverticular disease (2 patients) was found, all had unnecessary repeat colonoscopy (100%).

Conclusion: In all, surprisingly, we had complied with the BSG guidelines in only 4 of the 88 patients (5%). If we had followed the guidelines, this would have resulted in a net reduction of 84 unnecessary procedures, i.e. 95% reduction in endoscopy time. We have therefore started reviewing repeat requests for and reports of surveillance procedures to ensure adherence to BSG guidelines; this should reduce the number of unnecessary procedures performed. We plan to re-audit the outcome in 6 months.

Surgical complications

Surgical complications 0178

The influence of epidural-induced prolonged hypotension on anastomotic leak rates following anterior resection of the rectum

D. Coull, P. Bearn, K. Galbraith, H. Scott, D. Donaldson
St. Peter's Hospital, Chertsey

Background: The utilisation of epidural anaesthesia for post-operative pain relief after anterior resection has become firmly established in our unit over the last 10 years. We aimed to identify whether or not post-operative hypotension was associated with an increased rate of anastomotic dehiscence in these patients.
Methods: A retrospective case note review was performed on all patients who had undergone anterior resection in our unit from January 2004–July 2006. Clinical details were recorded. Post-operative hypotension was defined as systolic blood pressure below 100 mmHg.
Results: 115 patients (59 males) underwent anterior resection during this period. 95 (83%) had an epidural sited. The other twenty patients (17%) received opiates via a Patient Controlled Analgesia System. Results from those patients with clinical anastomotic leaks were compared to those with no leak. Group A - 11 patients (10%) developed a clinical anastomotic leak. All 11 patients had an epidural catheter. Ten of these patients (91%) with leaks had post-operative hypotensive episodes for a mean duration of 9·8 hours, commencing at an average of 0·9 days after surgery. One patient (9%) was given inotropic support to counter-act hypotension. Group B - 84 out of 104 (83%) of patients without clinical leaks had an epidural sited. In comparison, only 34 out of 104 (36%) of these had post-operative hypotensive episodes for a mean duration of 5·5 hours commencing at an average of 1·2 days after surgery. Seven of these 34 patients (21%) received inotropic support. The association between leaking and hypotension is highly significant by Fisher's exact test ($p < 0·001$). Both groups were well matched for ischaemic risk factors.
Conclusion: The cause of anastomotic leaks is multi-factorial but we feel that prolonged post-operative hypotension is a major contributory factor. This hypotension may, in large part, be a consequence of epidural anaesthesia. We recommend, that in a bid to minimise anastomotic leaks in patients undergoing anterior resection when epidural anaesthesia is employed, careful intra- and post-operative fluid management, plus additional inotropic support to maintain the systolic blood pressure at a value close to the pre-operative levels.

Surgical complications 0187

Methylene blue neurotoxicity following parathyroidectomy: an unusual complication

M. A. S. Khan[1], A. P. North[2], D. R. Chadwick[1]
[1]Department of Breast and Endocrine Surgery, Chesterfield and North Derby Royal Hospital, Chesterfield, [2]Department of Anaesthesia, Chesterfield and North Derby Royal Hospital, Chesterfield

Background: Methylene blue (MB) is routinely given in many institutions during parathyroidectomy to aid localisation of an adenoma. The technique is generally considered to be safe except causing pseudo cyanosis. We report 3 cases of MB neurotoxicity. The aim of the study is to define the safe and adequate dose of Methylene blue and review the probable mechanism of MB neurotoxicity.
Methods: A review of 3 patients who manifested symptoms of neurotoxicity while undergoing parathyroidectomy with methylene blue infusion at our institution (out of a total of approximately 200 parathyroidectomies from April 1999 to April 2006). A literature search was carried out and case reports of MB neurotoxicity were compared with our patients. The possible mechanisms of MB neurotoxicity are discussed.
Results: There were 3 patients, all female with MB neurotoxicity with age range of 55–74 years. MB was given as infusion of 5 mg/kg in 5% glucose solution during surgery. These patients were slow to recover from anaesthesia and had confusion, agitation, altered mental status and rapid, inappropriate jerky movements of all 4 limbs in the early postoperative period. They were managed conservatively over 2–4 days when their symptoms resolved. The diagnosis of MB neurotoxicity was made by exclusion. Since then we have reduced the dose of MB to 3 mg/kg with no adverse outcome. 2/3 patients in our series and 3/4 patients reported in literature had history of depression and use of antidepressants, Clomipramine (Antimuscrinic), Fluoxetine Paroxetine and Venlafaxine (Selective serotonin re-uptake inhibitors, SSRI). An adverse drug interaction between MB and SSRI cannot therefore be excluded.
Conclusion: The lower dose (3 mg/kg) of MB is safe and adequate to stain the parathyroid. The mechanism of MB neurotoxicity might be complex and synergistic involving a direct central mechanism or interaction with new antidepressants the Selective Serotonin Reuptake Inhibitors (SSRI).

Surgical complications 0209

Morbidity and mortality following closure of loop ileostomy

A. Saha, C. R. Tapping, G. Foley, R. Baker, D. Burke, P. Sagar, H. S. Ling, P. Finan
The General Infirmary at Leeds, Leeds

Background: A loop ileostomy is used as a method of faecal diversion to protect distal anastomoses. The aim of this study was to identify factors, which predict morbidity and mortality following closure of ileostomy.
Methods: Three hundred and twenty five consecutive patients who underwent closure of loop ileostomy between 1998 and 2005 at our institution were reviewed. Thirty-one patients had incomplete data and were excluded. Pre-operative history, operative techniques and post-operative management together with outcome were recorded. Univariate and multivariate logistic regression analyses were performed.
Results: Reasons for primary surgery were: anterior resection for cancer ($n = 142$, 48%), ileal pouch-anal anastomosis ($n = 102$, 35%), diverticular disease ($n = 24$, 8%), Crohn's colitis ($n = 4$, 1%) and other conditions ($n = 22$, 8%). At closure, 118 patients (40·1%) had a hand-sewn anastomosis. Overall mortality was 2·7% ($n = 8$) and morbidity was 23·8% ($n = 70$). Thirteen patients (4·4%) had an ileal anastomotic leak. 31 (10·5%) patients developed small bowel obstruction (median follow-up 238, range 69–393 weeks) of whom 7 (22·6%) required operative intervention. Eighteen patients (6·1%) developed incisional hernia at their ileostomy closure site (median follow-up 271, range 158–394 weeks). In total, 28 patients (9·5%) required re-operation. Significant factors associated with anastomotic leak were anaemia (Hb < 11 g/dL; $n = 65$, $p = 0·033$) and a complication following the primary operation ($p = 0·021$). Hypo-albuminaemia (albumin < 34 g/L) was associated with mortality ($n = 43$, $p = 0·004$). Anastomotic leak rates were lower in patients with stapled anastomoses (69% ($n = 9$) hand-sewn *versus* 31% ($n = 4$) stapled; $p = 0·029$). No other factors, including timing of closure of ileostomy, were found to have a significant effect on anastomotic leak rates and mortality.
Conclusion: Closure of loop ileostomy is associated with significant morbidity and mortality. The findings of this study suggest that anaemia and hypo-albuminaemia may be associated with poor outcome. Lower rates of anastomotic leak were seen with stapled anastomoses.

Surgical complications 0278

Pyloric dysfunction following oesophagectomy without pyloroplasty: long term outcomes

R. C. Tandon, M. J. Forshaw, P. Morales, L. Doig, T. Sabhawal, A. Adam, R. C. Mason
St Thomas' Hospital, London

Background: Delayed gastric emptying is a common condition following oesophagectomy using a vagotomized gastric conduit. This study analyses the incidence of pyloric dysfunction following oesophagectomy without pyloroplasty and assesses the success of dilatation therapy.
Methods: 175 patients underwent oesophagectomy without pyloroplasty between January 2000 and May 2003 at a tertiary unit. Endoscopy was only performed in symptomatic patients and balloon dilatation was performed at either endoscopy or under fluoroscopic guidance.
Results: Pyloric dysfunction was observed in 45 patients (35%) undergoing endoscopy but only 26 patients (20%) patients reported symptoms attributable to delayed gastric emptying. Pyloric dysfunction was not related to the type of oesophagectomy performed. The underlying cause of pyloric dysfunction was benign (post vagotomy) in 22 patients and locoregional disease recurrence in 4 patients. Patients with benign pyloric dysfunction all presented within the first 12 months after oesophagectomy whereas the earliest presentation of locoregional recurrence was at 11 months. All of the symptomatic patients were treated with endoscopic and/or radiological dilatation without complication: 73% of patients required only a single dilatation (media $n = 1$, range = 1–5). 5 patients ultimately required placement of self expanding metallic stents across the pylorus (4 patients with locoregional recurrence and 1 patient with persistent post vagotomy dysfunction) with good symptomatic relief.
Conclusion: Benign pyloric dysfunction following oesophagectomy usually presents within the first year and can be successfully treated by a combination of endoscopic and radiological treatment. Late-onset delayed gastric emptying after the first year may suggest locoregional recurrence.

Surgical complications 0279

Anastomotic strictures following oesophagectomy: endoscopic and radiological management

R. C. Tandon, M. J. Forshaw, P. Morales, L. Doig, T. Sabhawal, A. Adam, R. C. Mason
St Thomas' Hospital, London

Background: Anastomotic stricture following oesophagectomy has a significant impact upon quality of life. This study aims to assess the incidence and cause of anastomotic strictures and the relative success of endoscopic and radiological treatments.
Methods: 175 patients underwent oesophagectomy (103 : 72 cervical : intrathoracic anastomoses) between January 2000 and May 2003 at a tertiary unit. There were 3 in-hospital deaths (1·7%) and 127 patients (74%) were followed up at the unit until January 2006. Endoscopy was only performed in symptomatic patients. Anastomotic strictures were treated initially with endoscopic balloon dilatation; radiological balloon dilatation was reserved for resistant strictures.
Results: 223 endoscopies were performed in 84 symptomatic patients (66%), predominantly for postoperative dysphagia (64%). Anastomotic strictures were observed in 44% of patients and were more common with cervical compared to intrathoracic anastomoses (51% *versus* 31%; $p = 0{\cdot}04$). 48 patients (38%) underwent endoscopic dilatation (media $n = 1$; range = 1–14): symptomatic relief occurred in 75% of patients within 4 dilatations. 15 patients required radiological dilatation but symptomatic relief could only be produced in 47% of these patients after 3 dilatations. 7 stents were placed either for resistant strictures or underlying locoregional recurrence. There were no treatment-related adverse events. Within the first 12 months, dilatation was performed predominantly for benign post-surgical strictures (75%); after 12 months, locoregional recurrence was ultimately identified as the underlying cause in 43% of patients requiring anastomotic dilatation.
Conclusion: Endoscopic and radiological management is safe and successful in the majority of patients with anastomotic strictures following oesophagectomy but multiple procedures may be required.

Surgical complications 0474

Foot perfusion and calf pressure in patients undergoing colorectal surgery

S. Beraldo, A. Lala, M. A. S. Chapman, S. R. Dodds
Department of Surgery, Good Hope Hospital NHS Trust, Sutton Coldfield

Background: Lower limb compartment syndrome (LCS) is an unusual but serious complication following prolonged operations in lithotomy position. Elevation and duration of surgery are known risk factors but the role of calf external compressions devices is still controversial.
The aim of this study was to determine the effects of foot elevation on foot perfusion, the variation of calf pressure and the role of compression devices during surgery.
Methods: We prospectively studied 26 patients undergoing colorectal surgery: 16 with lithotomy position and 10 without. The lower limb intra-compartment pressure, the brachial systolic pressure and the ankle reserve perfusion pressure were recorded every 15 minutes for the entire duration of surgery. The intra-compartment pressure was recorded for 10 hours post-operative.
Results: All patients had a significant rise of ICP from baseline 7·06 (SD 3·92) mmHg to 14·38 (SD 7·63) ($p < 0{\cdot}0001$) after the application of compression device. During surgery, mean ICP in the supine position group was 15·79 (SD 9·8) and in the lithotomy 14·58 (SD 7·58) ($p = 0{\cdot}248$). However 10 hours following surgery patients from the lithotomy group were found to have higher mean ICP (9·8 mmHg SD 5·05) as compared to those who had their surgery in supine position (4·88 SD 4·8) ($p < 0{\cdot}05$). Lithotomy position also led to significant reduction in ankle perfusion pressure (89·37 mmHg, SD 23·43) as compared to supine position (119·16 SD 22·92) ($p < 0{\cdot}0001$). None of these patients developed compartment syndrome.
Conclusion: Application of compression device and reduced ankle perfusion in lithotomy position may be important contributing factors leading to post-operative reperfusion injury and subsequent compartment syndrome.

Surgical complications 0510

C-reactive protein is superior to contrast swallow at recognising gastric-conduit related complications following minimally invasive oesophagectomy

D. Veeramootoo, R. Parameswaran, R. G. Berrisford, S. A. Wajed
Royal Devon and Exeter NHSFT, Exeter

Background: Oesophagectomy is a high-risk procedure, and it is essential that post-operative problems are recognised early and dealt with immediately. Changes in C-reactive protein (C-RP) may be more helpful than contrast swallow in the rapid and accurate identification of potentially serious gastric-conduit related complications. The aim was to compare the clinical value of C-RP with routine contrast swallow following minimally invasive oesophagectomy (MIO).
Methods: MIO is the procedure of choice for oesophago-gastric resection in our unit. This involves a thoracoscopic oesophageal mobilisation, laparoscopic gastric mobilisation and conduit formation with an open cervical anastomosis. Standard post-operative care, similar to open oesophagectomy is undertaken on a specialist ward. Routine investigations include daily C-RP and a contrast swallow performed at post-operative day (POD) 5. We carried out a retrospective analysis to assess the utility of these tests in the clinical management of post-operative events.
Results: Between April 2004 to July 2006, 50 patients underwent MIO. There was one death (mortality 2%); 26 (52%) had an uneventful recovery (U), and 24 (48%) developed complications (C). These included a sub-group of 9 patients (18%) with specific problems related to the gastric conduit (GC). All patients demonstrated a transient, abnormal rise of C-RP between POD 1 to 3. In group-U, levels then fell, but in group-C, these remained elevated or increased further (POD-5: $U = 96$, $C = 180$, $p < 0{\cdot}01$).This discrepancy trend was further exaggerated in the GC-subgroup (POD-5: $GC = 254$, $p < 0{\cdot}01$). Contrast swallow recognised gastric-conduit complications in only 3 patients (sensitivity 33%), and incorrectly suggested this in 2 (specificity 60%). Areas under the ROC curve were 0·86 and 0·64, and costs £3·02 and £69·32 for CRP and contrast swallow tests respectively.
Conclusion: Post-operative C-RP monitoring is a far more accurate and cost-effective modality than contrast swallow the early diagnosis of gastric-conduit related complications following MIO.

Surgical complications 0515

Effectiveness of routine pre-operative investigations in predicting post operative problems following laparoscopic cholecystectomy

S. N. Andrews, G. Wajed, M. J. Cooper, S. Wajed
Department of Thoracic and Upper GI Surgery Royal Devon and Exeter Hospital, Exeter

Background: To investigate the utility of routine investigations prior to laparoscopic cholecystectomy (LC) including liver function tests (LFTs) and radiology in predicting those patients likely to suffer post-operative problems requiring endoscopic retrograde cholangiopancreatography (ERCP).
Methods: Retrospective analysis of all patients who presented with post operative problems following LC over a five year period and deemed clinically sufficient to warrant investigation with ERCP was carried out. ERCP conclusions were compared with the pre-operative assessment results.
Results: Between January 1999 and March 2004, 1527 LCs were performed by eight different surgeons. Routine intraopertive cholangiography (IOC) was not carried out. Fifty patients (3·3%) required an ERCP to investigate post operative problems. Retained stones in the common bile duct (CBD) were observed in 24 (1·6%). Eighteen patients (1·2%) had a normal ERCP with the assumption of spontaneously passed stone. Abnormal LFTs and/or a dilated CBD was observed in 13 of the 24 (54%) patients with proven retained stones, the tests failing to identify the problem in 11 (46%). Three bile leaks required intervention (0·3%).
Conclusion: A small number of patients may develop complications related to retained CBD stones following LC (1 in 63). Action on the presence of abnormal pre operative tests would reduce this to less than 1 in 100. The morbidity associated with routine IOC is difficult to justify for all patients. This audit shows routine tests cannot exclude this potential problem in all cases, less invasive techniques at assessing CBD stones should be employed.

Surgical complications 0528

Mortality and pulmonary complications after transhiatal and transthoracic oesophagectomy. The evolving evidence

Y. Leigh, P. Mcculloch
University of Oxford, Oxford

Background: Individual trials and one small meta-analysis have failed to identify significant morbidity or mortality benefits from transhiatal oesophagectomy (THE) compared to trans-thoracic oesophagectomy (TTE), although trends and subjective impressions suggest one. Our objective was to update the evidence by performing a systematic review of the relative risks of death and respiratory complications after THE and TTE, including data from the most recent studies.
Methods: We performed a systematic review of randomised controlled trials comparing THE with TTE techniques identified on Medline, Pubmed and Embase from 1990 to 2005. Only four randomised controlled trials of robust quality were included in the analysis ($n = 325$). Meta-analysis was performed using Revman software to calculate odds ratios and associated confidence intervals for 30 day mortality and pulmonary complications.
Results: The addition of one large recent RCT changed the conclusions of previous analyses. The Odds ratio of death after THE ($n = 160$) *versus* after TTE ($n = 165$) was 0·87 (CI 0·33–2·2). The Odds ratio of pulmonary complications after THE *versus* after TTE was 0·38 (CI 0·24–0·61).
Conclusion: There is no randomised controlled trial evidence that transthoracic oesophagectomies for cancer have a higher post operative mortality. Transthoracic oesophagectomies are associated with a significant increase in pulmonary complications. Clinical evidence summaries require regular updating and re-evaluation to remain current.

Surgical complications 0679

Persistent blue discoloration of skin after Sentinel Node Biopsy. Does the method of introduction make any difference?

H. Devalia, M. Kissin
Royal Surrey County Hospital, Guildford

Background: Sentinel node biopsy (SNB) is becoming the standard of care to assess the axillary status in patients with invasive breast cancer in the U.K. Prolonged staining of the native breast skin is common sequelae with patent blue dye used for SNB. This prospective study compares peritumoral and subareolar routes of injection and its duration.
Methods: In ALMANAC study, the dye was injected peritumorally in all patients as per protocol. Our study compares 129 patients who participated in ALMANAC study at our institute with non-ALMANAC cohort comprising of 129 patients with subareolar dye injection. The data was collected prospectively at 1, 3, 6, 12, 18 and 24 monthly intervals until the blue discolouration had completely disappeared.
Results: Median time for complete disappearance of blue discolouration in ALMANAC group was 1 month (range 1–12). In comparison, the median time in non-ALMANAC group was 6 months (range 1–21).
Conclusion: Blue skin discoloration persists longer after subareolar injection when compared to periareolar method. All patients should be warned about the persistence of the blue colour when being consented.

Surgical complications 0727

Body Mass Index does not have an impact on post-operative complication rates and length of stay in a colorectal enhanced recovery programme

J. Rink, J. Watson, S. Mitchell, R. Pullan, D. Defriend
Torbay Hospital Trust, Torquay

Background: Being overweight or underweight has been shown to be associated with increased rates of post-operative complication. This report examines the relationship between Body Mass Index (BMI) and complication rates and length of stay for patients undergoing colorectal surgery with an enhanced recovery programme. The enhanced recovery programme encourages early feeding and mobilisation in the post-operative period.
Methods: Data was collected prospectively for 145 patients treated within the enhanced recovery programme. Complications recorded included any adverse events. BMI was examined as a continuous variable and as a categorical variable (low, average, overweight and obese). Multivariate Poisson regression was used to examine the relationship between patient age, procedure performed, malignancy, ASA and BMI with the incidence of complications and re-operation. ANOVA was used to examine the effect of patient age, procedure performed, malignancy, ASA, complications, re-operation and BMI on length of stay.
Results: BMI in this patient population ranged from 15 to 38 (mean 26). Age 21 to 89 years (mean 65). Recorded complications covered a range of adverse events - from mild urinary tract infection to anastomotic leak and death. 84 patients (57%) had a recorded complication. 17 patients (11%) required further surgery during the same admission. The mean length of stay was 10 days (range 4–48 days). BMI had no association with complications or re-operation. High or low BMI was not associated with prolonged admission – the only predictor of prolonged admission was presence of a complication or further surgery.
Conclusion: This series of 145 patients undergoing surgery in the context of an enhanced recovery programme did not find any association between BMI and adverse outcomes.

Surgical complications 0777

Parenteral nutrition in the management of lymph leak - does outcome vary with the underlying pathology?

C. Seow, L. Murray, R. McKee
Glasgow Royal Infirmary, Glasgow

Background: Lymph leak is a rare but potentially serious complication following major surgery of the neck, chest, abdomen & pelvis. Most studies in the literature have reported various management modalities including paracentesis, dietary modification, TPN, somatostatin analogue and direct surgical repair. We report our experience in the use of TPN and clear fluids orally in the treatment of post-operative lymph leak.
Methods: Between 1st April 1998 and December 2006, data has been collected prospectively from all patients receiving TPN ($n = 442$) in our hospital. 36 patients received TPN because of lymph leak greater than 500 ml over 48 hour. Outcome was assessed for survival to discharge; cessation of lymph leak with TPN alone; length of TPN and length of hospital stay; need for further intervention and complications.
Results: 36 patients developed lymph leak following radical neck dissection ($n = 10$), Whipples procedure ($n = 14$), oesophagectomy ($n = 10$) & cardiac/vascular ($n = 2$) surgery. The survival to discharge is 89% (32 out of 36). The mortality rate in patients with chylothorax following oesophagectomy is 30% (3 out of 10; chi square test, $p \leq 0{\cdot}05$). One patient required the placement of a peritoneovenous shunt for persistent lymph leak. The length of TPN treatment (mean 16, range 2–68, SD = 14 days) is: hepatobiliary (18), head and neck (16) & upper gastrointestinal surgery (15 days). The hospital stay of survivors (mea $n = 39$, range 10–203, SD = 35 days) is: hepatobiliary (35), head and neck (35) & upper gastrointestinal surgery (63 days). One patient developed feeding line sepsis needing replacement. Two patients developed recurrent lymph leak needing re-introduction of TPN but eventually settled spontaneously.
Conclusion: In our series, most patients responded successfully to TPN alone at the expense of prolonged hospital stay. In particular, patients who developed chylothorax have the longest hospital stay with worst prognosis compared to others.

Surgical complications 0796

Needle catheter jejunostomy feeding tubes in gastro-oesophageal cancer patients: A review of 97 consecutive cases

S. B. Broad, V. Reddy, C. Sutton
Leicester Royal Infirmary, Leicester

Background: Patients with gastro-oesophageal malignancies are often significantly malnourished prior to surgical resection. Furthermore, the nature of the surgery they undergo renders them unable to feed orally as the anastomosis needs time to heal before food can transit. It is therefore necessary for patients to be fed by other means. There is still no consensus regarding the means of delivery of nutrition. In our unit, we favour the use of enteral feeding via needle catheter jejunostomy that is sited at the time of surgery. We present a retrospective review of our experience with needle catheter jejunostomies in gastro-oesophageal cancer patients.
Methods: 97 patients with diagnoses of gastro-oesophageal cancer had needle catheter jejunostomy feeding tubes inserted between 1997 and 2005 inclusive. Patients' notes were reviewed to identify the complications that occurred in these cases.
Results: Oral feeding began at 9·3 days post-op on average (range 3 to 28 days). Jejunostomy feeding was used for 23·8 days on average (range 4 to 92 days). The jejunostomy tube was removed at 58·6 days on average (range 12 to 198 days). Complications were recorded in 34% of cases as follows: tube blockage 12%, displacement 9%, other tube complications 7%, leak around stoma 2%, pain 2%, bowel distension 1%, ileus 1% and aspiration pneumonia 1%. All complications were managed successfully.
Conclusion: Needle catheter jejunostomy offers a safe and effective means of delivering nutrition for gastro-oesophageal cancer patients. In our experience, we did not encounter any major complications.

Surgical complications 0798

The relationship between the systemic inflammatory response (SIR), POSSUM-calculated morbidity and post-operative complications in patients undergoing potentially curative resection of colorectal cancer

E. F. Leitch, J. E. M. Crozier, R. McKee, J. H. Anderson, P. Horgan, D. C. McMillan
University Department of Surgery Glasgow Royal Infirmary, Glasgow

Background: Post-operative complications following cancer surgery are common and associated with poor short- and long term outcomes. POSSUM, a scoring system developed to predict post-operative complications, has recently been shown to predict long term survival, independent of stage, in colorectal cancer. However, the systemic inflammatory response (SIR), as evidenced by an elevate inflammation score (IS) based on pre-operative C-reactive protein (CRP > 10 mg/l) and albumin (ALB < 35 g/l), has recently been shown to be superior to POSSUM in the prediction of long term survival. Therefore, we wished to compare both POSSUM and IS in the prediction of complications (short-term outcome) in patients undergoing elective potentially curative resection for colorectal cancer.
Methods: Patients ($n = 87$) who underwent potentially curative resections between September 2001 and November 2004 were studied. POSSUM percentage morbidity was calculated, and the pre-operative CRP and ALB recorded.
Results: The majority of patients were over the age of 65 years (68%). The median POSSUM percentage morbidity was 35·0%. CRP was elevated (41%) and ALB decreased (8%) in patients giving scores of 0 ($n = 51$), 1 ($n = 29$) and 2 ($n = 7$). During the immediate post-operative period, 31 patients (36%) developed a complication. The most common complications were wound infection, intra-abdominal abscess and pneumonia which each occurred in approximately 10% of patients. On univariate logistic regression analysis, BMI ($p = 0{\cdot}083$), deprivation ($p = 0{\cdot}097$), POSSUM ($p = 0{\cdot}058$) and IS ($p = 0{\cdot}052$) were significantly associated with post-operative complications. On multivariate analysis of these variables only BMI ($p = 0{\cdot}069$) and IS ($p = 0{\cdot}036$) were independently associated with post-operative complications.
Conclusion: In this preliminary study POSSUM was not an independent predictor of post-operative complications in patients undergoing elective potentially curative resection for colorectal cancer. If these results are confirmed in larger studies it may be that measurement of the SIR (few variables and simple to measure) might replace POSSUM (many variables and less simple to measure) in the assessment of the complication risk in these patients.

Surgical complications 0931

Does the Glasgow aneurysm score predict outcome after elective abdominal aortic aneurysm repair in Glasgow?

G. Bryce, C. Payne, D. Kingsmore, D. Byrne
Department of General and Vascular Surgery, Gartnavel General Hospital, Glasgow

Background: The Glasgow Aneurysm Score (GAS) is a scoring system developed to determine the likelihood of post-elective repair complications, and thus improve selection for elective repair. The aim of this study was to investigate whether the GAS is a valid scoring system for elective AAA patients in Glasgow, 15 years after its design.
Methods: A prospective, 1 year observational multi-centre cohort study was performed in Glasgow between August 2005 and August 2006. The GAS was calculated in all patients undergoing an elective AAA repair. Post-operative follow-up consisted of daily clinical assessment until discharge and cardiac screening at days 2 and 5 (ECG and troponin). GAS was correlated to in-hospital mortality and major morbidity with GAS < 70 expected to be negatively predictive and GAS > 79 expected to be related with increased mortality and morbidity as validated by previous large retrospective cohort studies.
Results: 83 patients were admitted for elective AAA repair of which 21 had endovascular repair and 62 had open repair. Of those that had open repair 5 patients (8·5%) died and 9 (15%) had a major complication (irreversible complication/needing admittance to ICU/re-operation). The mortality and morbidity correlated with GAS with 0% mortality and morbidity for scores

below '70 GAS'. Patients scoring 'GAS > 79' had similar mortality (10% *versus* 7·9%, $p = 1$) but a higher morbidity (30% *versus* 10%, $p = 0·07$). All morbidity consisted of cardiac complications.
Conclusion: The GAS is a poor predictor of immediate postoperative mortality and morbidity after elective open repair of AAA in Glasgow. This is possibly a reflection of the increasing age of those operated on compared to 15 years ago and the poorly defined risk factors from the original GAS report.

Surgical complications 0946

Post – thyroidectomy hypocalcaemia

D. Akolekar, D. Lee, M. Akyol, G. Browning, J. L. R. Forsythe, L. P. Marson
Royal Infirmary of Edinburgh, Edinburgh

Background: Postoperative hypocalcaemia is a common and most often a transient event after thyroid surgery. The aim of the study was to evaluate the risk of hypocalcaemia after thyroid surgery in a specialist endocrine unit.
Methods: All patients who underwent thyroid surgery in a single specialist endocrine unit over a 5 year period from 2001 to 2005 were identified from the surgical database. Postoperative calcium levels were recorded from patient notes. Hypocalcaemia was defined as corrected serum calcium levels of < 2·10 mmol/L. Parathyroid data was collected from operative notes and pathology reports.
Results: A total of 482 patients underwent thyroid surgery over the 5 year period. The commonest procedure performed was a lobectomy (45%) followed by total thyroidectomy (22%). Follicular adenoma (28·6%) was the commonest pathology. Malignancy and multinodular goitre were also common (20% each). Postoperative hypocalcaemia was observed in 100 patients (21%). It was most often seen following total thyroidectomy. 42% patients who underwent total thyroidectomies had postoperative hypocalcaemia. 97% of patients had serum calcium levels measured on the first postoperative day. Serum calcium levels returned to normal in five to six days in 72% patients. Only 4 patients (0·8%) had chronic hypocalcaemia (hypocalcaemia persisted beyond 180 days) and required calcium supplementation for up to 2 years. Malignant thyroid disease was not associated with an increased incidence of hypocalcaemia compared to benign pathology in our series.
Unintentional or inadvertent parathyroidectomy was detected in 14% patients with transient hypocalcaemia.
Conclusion: Transient hypocalcaemia is common following thyroid surgery. However permanent hypoparathyroidism is rare in a specialist thyroid unit.

Surgical complications 1032

Ligasure™ haemorrhoidectomy: does it cause internal sphincter damage?

K. Kochar, K. Marimuthu, U. Pandey, G. Mathew
George Eliot Hospital NHS Trust, Nuneaton

Background: Ligasure™ haemorrhoidectomy is an excellent method for bloodless dissection of haemmorrhoids. Technically, it is simple, easy to learn and quick to apply. An area of concern with any technique of haemmorrhoidectomy is the potential to cause inadvertent internal sphincter injury. This prospective study was done to evaluate the incidence of internal sphincter injury in patients undergoing Ligasure™ haemmorrhoidectomy for grade 3 or 4 haemmorrhoids.
Methods: 25 patients, with grade 3 or 4 haemmorrhoids were incorporated in the study. A total of 56 haemmorrhoids were excised using Ligasure™. The same colorectal team carried out all the procedures. All excised haemmorrhoids were sent for histopathological examination to look for smooth muscles and patients were evaluated in out patients department 6 weeks after the operation.
Results: Histological analysis showed evidence of smooth muscle in only 1 of the 56 samples. None of the patients complained of flatus or faecal incontinence at 6 weeks review.
Conclusion: With the use of adequate tissue retraction haemmorrhoidal plexuses can be elevated of the underlying internal anal sphincter allowing safe application of Ligasure™ forceps. Our study shows that Ligasure? haemmorrhoidectomy is not associated with inadvertent internal sphincter injury and is a safe procedure for grade 3 and 4 haemmorrhoids.

Surgical complications 1125

Peritoneal gall stones and bacterial growth: retrieve all spilled stones

M. Jagtiani, Y. M. Kan, A. Wells, A. Choy, F. Bajwa
Peterborough District Hospital, Peterborough

Background: Spillage of bile and gallstones during laparoscopic cholecystectomy (LC) is a recognised intra-operative event and can occur in a substantial number of cases with occurrence in upto 40%. Septic complications though uncommon have been reported with lost gall-stones in the peritoneal cavity presenting with short term and long term complications and therefore reflecting the infective potential of gallstones. In this prospective study we aim to identify the incidence of bacterial growth in gall stones and therefore the potential risk of complications of unretrieved stones.
Methods: The gall-stones and bile of forty six consecutive patients undergoing laparoscopic cholecystectomy were retrieved and cultured for bacterial growth. The gall-stones were washed with methylated spirit to decontaminate the outside of the stone, bisected and scrapings from the core were then taken for culture.
Results: Forty three patients underwent elective LC for chronic cholecystitis ($n = 10$) or biliary colic ($n = 33$). A further three patient presented with acute cholecystitis had a LC within 3 days of their presentation. Thirty seven were female. The types of gall-stones were pigmented ($n = 16$), mixed ($n = 6$) and cholesterol ($n = 24$). Bacterial growth was found in 10 (22%) of the gall stone specimens of which 8 were from pigmented stones and 2 from mixed stones (E.coli x6; streptococci x4, mixed coliform x1). Positive cultures were also identified in the bile in these cases (E. faecalis x2; E. coli x5; streptococci x1). Bile culture was positive in two further case (mixed coliform, E coli) but the cholesterol gall-stone was negative for growth.
Conclusion: The presence of live bacteria in the core of gall-stones underlines the potential hazards of leaving stones in the peritoneal cavity during laparoscopic cholecystectomy. The risk of infection appears to be greatest in those with pigmented or mixed stones in contrast to those with pure cholesterol stones. Every effect should be made to retrieve every spilled stones especially those with pigmented characteristics.

Surgical complications 1149

Demographic and clinical predictors for breast capsule formation – Do we know all the answers?

S. Gurdezi, D. Banerjee
St Georges University Hospital, London

Background: Capsular contracture affects one in ten women who undergo breast implant surgery. Smoking, post operative complications (seroma, haematoma, infection), type of implant and adjuvant treatments are just some of the factors that have been considered as predisposing factors in the past. This has altered operative practice, so that the tendency is towards the placement of submuscular, textured expandable implants. No previous papers have looked at multivariant demographic and clinical data as predictors for breast capsule formation.
Methods: A proforma was used to extract data from case notes of all patients who had undergone breast implant exchange in a five year period (Jan 2001–Jan 2006). Factors such as age, ethnicity, medical comorbidities, reason for augment, adjuvant therapy, anatomy and type of implant, perioperative complications and time to explant surgery were considered and analysed.
Results: Thirty two patients (79% Caucasian, 37·5% smokers) were included in the study. The average age was 46 (range 27–70). 20/32 (62·5%) of implants were inserted for oncological surgery. 65% of these had post operative radiotherapy [XRT] (Avg 7 months post surgery). The average time to explant surgery for capsule formation was 48 months. Interestingly, it was 20 months

for the cancer group and 92 months for the cosmesis group. Within the population who had implant insertion for cancer surgery, time to explant surgery was significantly shortened by radiotherapy (17·5 mths with XRT, 44 months without XRT). The majority of women had textured expandable implants (20/21–11 unknown). No significant association between ethnicity, autoimmune disease, history of keloid/hypertrophic scarring, anatomy of implant or perioperative complications (esp infection) were identified.
Conclusion: Capsule formation remains the most common cause for re-operation in women with breast implants. This paper is the first to analyse multiple demographic and clinical pre-disposing factors. Our study shows that the only consistent and significant predictor is post operative radiotherapy. Further comparative studies with larger numbers are required to investigate this further.

Surgical complications 1158

Factors affecting perineal wound complications following abdominoperineal excision of the rectum

S. Gonsalves, A. Saha, D. Thekkinkatil, D. Burke, P. Sagar, P. Finan
The General Infirmary at Leeds, Leeds

Background: Perineal wound complications are common following abdominoperineal excision of the rectum (APER). The authors seek to describe their experience in the prediction of perineal wound complications.
Methods: Patients that underwent an APER at our institution by 3 consultants from 1998 to 2006 were identified. Pre-operative history, pathological stage, wound complications and outcomes were recorded.
Results: 60 patients underwent APER for rectal cancer (median age 69, range 36–90 years) during the study period. 49 patients (81·7%) received oncological treatment pre-operatively of whom, 24 patients (49%) received short course radiotherapy, 21 (42·9%) patients received neo-adjuvant chemoradiotherapy and 4 (8·2%) patients received neo-adjuvant chemotherapy. 20 (33·3%) received adjuvant oncological treatment. Dukes stage for resected tumour was A ($n = 10$, 16·7%), B ($n = 22$, 36·7%), C ($n = 20$, 33·3%) and D ($n = 2$, 3·3%) with 6 incomplete pathology reports. Overall, 24 (40%) patients had a perineal wound complication of whom, 3 (12·5%) required operative intervention. Short course radiotherapy was associated with perineal wound complication (66·7% ($n = 16$) with radiotherapy *versus* 33·3% ($n = 8$) without radiotherapy, $p = 0·003$). No other factors were found to be significantly associated with perineal wound complications.
Conclusion: APER is associated with a significant risk of perineal wound complications. Pre-operative short course radiotherapy is significantly associated with perineal wound complications.

Surgical complications 1211

Complications of loop ileostomy closure

C. Jensen, S. Mansfield, S. Kelly
Northumbria NHS Trust, Northumbria

Background: Loop ileostomies are often created to defunction distal bowel anastamoses. Restoration of intestinal continuity is then usually performed at least 6 weeks later. This study aims to assess the complications associated with ileostomy closure and attempt to identify factors that make them more likely.
Methods: All case notes of patients undergoing reversal of loop ileostomy over a five year period (Jan 2001 – Dec 2005) within one NHS Trust were retrospectively assessed.
Results: A total of 123 case notes were reviewed. 41 patients (33%) suffered complications with 9 patients (7%) requiring further intervention. Re-operation was more common in patients who had a shorter wait from creation to reversal of the stoma ($p < 0·0001$) and whose operation time was shorter ($p = 0·0018$). Patients with increased co-morbidities were more likely to suffer complications ($p = 0·0007$). Complication rates were lower in patients undergoing reversal of loop ileostomy after anterior resection ($p = 0·0003$) as compared with other primary conditions. There were four post operative deaths mostly in elderly patients ($p = 0·0006$), three of which were associated with diverticular disease and one with colorectal cancer. Neither grade of surgeon nor anastomotic technique affected post-operative morbidity.
Conclusion: Closure of loop ileostomy may be associated with significant morbidity and mortality. There is an increased risk in elderly patients with more co-morbidities. Increasing the delay from creation to closure of loop ileostomies may result in fewer of these complications.

Technology in surgery

Technology in surgery 0024

The modified technique of transvaginal repair for symptomatic rectocele

C. S. Chung, G. Y. Jeong, D. K. Lee
Hansol Hospital, Songpagu, Korea

Background: Rectocele is an abnormal bulging of the anterior rectal wall into the vagina, caused by weakening of the rectovaginal septum or fascia and manifests a variety of symptoms. This study was designed prospectively to compare the results of the modified technique with the results of the transvaginal levatorplasty for symptomatic rectocele.
Methods: Between January 2004 and June 2005, of 25 patients who underwent transvaginal repair for the symptomatic rectocele, 13 consecutive patients (Group A, mean age 50; range, 30–69 years) were performed by the anterior rectal wall inversion and plication transvaginally. At the 12 months after surgery, the results of a physiologic and clinical evaluation for each patient were compared with the results of 12 consecutive patients (Group B, mean age 50; range, 26–71 years) who underwent transvaginal levatorplasty. By using anal manometry and defecography, mean resting and maximum squeeze pressure and the depth of rectocele were evaluated pre- and postoperatively. A clinical symptoms including a sense of incomplete evacuation, excessive strain, use of laxatives, digitations to assist evacuation, dyspareunia and postoperative patient's satisfaction were assessed in the office before surgery and at the 12 months after surgery. Subjective outcomes were assessed as excellent, good, moderate or poor. Good and excellent were considered as an improvement of their symptoms.
Results: Both groups were comparable in terms of demographic and anal manometric findings and preoperative symptoms. There were no operative complications, such as hematoma, wound disruption, or rectovaginal fistula in each group. Pre- and postoperative mean anal resting (Group A, $61{\cdot}50 \pm 21{\cdot}98$ mmHg *versus* $55{\cdot}79 \pm 7{\cdot}60$ mmHg; Group B, $56{\cdot}22 \pm 14{\cdot}44$ mmHg *versus* $54{\cdot}28 \pm 7{\cdot}58$ mmHg) and maximum squeeze pressures (Group A, $126{\cdot}67 \pm 31{\cdot}10$ mmHg *versus* $126{\cdot}52 \pm 23{\cdot}84$ mmHg; group B, $126{\cdot}63 \pm 23{\cdot}54$ mmHg *versus* $123{\cdot}28 \pm 20{\cdot}41$ mmHg) were comparable in both groups. On the defecographic findings, the mean preoperative depth of the rectocele (Group A *versus* B) was $5{\cdot}36 \pm 0{\cdot}90$ *versus* $5{\cdot}83 \pm 0{\cdot}98$ ($p = 0{\cdot}247$). The postoperative depth of the rectocele showed significantly decrease in both groups (group A *versus* B, $1{\cdot}91 \pm 0{\cdot}20$ *versus* $2{\cdot}25 \pm 0{\cdot}46$, $p = 0{\cdot}040$). The mean operation time (minutes) was $61{\cdot}54 \pm 11{\cdot}44$ *versus*. $74{\cdot}17 \pm 11{\cdot}65$ ($p = 0{\cdot}014$). At follow-up 12 months, 77% (10 patients) in the Group A and 75% (9 patients) in Groups B reported improvement of their symptoms. 3 patients in each group showed no improvement of the symptom after surgery. No patients in both groups had complained dyspareunia after surgery.
Conclusion: Regarding clinical and physiologic evaluation, the preliminary results of our study showed that the modified technique can provide comparable short-term results to transvaginal levatoplasty for symptomatic rectocele. Further follow up studies, however, are needed to assess the long-term results of this surgical approach for rectocele repair.

Technology in surgery 0075

Ultrasound guided saline enema reduction – a very useful tool in treating childhood intussusceptions

T. Kallachil, S. T. Binoj, A. T. Jacob
Trivandrum Medical Cillege, Trivandrum, Kerala, India

Background: To study the various aspects of pediatric intussusceptions including incidence, age distribution, type and the efficacy of non-surgical reduction using saline under ultrasound guidance.
Methods: This is a retrospective study of 124 children admitted with intussusceptions in the pediatric surgery department of medical college hospital Trivandrum, India during the period from April 2002 to March 2004. The effectiveness of saline enema under real-time sonography was evaluated. The whole procedure was monitored. Results were analyzed with SPSS.
Results: 25% of intestinal obstructions presented to the department were due to Intussusception. Males constituted 69% and females 31%. 82% cases belonged to less than 1year age group. 72% of the intussusceptions were ileocolic and 23% were ileocaecal. Ultrasound guided saline reduction was attempted in 60 patients of which 54(90%) were successful. No incidence of colonic perforation documented. There was no mortality in the series. Bowel resection was done in 4 of the failed 8 cases.
Conclusion: Ultrasound guided saline reduction was successful in 90% of cases presenting within 24 hours of the onset of symptoms. It avoids radiation exposure. It is reliable and safe. We recommend it in the District General Hospital setup.

Technology in surgery 0122

Multi-slice spiral computerised tomography – An under-utilised tool in the investigation of inguino-femoral pathology

P. T. Cherian, A. P. Parnell
Goodhope Hospital, Birmingham

Background: Until now imaging of the inguinal region, especially in emergencies, has been limited, leading to surgeons needing to make educated 'guesses' on important aspects of treatment of groin symptoms including choice of incisions and timing of surgery. We hypothesized that multiplanar reconstructions provided by current multi-slice computed tomography (CT) scanners would improve diagnostic accuracy. We set out to re-examine the inguino-femoral radiological anatomy in asymptomatic patients.
Methods: A systematic, prospective (proforma based), review of scans of 10 consecutive male and 10 female patients chosen retrospectively from our CT database. An experienced radiologist together with a surgeon conducted image review to maximise pick up of relevant anatomical detail.
Results: The inferior epigastric artery and the femoral canal were identified in all planes in all patients. On axial views the inguinal ligament was not reliably identified in any. This is of significance, as it seems to have been the rate-limiting step to the accurate diagnosis of pathology within the groin so far. The round ligament/spermatic cord was visible only in 15 of 20 scans (75%). In contrast, on coronal and sagittal views the inguinal ligament, vital to reliable interpretation was visible in 19 of 20 scans (95%). The sagittal identified the guttered ligament best with even the canal and contents clearly visible in 95%. On sagittal views the internal ring was identifiable in 90% and the round ligament/spermatic cord in 95%. On coronal images, the internal ring was identified in all patients and the conjoint tendon in 95%. The round ligament/spermatic cord could not be seen in 10%.
Conclusion: Multi-slice CT allows 100% identification of key anatomical structures in our small series, when information from all three views were combined. This should enable better demonstration of inguino femoral pathology especially with regards to hernias, hitherto not available. This has a bearing on current Royal College of Surgeons of England guidelines that recommend elective hernia repair in some of the asymptomatic hernias. We illustrate subtle differences found between imaging and standard anatomical teaching.

Technology in surgery 0264

The error of surgical prescribing

G. Khera, P. McQuoid, P. Roberts, C. Makin
Wirral NHS Trust, Mersey

Background: To prospectively measure the incidence of adult surgical prescribing errors and evaluate their clinical significance. To retrospectively ascertain surgical prescribing patterns by identifying the range and number of medicines prescribed for surgical inpatients.
Methods: All new prescriptions for patients admitted to general surgery and urology wards were analysed prospectively over a two-week period. These new prescriptions were stratified according to whether the patient was admitted on the medicine ("transcribed") or whether the medicine had been initiated in hospital ("prescribed"). Errors were classified as errors of drug, dose, indication, omission or duplication. Also, using an electronic data repository that has been in place since 1992, we ascertained ALL inpatient drugs prescribed for surgical admissions over 3 years between 01/01/2001 and 01/01/2004.
Results:

	New prescriptions	Errors	Error rate
Transcribed	724	205	28%
Prescribed	1256	114	9%
Total	1980	319	16%

Over the two weeks study, the error rate for "transcribed" was higher than "prescribed" medicines (28% v 9%). Patients are admitted on a wide range of medicines, in contrast to prescriptions initiated in hospital. Over the 3-year data collection period, there were 1749 different medicines prescribed, from which 242 843 prescriptions were generated. The top 25 drugs accounted for 51% of total prescriptions.
Conclusion: Electronic prescribing systems are currently being implemented in NHS Trusts across the UK. The types of errors generated by electronic systems are different but as serious as manual prescribing. We must minimise electronic prescribing errors by knowing prescribing patterns and identifying potentially serious electronic specific prescribing habits.

Technology in surgery 0739

Technological growth; bacterial contamination of mobile communication devices in the operative environment

R. Brady, S. Fraser, M. Dunlop, S. Paterson-Brown, P. Gibb
[1]*Department of Colorectal Surgery, Western General Hospital, Edinburgh,* [2]*The University of Edinburgh Medical School, Edinburgh,* [3]*Department of Surgery, Royal Infirmary of Edinburgh, Edinburgh,* [4]*Department of Microbiology, Royal Infirmary of Edinburgh, Edinburgh*

Background: Research considering the safe utilisation of mobile phone technology in hospitals has concentrated on the impact of electro-magnetic interference. Previous reports have suggested high levels of pathogenic bacterial contamination on mobile communication devices (MCDs). In order to identify if MCDs, such as mobile phones, pagers and Personal Digital Assistants (PDAs), could compromise infection control in clinically sensitive areas, this prospective cross-sectional study bacteriologically sampled MCDs in the operating theatre environment.
Methods: On 3 separate occasions, medical staff, within the operating theatre environment, were asked to provide any MCDs carried on their person for assessment of bacterial contamination. In addition, personal infection control practices, attitudes and beliefs were examined by questionnaire.
Results: 90 operative personnel were included in the study (37·8% surgeons, 43·3% anaesthetists, 18·9% medical students). 78 MCDs were available for bacteriological sampling (31% of personnel carried no device, 53·3% 1 device, 13·1% 2 devices, 2·2% 3 or more devices). Devices included 46 mobile phones, 27 pagers and 5 PDAs. Subsequent bacteriological analysis revealed that 89·7% of devices were contaminated by bacteria, 11·5% demonstrating bacteria known to cause nosocomial infections (3 Meticillin-sensitive *Staphylococcus aureus*, 3 *Pseudomonas spp.*, 1 *Acinobacter spp.*, *1 S. maltophilia*). Study of 21 fixed landline telephones within the operating theatres revealed that 90·5% of telephones had bacterial contamination however no telephone revealed bacterial species known to cause nosocomial infection.
Conclusion: MCDs can act as a reservoir for bacteria known to cause nosocomial infection and are routinely transported into clinically sensitive areas, such as the operating environment, by medical staff. Simple measures such as increasing hand hygiene, guidance on the cleaning of MCDs and provision of secure storage facilities may reduce the risk of cross-contamination caused by these devices. Consideration of emerging technology such as Voice over Internet Protocol systems (VOIP) could negate the work related requirement for MCDs in the operating theatre environment.

Technology in surgery 0785

Use and abuse of scrotal imaging in paediatric surgery

A. B. Sassi, Y. Fong, E. Trapp, M. E. Foster
Royal Glamorgan Hospital, Llantrisant

Background: Ultrasonographic (US) imaging of scrotum in children is often requested for evaluation scrotal pathologies. We have examined the indications, findings and outcomes in elective and emergency setting to evaluate the usefulness of US. There is no clear guideline regarding the use of scrotal US in these settings.
Methods: Retrospective review of all children underwent scrotal ultrasound and emergency admission due to scrotal pain.
Results: 61 cases were identified. Of these 15 were emergency and 46 were elective. Mean age was 14·5 (range 4 months to 16 years) in elective cases, while mean age in emergency cases was 11·1 (range of 4 years to 15 years). In the elective cases 61% were GP referral, 39% from hospital specialist. 66% of these referrals were for swelling, 9% for pain alone, 7% for painful swellings, and 9% for undescended testes. The most common findings were hydrocoeles (26%), and normal testes (26%), the rest comprise of varicocoele (19%), undescended testes (6%) and others (23%). 30 patients (66%) were discharged with no further intervention, 8 (17%) required elective surgery. 15 US scans were emergencies; The findings for 9 (60%) of these US were normal, 4 (26·6%) were inflammation and 2 (13·3%) were scrotal haematoma. During this period further 23 cases were admitted with testicular pain and underwent a testicular exploration, only 3 cases had testicular torsion.
Conclusion: Large number of scrotal US scans can potentially be avoided either by restricting access or appropriate referral to hospital specialists prior to US scan. In emergency setting US scan may be in value in preventing unnecessary operation.
Local guidelines should be clarified and results audited regularly.

Technology in surgery 0814

Does suprarenal endograft fixation affect medium-term renal function? Systematic review

S. R. Walsh, T. Tang, A. G. Lynch, J. Carpenter, K. Varty, J. R. Boyle, M. E. Gaunt
Cambridge University Hospitals NHS Foundation Trust, Cambridge

Background: Renal impairment following aortic aneurysm repair may adversely affect outcome following subsequent interventions. Suprarenal fixation (SF) is widely used in endovascular aneurysm repair. Numerous small, underpowered studies have concluded that it does not increase the risk of renal impairment compared to infrarenal fixation. A recent meta-analysis demonstrated that renal infarction is more common with SF but the effect on renal function remains unclear.
Methods: Electronic abstract databases, article reference lists and conference proceedings were searched for series reporting renal function data following SF. Formal statistical meta-analysis was futile due to study heterogeneity with respect to key factors such as pre-existing renal dysfunction and length of follow-up. Consequently, we contacted authors to obtain individual patient data for a pooled re-analysis using standardised criteria.
Results: Data were obtained for 1151 patients (567 suprarenal fixation) with a median follow-up 33 months. Using a Bayesian hierarchical Weibull regression model fitted in open BUGS, the pooled hazard ratio for deterioration of renal function following suprarenal fixation was 0·6 (95% CI 0·3 to 10).

Conclusion: There is no evidence that suprarenal fixation produces a large increase in the risk of renal dysfunction following EVAR. A small effect, in certain subgroups, cannot be excluded. A randomised controlled trial of suprarenal fixation may resolve this issue.

Technology in surgery 1180

Safety of rectal tube decompression of left sided colorectal anastomosis

C. Vijayasekar, K. Kunal, K. Marimuthu, G. Mathew
George Eliot Hospital, Nuneaton

Background: To evaluate the safety of rectal tubes in a case series of patients who have undergone rectal tube decompression following elective left sided Colorectal anastomosis.
Methods: All patients undergoing elective left sided anastomosis were collected prospectively in the colorectal unit database. From this, patients who had rectal tube placement were selected. The demographic details, nature of operation performed, leak rates and complication rates were evaluated. The rectal tube used was made of soft silicone (Closed round-drain system, 24Fr, Ref 22125, PFM, Medizin AG). The rectal tube was placed if the anastomosis was deemed technically satisfactory. It was introduced through the anal canal and was guided and positioned 10–15 cms in place above the anastomosis by the operating surgeon and secured with a silk stitch. It was usually removed on the 7th post-operative day.
Results: During the 5-year period of April 2001 to April 2006, 71 patients (29 males: 42 females) underwent rectal tube decompression. The mean age was 63 years (Range 24–89 years). The operations performed were Anterior resection (30), Left hemicolectomy (7), Reversal of Hartman's (6), Sigmoid colectomy (19), Ileal pouch-anal anastomosis (3) and Ileo-rectal anastomosis (6). There was no 30-day mortality and no clinically significant leak in the group of 71 patients who had rectal tube decompression. The only problem associated with rectal tube has been the minimal discomfort experienced by the patients due to the silk stitch near the anal canal.
Conclusion: Rectal tube decompression could be used safely in elective left sided anastomosis. It is well tolerated and could be considered as an adjunctive measure to reduce the risk of bowel leak.

Technology in surgery 1192

Retrieval of large colonic polyps using a Procto-Colonoscopic method

S. Karuppiah, M. Loudon
Grampian University Hospitals NHS Trust, Aberdeen

Background: Retrieval of polyps during colonoscopic procedures can be technically difficult and time consuming. This is particularly the case when attempts are made to retrieve large polyps intact through the anal canal of an anxious patient with a hypertonic sphincter. The use of a simple instrument such as a proctoscope during colonoscopy permits the complete removal of large polyp intact and improve success rate.
Methods: When difficulty in extracting a large colonic polyp is anticipated or the polyp is placed in an accessible position in the rectum, a colonoscope is threaded through a proctoscope before it is introduced in to the rectum. After colonoscopy with polypectomy is preformed in a routine fashion, the proctoscope is then advanced forwards over the colonoscope and into the anal canal. Simultaneously the colonoscope is withdrawn, with the polyp, into the proctoscope. Both instruments are withdrawn with the polyp held intact within the proctoscope. Provided the proctoscope is well lubricated and the patient instructed to relax the sphincter complex at the time of insertion the procedure is well tolerated.
Results: In the last year, the total number of colonoscopes performed using this technique was 52 with 63 large polyps removed. The average size of the polyps was 4·96 mm (+/− 0·25) and all polyps were intact and suitable for histopathological examination. None of the polyps were lost during the procedure. 10% of the polyps were diagnosed positive for tumour.
Conclusion: The method described is simple to use and cost effective technique requiring no additional devices than what are already available in the endoscopy room. Large polyps can easily be withdrawn without fear of the tissue being dislodged or damaged while removing it.

Technology in surgery 1221

Dynamic Magnetic Resonance Imaging assessment of the STARR procedure

I. Khan, E. Eguare, H. Stunell, W. Toreggiani, F. Keane, P. Neary
Adelaide and Meath Hospital, Incorporating National Children's Hospital,Dublin

Background: Obstructed defaecation syndrome (ODS) is a multifactorial evacuation disorder. In 2001 an innovative surgical approach using a double circular stapling technique termed the STARR procedure (Stapled Trans Anal Rectal Resection) for obstructed defaecation syndrome was introduced. The STARR procedure reportedly restores the anatomical alignment of the rectum and thereby corrects the perceived underlying functional abnormality. We now report the first objective magnetic resonance imaging of the corrective surgery associated with the STARR procedure.
Methods: Our unit has previously characterized abnormalities in the pelvic floor of patients with ODS using dynamic magnetic resonance imaging (MRI)[1]. Six patients diagnosed as ODS underwent dynamic MRI eight weeks postoperatively and these parameters were compared to their preoperative status and baseline normal controls[1]. These patients were also asked to participate in quality of life survey. They had this assessed on the basis of SF-36 and Wexner Constipation scoring pre and post op.
Results: We measured pre and post operative Anorectal angle,levator hiatus, Levator length, Levator thickness and compared them with normal values.We also showed improvement in quality of life based on SF 36 and constipation score.
Conclusion: There is a paucity of any objective evaluation of the STARR procedure in the literature. Clinical reports on the efficacy of the procedure are restricted to small numbers of patients. The objective imaging of the anatomical reconfiguration of the pelvic floor following this innovative surgery is limited to a single report which used defecating proctography[2]. In this series the objective MRI assessment of patients undergoing this innovative surgery is reported. We believe that we are the first unit to demonstrate these anatomical changes associated with the STARR procedure.

Trauma/critical care

Trauma/critical care 0714

Ambulance transport is associated with a higher mortality than private transport following major penetrating trauma in a semi-urban environment

E. J. Dickson, D. van Niekerk, S. Robertson, J. Goosen, F. Plani, K. D. Boffard

Johannesburg Hospital Trauma Unit and University of the Witwatersrand, Johannesburg, South Africa

Background: The use of private transportation has been associated with improved outcomes in urban trauma patients. The need for patient stabilization at the scene needs to be balanced with the need for early operative intervention, and therefore the need for rapid transportation to hospital. Our aim was to assess the relationship between the mode of transport to hospital and outcome in a semi-urban trauma environment.
Methods: Data were collected prospectively on 1396 patients admitted to a Level 1 South African Trauma Unit over a one year period. The Revised Trauma Score was used to assess injury severity and physiological derangement at the time of admission, and to allow comparison between the groups. Mortality was defined as death within 30 days.
Results: The mortality in the blunt trauma patients ($n = 527$) was higher in the ambulance transport group but this was not statistically significant. However, the mortality in the penetrating trauma patients ($n = 808$) was significantly higher in the ambulance transport group ($p = 0{\cdot}020$, chi-square, table) despite similar Revised Trauma Scores.

Penetrating trauma	Private transport $n = 257$	Ambulance $n = 551$
Alive	98·8%	95·6%
Dead	1·2%	4·4%

Conclusion: The use of ambulance transportation is associated with a 3·7 fold increase in mortality following penetrating injury. This may be related to longer times in the field resulting in delay to definitive care in hospital.

Trauma/critical care 0733

A population-based study of blunt splenic trauma in Scotland

M. Bandari, R. Brady, S. Paterson-Brown, R. Parks

Department of Surgery, Royal Infirmary of Edinburgh, Edinburgh

Background: The spleen is the most commonly injured abdominal organ in trauma patients. In order to investigate the UK incidence, patient demographics, management and outcomes of splenic trauma, a large multi-centred, population database of trauma patients was interrogated.
Methods: The Scottish Trauma Audit Group database (STAG), a prospectively gathered database containing the details of trauma patients admitted to participating Scottish Hospitals over an 11-year period, was analysed.
Results: 672 (1·3%) splenic trauma patients (442 male, 230 female) were identified from a total population of 52215 trauma patients. 579 (86·2%) injuries resulted from blunt trauma and 93 (13·8%) were due to penetrating trauma. The most common mechanism of injury was road traffic accidents (RTAs) (71%), followed by falls (18·4%), assault (4·6%) and sport-related injuries (2·6%). 93·1% of patients arrived by ambulance/air, the remaining 6·9% self presented. The median injury severity score (ISS) was 29. Patients had associated injuries to the head in 269 (46·5%) patients, lung in 218 (37·7%) and liver in 179 (30·9%). The overall mortality rate was 33·5%. Whilst there was no mortality in the 36 (6·2%) patients with isolated splenic injuries, those with concomitant aortic or cardiac injuries had a mortality rate of over 95%. The most common type of injury was a simple capsular tear in 168 (36·9%). Laparotomy was the first procedure in 299 (51·6%) cases had a laparotomy as a first procedure at a median time of 3·06 hours following admission.
Conclusion: The overall incidence of blunt splenic trauma has remained relatively constant over the duration of data collection and has high mortality, associated with the timing of presentation and concomitant injuries.

Trauma/critical care 0929

Duration but not severity of hypoperfusion predicts outcome in surgical HDU patients

J. A. E. Philips, M. Walsh, K. Brohi

The Royal London Hospital, London

Background: Inadequate tissue perfusion leads to anaerobic metabolism and the production of lactic acid and may exist despite normal vital signs (pulse, blood pressure, urine output). Ischaemic tissues activate the inflammatory and coagulation systems and reperfusion results in further organ injury. The degree of metabolic acidosis can be used to assess the severity of systemic hypoperfusion. Previous studies have shown that admission base deficit or lactate is a useful predictor of morbidity and mortality in patients seen in ITU and trauma. This study was designed to assess whether these findings are also applicable to patients requiring level 2 care in a surgical HDU.
Methods: The charts were reviewed retrospectively for consecutive patients admitted to the surgical HDU between January and April 2006. Lactate and base excess values were used as measures to systemic tissue hypoperfusion. Serial arterial blood gas results were recorded and the total duration spent outside the normal range calculated. Outcome measures included duration of critical care and hospital stay, mortality, escalation to ITU and development of organ injury.
Results: 235 patients were admitted to the HDU over the 4 month period. 38 (16%) patients died prior to hospital discharge, 28 (12%) patients developed acute lung injury, 25 (11%) developed acute renal injury and 11 (5%) were escalated to Level 3 care. Admission base deficit and lactate levels did not correlate with outcome. However the duration of hypoperfusion was strongly associated with outcome. Patients with a base deficit > 6 mmol/l for over 12 hours were more likely to die (50% *versus* 8%, $p = 0{\cdot}006$), be admitted to ICU (50% *versus* 6%, $p < 0{\cdot}001$), develop acute renal injury (50% *versus* 14%, $p = 0{\cdot}045$) and tended to an increased incidence of acute lung injury (50% *versus* 21%, $p = 0{\cdot}17$).
Conclusion: HDU patients who did not normalise their base deficit within 12 hours were more likely to die, require ICU admission and develop organ injury. Further research is needed to identify whether goal directed therapy targeted to normalising perfusion will improve outcome in high-risk surgical patients. The severity of lactic acidosis on admission to HDU did not correlated with patient outcomes.

Trauma/critical care 0966

Futility of continuous positive airway pressure (CPAP) in the surgical high dependency unit (HDU)

A. Biswas, M. Walsh, K. Brohi

Royal London Hospital, London

Background: Surgical HDU is an intermediate care facility providing level 2 care, particularly in peri-operative period. Patients with respiratory insufficiency may be treated with CPAP ventilation. The aim of this study was to analyse the utliity and outcome of CPAP ventilation when applied in a HDU setting.

Methods: This was a retrospective study of patients receiving CPAP in surgical HDU over a 15-month period. Data were collected on diagnosis, co-morbidity, CPAP administration and outcomes. Arterial blood gas (ABG) recordings were analysed before CPAP, at 1–2 hours and 4–6 hours.
Results: 56 patients received CPAP. The total duration of CPAP varied between 1 and 97 hours (median 10 hours). There was no significant difference in FiO2, PaO2 or PaCO2 over the duration of CPAP. There was a statistically significant increase in SaO2 after 1 hour but this was probably of minimal clinical significance (before/after CPAP: 93% *versus* 96%). Patients with pulmonary oedema did not have significant improvement with CPAP compared to other indications. In 23% of cases CPAP was associated with CO2 retention. There were two cases of aspiration and two respiratory arrests. 21 (38%) patients were transferred to ICU for respiratory deterioration. Patients who did not require ICU reduced their FiO2 requirements by 10% within 1–2 hours, although this was not statistically significant. Response by ABG parameters failed to identify patient deterioration and requirement for ICU care.
Conclusion: CPAP appears to have minimal clinical utility in surgical high dependency patients. Patients who fail to respond to CPAP within 1–2 hours are unlikely to benefit further and are likely to require ICU admission.

Trauma/critical care 1014

Validation of the penetrating abdominal trauma index as a predictor of morbidity after penetrating injury

S. C. E. Clarke, A. T. Stearns, C. Payne, A. J. McKay
Gartnavel General Hospital, Glasgow

Background: Trauma research is dependent on anatomical scoring scales to standardize injury description. The Penetrating Abdominal Trauma Index (PATI) has been derived in the US and validated with regards to both morbidity and mortality in penetrating abdominal trauma. In particular, it has the advantage of being able to describe multiple abdominal injuries, unlike other systems such as the injury severity score. However, the mechanisms of injury are very different in the US, with some American series reporting over 90% gunshot injuries. There is no validation to date of PATI in a European penetrating trauma population, where stab injuries predominate.
Methods: A retrospective case note review of all patients presenting with penetrating abdominal injuries to three hospitals in 2001–2005. Abdominal injury descriptions, obtained from operation notes and cross-sectional imaging, were classified according to published organ injury scale grades. Full details of hospital stay, including duration of admission, intensive care admission and post-operative complications were recorded.
Results: 224 patients were identified, with a range of PATI scores of 0–40. 2 were gunshot injuries, with 208 blade injuries. 48 (22%) underwent laparotomy. PATI was highly predictive of increased hospital stay: median duration was 9·0 days for PATI ≥ 16, compared to 5·5 days for PATI of 1–15 (Kruksal-Wallis, $p < 0{\cdot}001$). Similarly, PATI ≥ 16 strongly predicted ITU admission (χ^2, $p < 0{\cdot}001$) and correlated with duration of intubation (Spearman's, $p < 0{\cdot}001$). Post-operative complications occurred in 22 patients (9·9%), the most frequent complication being respiratory compromise (14 patients, 6·3%). The mean PATI score for patients with a complication was 12·1, compared to 1·3 for those without (Kruksal-Wallis, $p < 0{\cdot}001$).
Conclusion: Despite differences in injury mechanism, PATI ≥ 16 is strongly predictive of morbidity after penetrating abdominal injury in a UK trauma population. As PATI cannot be derived from other injury scales such as AIS-90, trauma databases should consider coding injuries such that PATI scores can be calculated.

Trauma/critical care 1066

Indocyanine green R 15 ratio influenced by liver perfusion rates

M. W. W. Janssen, G. Sliwinski, K. T. Druckrey-Fiskaaen, L. Omidi, M. Suleiman, B. Donaubauer, Ch. Thiele, J. Thiery, J. P. Hauss, M. R. Schön
Department of Surgery University of Leipzig, Leipzig, Germany

Background: Indocyanine green retention ratio after 15 minutes (ICG R15) is utilized to monitor global liver function in intensive care units. ICG excretion is in some part dependent upon the liver perfusion rates. Our aim was to study the impact of liver blood flow on ICG R15 under defined and controlled perfusion rates in isolated porcine livers. To allow for comparability retention rates under perfusion conditions then were compared to retention rates in healthy pigs.
Methods: Livers of 5 healthy landrace pigs ($35,4 \pm 5$ kg) were explanted and placed in a perfusion unite for normothermic extracorporeal liver perfusion (NELP). The hepatic artery, the portal vein and the inferior V. cave were canulated. Fresh porcine blood was oxygenated and dialyzed continuously during perfusion. hepatic artery and portal venous pressures were maintained by separate pumps in order to establish physiological conditions. Normal and high perfusion rates were defined as 1 ml or 2 ml/g liver weight/min, respectively. According to manufacturer instructions 0,5 mg of ICG/kg were applied and ICG ratios calculated from blood samples. The results were compared with the ICG R15 ratios of 5 anesthetised healthy landrace pigs ($31, 5 \pm 0, 7$ kg).
Results: All perfusions were characterized by physiological bile production and the lack of hepatocellular damage. ICG R15 ratios in group 1 (normal flow), group 2 (high flow) and group 3 (healthy control group) were $18, 9 \pm 6$, $7, 2 \pm 3$, and $16, 6 \pm 5$ respectively. ICG R15 ratio was significantly lower in the high flow group ($p<0,05$). No significant difference was measured between the isolated perfusion group with normal flow and the healthy control group.
Conclusion: We would like to conclude the following: ICG R 15 ratios in the normothermic isolated perfusion circuit are comparable to results of healthy pigs indicating the validity of our model; with doubling of perfusion rates ICG R 15 ratios are reduced by half; under clinical conditions with hyper dynamic states the increase of liver perfusion should be taken into consideration interpreting the ICG R15 ratio.

Trauma/critical care 1119

Maximising survival after injury to the inferior vena cava: get the patient to the operating room!

M. McMonagle, T. El-Khoury, V. Malka, T. Hughes
Westmead Hospital, Sydney, NSW, Australia

Background: To identify possible outcome variables and prognostic factors in patients presenting with injuries to the inferior vena cava with particular reference to factors that may optimise survival after injury.
Methods: All patients with an injury to the inferior vena cava (IVC) were identified from our trauma database. Retrospective chart reviews were used to identify patient and injury demographics, physiological status, associated injuries, emergency and surgical management and outcomes.
Results: A total of 28 patients were identified from our database. Blunt trauma accounted for 89% of the population and penetrating injury for the remaining 11%. Patients were grouped according to outcome; Group 1 (deaths, $n = 22$) and Group 2 (survivors, $n = 6$). The median Injury Severity Scores for each group was 45 (I.Q. 37–57·5) and 27 (I.Q. 25–39·8) respectively ($P = {\cdot}01$). The overall mortality was significantly altered by the presence or absence of a head injury ($P = {\cdot}018$). The administration of packed red cells for fluid resuscitation was associated with a better prognosis ($P = {\cdot}046$), however other types of fluid administered did not alter the outcomes ($P = {\cdot}339$). Injury to the retrohepatic or infrarenal IVC was associated with a better outcome compared to suprarenal or suprahepatic injuries ($P = {\cdot}018$).
Conclusion: IVC trauma remains a formidable challenge for surgeons, and is still associated with a high mortality. Presently there is no one readily identifiable factor to improve outcomes. However, in our study, injury severity scores, the presence of a head injury, amount of blood transfused and the site of IVC injury had a significant impact on prognosis. Survival in the shocked IVC-injured patient appears to be optimised with timely operative intervention.

Vascular/ischaemia-reperfusion

Vascular/ischaemia-reperfusion 0062

The surgical management of 73 vascular malformations and pre-operative predictive factors of major haemorrhage – a single centre experience

N. Maftei, A. Howard, L. C. Brown, P. Gunning, N. J. Standfield
Hammersmith Hospitals NHS Trust, London

Background: Massive blood loss during surgery for congenital vascular malformations (CVMs) is one of the reasons why surgeons avoid operative management even though patients' symptoms may be significantly improved. In our series of patients we investigated pre-operative factors for predicting major haemorrhage at surgery and propose an algorithm for the surgical management of CVMs.
Methods: Peri-operative data were collected on 73 consecutive procedures in 41 patients with CVMs between 1992–2006 at a large university hospital. Data were used to investigate whether the following factors were associated with blood loss during the procedure: type of procedure, possibility of proximal tourniquet use, lesion flow characteristics, previous history of major haemorrhage with CVM surgery, platelet counts, and length of hospital stay.
Results: There was good evidence to suggest that significantly higher blood loss was associated with debulking surgery ($p = 0{\cdot}006$) and with previous history of major haemorrhage during CVM surgery, ($p = 0{\cdot}041$). There was also some evidence to suggest that blood loss was higher in lesions where proximal tourniquet application was not possible ($p = 0{\cdot}093$). High flow lesions did not appear to be strongly associated with major blood loss ($p = 0{\cdot}288$). Major blood loss (> 2 L) occurred in16 (20·8%) procedures performed on 11(26·2%) patients but this did not appear to prolong hospital stay.
Conclusion: The risk of major haemorrhage should not exclude patients with CVMs from surgery, providing they are managed in appropriate centres with adequate surgical and haematological resources.

Vascular/ischaemia-reperfusion 0112

Temporal artery biopsy. A retrospective review of the results of a DGH in the period from 1997 to 2006

M. Abdel-Halim, M. Nadeem, H. Gajraj
Yeovil District Hospital, Yeovi

Background: The clinical practice of routine temporal artery biopsy for the diagnosis of temporal arteritis has recently been questioned (1, 2). Recently at our hospital, a patient has suffered an injury to the temporal branch of the facial nerve resulting in drooping of the eyebrow and forehead asymmetry. Following this, we reviewed the results of all the biopsies performed since 1997.
Methods: Computerised histopathology data collection started in 1997. We reviewed the histology results of all temporal artery biopsies performed after this date.
Results: A total of 119 procedures were performed. 77 patients (64·7%) were females. The average age of the patients was 72 (+/− 11·4). Nervous tissue, a vein or strands of connective tissue were biopsied instead of the artery on four occasions (3·4%). The arterial biopsy was positive in 20 cases (17·2%), and negative in 96 cases (82·8%).
Conclusion: Although temporal artery biopsy is a simple procedure, complications can arise (3). Biopsy of non-arterial tissue does occur and can be associated with significant morbidity. 'Skip lesions' are a common feature of temporal arteritis and can lead to a false negative result. Studies have shown that the use of Colour Duplex Ultrasound (CDU) can reduce the number of patients requiring the invasive temporal artery biopsy (1–3). Our review shows a significant negative yield from temporal artery biopsy. We advocate utilising the use of CDU to limit the number of patients subjected to the procedure.

Vascular/ischaemia-reperfusion 0158

The suitability of endovenous laser ablation of the long saphenous vein, bifid long saphenous vein and common truncal varices at the saphenofemoral junction

C. Bicknell, N. Upadhyay, D. Greenstein
Northwick Park Hospital, Harrow

Background: Endovenous laser ablation (EVLA) of the long saphenous vein (LSV) has a good outcome. The technical closure rate of the LSV below its subterminal valve is 98%. Concerns still remain regarding recurrence as the SFJ may remain open because of a bifid LSV or a common origin of a major truncal branch. Our aim was to assess the results of EVLA in all primary varicose veins involving the LSV, inclusive of a bifid LSV and common origin of a major truncal branch.
Methods: 193 consecutive patients with varicose veins off the LSV were assessed for EVLA. Patients were deemed technically suitable based on the duplex anatomy of the LSV and SFJ. These underwent EVLA (ELVeS 980 nm, 50–60 J/cm) with 2nd vein ablation where necessary. In these patients with a true bifid LSV or common origin of a major truncal branch a second EVLA procedure was performed at the same time. Patients underwent duplex examination immediately and followed up at 6 weeks with duplex examination.
Results: 192 of 193 patients were suitable for EVLA. 127 cases had EVLA to the LSV alone. 20 required EVLA to a bifid LSV system and 45 patients to the anterolateral vein to ensure closure of the SFJ. The SFJ was closed in 186/192 (96·8%) patients immediately and after 6 weeks. All bifid LSVs were successfully closed.
Conclusion: 99% of all primary LSVs are technically suitable for EVLA, with closure of the SFJ in 96·8%. A second vein often needs to be ablated to close the SFJ and achieve these figures.

Vascular/ischaemia-reperfusion 0185

The role of conservative management in upper limb ischaemia

E. J. H. Turner, A. Loh, A. Howard
Queen Elizabeth's Hospital, London

Background: 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 percent), this was comparable to published reports using embolectomy as the primary management.

Conclusion: 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.

Vascular/ischaemia-reperfusion 0217

The significance of limb trauma as an initiating factor in chronic leg ulceration

S. R. Kulkarni, M. Roidl, M. S. Gohel, M. R. Whyman, K. R. Poskitt
Department of Vascular Surgery, Cheltenham General Hospital, Cheltenham

Background: This study aimed to assess differences in clinical outcomes between patients with traumatic and spontaneous leg ulcers.
Methods: Consecutive leg ulcer follow-up patients seen between April 2004 and October 2005 in a specialist leg ulcer clinic were asked about the mechanism of the original ulceration. 24-week healing and 12-month recurrence rates were calculated using Kaplan-Meier survival analysis. Clinical outcomes were compared between groups with traumatic and spontaneous ulcers.
Results: Of the 300 patients assessed, 38 (12·6%) were excluded (incomplete data). In the remaining 262 patients, the cause of ulceration was reported as traumatic in 116/262 (44%) and spontaneous in 146/262 (56%). Median age, ABPI < 0·85 and venous reflux were equally distributed between groups with traumatic and spontaneous ulcers ($p = 0·470$, 0·793, 0·965 respectively, Chi-square test). 24-week healing rates were 81% for traumatic and 67% for spontaneous ulcers ($p = 0·015$, Log-Rank test). 12-month recurrence rates were 32% and 33% for traumatic and spontaneous ulcers respectively ($p = 0·970$, Log-rank test). Patients with traumatic ulcers suffered a total of 53 ulcer recurrences (median 0, range 0–4) compared to 89 in patients with spontaneous ulcers (median 0, range 0–8) ($p < 0·001$, Mann-Whitney U).
Conclusion: Approximately half of all leg ulcer patients recall a traumatic event. When managed in leg ulcer clinic, these traumatic ulcers heal faster and recur less frequently than spontaneous ulcers.

Vascular/ischaemia-reperfusion 0243

A risk assessment/management clinic reduces predicted mortality in patients with peripheral vascular disease

S. Gulati, H. L. D. Lee, M. Abdul Rahman, A. Mekako, P. A. Coughlin, J. Hatfield, P. T. McCollum, I. C. Chetter
Academic Vascular Unit, Hull Royal Infirmary, Hull

Background: 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:

	Visit 1	Visit 2	P^*
PROCAM (%)	14 (8–30)	10 (4·5–21·0)	0·000
Framingham (%)	14 (10–25)	11 (7·5–17·0)	0·000
Total Cholesterol (mmol/l)	5·2 (4·5–6·1)	4·5 (4·0–4·9)	0·000
Triglycerides (mmol/l)	1·7 (1·2–2·5)	1·4 (1·0–2·3)	0·001
LDL (mmol/l)	3·1 (2·5–3·7)	2·5 (2·1–2·9)	0·000
King's College VascuQoL	4·4 (3·4–5·3)	4·8 (3·8–6·0)	0·030

*Wilcoxon signed rank test

Conclusion: 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.

Vascular/ischaemia-reperfusion 0245

Generic quality of life analysis in claudicants: Can the short form 8 replace the short form 36?

S. Gulati, P. A. Coughlin, H. L. D. Lee, J. Hatfield, B. Akomolafe, P. Renwick, P. T. McCollum, I. C. Chetter
Academic Vascular Unit, Hull Royal Infirmary, Hull

Background: Generic Quality of Life (QoL) is a crucial outcome measure in claudicants with the Short Form 36 (SF36) accepted as the "gold standard" instrument. We aimed to assess whether the new, shorter, simplified Short Form 8 (SF8) is sufficiently responsive to replace SF36 in claudicants.
Methods: 155 claudicants, 113 men and 42 women, median age 66 (range 44–84) years were graded according to ISCVS standards (30 mild, 52 moderate and 73 severe claudicants). Patients completed SF36 and SF8 at the time of assessment. Both instruments assess the same 8 QoL domains. Construct and convergent-divergent validity was assessed for both the QoL instruments. Responsiveness of normalised data between grades of claudicants was analysed with non-parametric statistical tests.
Results: There was greater correlation between like domains of SF36 and the SF8 (0·594–0·792, $p = 0·000$) than the non-like domains, suggesting good convergent-divergent validity. Furthermore, the SF36 and SF8 demonstrated similar construct validity. Increase in the severity of the claudication resulted in a statistically significant deterioration in six of the eight domain of both SF8 & SF36 ($p < 0·05$, Kruskal-Wallis ANOVA). However, comparison of patients with moderate and severe claudication showed no statistically significant difference in 7 of 8 SF36 domains and in any of the SF8 domains ($p > 0·05$, Mann-Whitney U test).
Conclusion: SF8 and SF36 have similar validity and responsiveness in patients with intermittent claudication. In future the simplified SF8 may replace SF36 as the gold standard generic QoL analysis in claudicants.

Vascular/ischaemia-reperfusion 0252

Reduced wound infection and stump breakdown with prolonged antibiotic prophylaxis following major lower limb amputation

U. Sadat, A. Chaudhuri, S. Wright, P. Hayes, M. Gaunt, J. Boyle, K. Varty
Addenbrookes NHS Trust, Cambridge

Background: To compare wound infection, stump breakdown and revision rates after major lower limb amputation between patients receiving 24 hours *versus* a 5 day course of prophylactic antibiotics.
Methods: The outcomes of a consecutive series of 40 major amputations in patients receiving a short 24 hour course of combined prophylactic antibiotics (flucloxacillin/vancomycin + gentamicin/ciproxin + metronidazole) were retrospectively analysed. Following this a further consecutive group of 40 major amputations were studied prospectively following the institution of a 5 day combined antibiotic regime (flucloxacillin/vancomycin + ciproxin + metronidazole). Mann-Whitney and Chi-squared data analysis.
Results: The 2 groups of patients were similar in terms of demographics, vascular risk factors and level of amputation. The 5 day antibiotic regime led to a significant reduction in wound infection and stump breakdown rates (5% *versus* 22·5% $P = 0·023$) and a reduced length of hospital stay (22 *versus* 34 days $P = 0·001$). Revision rates were lower (2·5% *versus* 10%) but did not reach statistical significance ($P = 0·36$). More patients in the prospective 5 day antibiotic series were operated on by the Specialist Registrar (77·5% *versus* 55% $P = 0·033$).
Conclusion: This data supports the use of a prolonged 5 day course of combined antibiotics after major lower limb amputation. This reduces stump infection and breakdown rates leading to shorter in-hospital stays.

Vascular/ischaemia-reperfusion 0352

A novel assay for the detection of platelet-derived microparticles – association with *in vivo* markers of platelet activation in patients with peripheral arterial disease

A. Burdess[1], A. Michelsen[2], R. Dawson[1], K. Fox[1], F. Brosstad[2], D. Newby[1]

[1] *University of Edinburgh, Edinburgh,* [2] *Rikshospitalet, Oslo, Norway*

Background: Increased platelet activation plays a key role in atherothrombosis, hence there is considerable interest in techniques that allow *in vivo* detection of platelet activity. Flow cytometric assessment of Platelet Monocyte Aggregation (PMA) is the gold standard of *in vivo* platelet assessment. Platelet-derived microparticles (PMPs) are also surrogate markers of cardiovascular risk, and have a direct role in vascular dysfunction. We assessed the reproducibility of a novel assay for PMP and examined the correlation of PMP and PMA measurements in a population of patients with raised baseline levels of platelet activation.

Methods: Four blood samples over a 48 hour period were collected from 22 subjects with symptoms of intermittent claudication and reduced ankle-brachial pressure index (< 0·8). Blood collected into P-PACK tubes underwent incubation with a FITC-conjugated anti-CD42a monoclonal antibody (GRP-P, platelet marker) and a PE-conjugated anti-CD14 monoclonal antibody (Tuk-4, monocyte marker) for flow cytometeric analysis of % platelet-monocyte aggregation. Platelet expression of *P*-selectin and CD40L was also assessed by flow cytometry. Platelet-poor plasma was prepared from matched blood collections, and PMP-located GPIIb was quantified by means of a novel one step time-resolved immunofluorometric assay. PMPs were divided according to size (PMPs > or < 0·1 μm).

Results: Both techniques demonstrated good reproducibility with no significant differences in measurements taken at different time points (PMA, mean 39·2%; mean of differences 1·4%, $P = 0·5$; Small PMP, mean 58·4; mean of differences 58·3, $P = 0·72$). Measurements of PMA demonstrated good correlation with assay-derived measurements of total PMPs ($r = 0·36$, $p = 0·003$), large PMPs ($r = 0·27$, $p = 0·029$) and small PMPs ($r = 0·43$, $p = 0·0004$). Platelet *P*-selectin correlated well with PMA measurements ($r = 0·50$, $p < 0·0001$) but only with small PMP values ($r = 0·43$, $p = 0·0004$). Platelet CD40L showed no correlation with any PMPs.

Conclusion: We have demonstrated that both PMB and PMPs can be reproducibly assessed using our techniques, although PMP appears to be more variable. PMPs, and especially small PMPs, correlate with 'gold standards' of platelet activation, namely PMAs and platelet expression of *P*-selectin. This suggests that PMPs are useful markers of, or are causally implicated in, *in vivo* platelet activation.

Vascular/ischaemia-reperfusion 0370

Five year results of perforator vein closure using TRLOP (transluminal Occlusion of Perforator)

J. L. Bacon, A. J. Dinneen, C. Harrison, J. Holdstock, B. A. Price, M. S. Whitely

Royal College of Surgeons of England, London

Background: Historically, incompetent perforator vein (IPV) surgery was performed using open techniques with high complication rates. Sub-fascial endoscopic perforator surgery (SEPS) reduced morbidity but requires general or regional anaesthesia. The transluminal occlusion of perforator (TRLOP) technique was first described in 2001. IPVs are closed percutaneously under ultrasound guidance using radiofrequency current.

Methods: Patients who had TRLOP between January 2001 to February 2002 were invited to attend for follow up duplex ultrasound examinations. Vascular technicians were blinded to previous scan results. Scans were compared with preoperative scans from 5 years previously. Results were classified into perforator closed, perforator not closed/reopened and new perforator. Closure of a perforator was defined as an absence of IPV at or within 5cm of previous perforator in the vertical and horizontal plane.

Results: Thirty eight patients out of 65 patients invited attended (response rate 58%), female : male, 24 : 14, age range 40 to 84 years, mean age 64 years. One hundred and twenty five perforators were analysed. The distribution of clinical classes (CEAP) was as follows: C2 36·2%, C3 27·6%, C4 34·5% and C6 1·7%. One hundred and one of 125 IPVs were occluded (closure rate of 82%), 24 perforators had not closed/reopened (18%) in 19 legs and 12 de novo IPVs were found in 11 legs.

Conclusion: These results compare favourably with published SEPS results. Despite being in our learning curve for TRLOP, we have found TRLOP to be an effective treatment for IPV.

Vascular/ischaemia-reperfusion 0420

Sustained improvement in maximum walking distance following completion of the nurse led structured exercise program

K. Juen Leong, R. Sam, A. W. Garnham, T. I. M. Gardecki

Department of Vascular Surgery, New Cross Hospital, Wolverhampton

Background: Several studies have demonstrated improvement in patient maximum walking distance following a period of different supervised exercise programs, but there is little evidence about whether this improvement is sustained with time. The aims of this study were to ascertain if there was improvement in patients' maximum walking distance through a nurse-led vascular clinic and structured exercise program and more importantly, if the improvement has been sustained at 3 months after completion of the exercise program.

Methods: Since April 2000, new patient referrals were assessed for intermittent claudication by our vascular nurses. Patients found suitable for the nurse-led clinic had their risk factors addressed and were then started on a twice weekly supervised treadmill program for 3 months after which they were encouraged to continue the exercise unsupervised. Comparison of their maximum walking distance at baseline, 3 months and 6 months was made.

Results: 184 patients were recruited. 142 (77%) patients completed the 3-month course. A further 73 (50%) patients returned for the treadmill assessment at 6 months. The median maximum walking distance at baseline, 3-months and 6-months were 160 m (IQR 80–230 m), 820 m (580–1115 m) and 690 m (430–1110 m) respectively. At 3-months, there was a statistically significant five fold improvement compared to baseline ($P<0·001$). There was also a significant 4 fold improvement at 6-months compared to baseline ($P<0·001$). There was no significant difference between the 3 month and the 6 month result ($P = 0·083$).

Conclusion: Our study has shown that the improvement in maximum walking distance achieved through the nurse-led vascular clinic and the exercise program has been sustained at 3 months after completion of the exercise program. Therefore, this treatment modality is safe and effective and provides a viable low cost and low complication alternative to angioplasty and surgical bypass.

Vascular/ischaemia-reperfusion 0480

Platelet activation and myocardial ischemic events in patients undergoing major vascular surgery

S. Rajagopalan, I. Ford, P. Bachoo, M. Greaves, J. Brittenden

Vascular Unit, Aberdeen Royal Infirmary, Aberdeen

Background: Myocardial ischemia is the leading cause of post-operative mortality and morbidity in patients undergoing peripheral vascular surgery. It has recently been shown that these patients have increased baseline platelet activity which is increased further following surgery. We aimed to assess the relationship, if any, between pre and post-operative platelet function and post-operative myocardial ischemic events.

Methods: The following investigations were performed on 136 patients undergoing elective revascularisation surgery for severe limb ischaemia (SLI) or abdominal aortic aneurysm (AAA) repair: daily ECG, 72 hour Holter monitoring, serial troponin-I and platelet function (*p*-selectin expression, fibrinogen binding +/− ADP stimulation, platelet-monocyte aggregate formation and aggregation).

Results: 93% of the patients were on aspirin and statin therapy. The Lee cardiac risk index score were: Class I-30%, Class II-45%, Class III-21%, and Class IV-4%. In total, 41 (30%) patients had a myocardial ischemic event (detected by troponin rise of $> 0{\cdot}1$ ng/ml, $n = 23$ (56%), Holter monitoring, $n = 13$ (32%) or both $n = 5$ (12%). The incidence was higher in patients with AAA compared to SLI (45% *versus* 26% $p = 0{\cdot}065$) and overall 65% of these events occurred in patients with a Lee class of I and II. The majority of events, 82% (34/41) occurred within 48 hours of surgery. Platelet activity increased significantly post-operatively in all patients, but did not predate or correlate with ischaemic events. 50% of previous aspirin responders had post-operative aspirin resistance.
Conclusion: Patients undergoing major vascular surgery have a 30% incidence of myocardial ischaemia, with the majority of events occurring within 48 hours of surgery. Platelet activity and aspirin resistance are dramatically increased in the post-operative period but no direct correlation was observed with the development of post-operative cardiac ischaemic events.

Vascular/ischaemia-reperfusion 0491

Should angiotensin converting enzyme inhibitors be omitted on the day of carotid endarterectomy?

M. Halawa, C. Kotze, P. Swoboda, K. El-Sakka, M. Harper, M. Brooks, S. W. Yusuf
Brighton and Sussex University Hospitals, Brighton

Background: Post-operative hypotension is observed in nearly 40% of patients undergoing carotid endarterectomy (CEA). Angiotensin Converting Enzyme (ACE) plays an important role in blood pressure regulation and severe intra-operative hypotension has been observed in patients receiving ACE inhibitors (ACE-I). The purpose of this study was to asses the relationship between ACE-I and post-operative hypotension following CEA.
Methods: Retrospective review of 92 consecutive patients undergoing CEA in our unit was carried out. Data on the use of ACE-I and perioperative invasive and non-invasive blood pressure (BP) measurements were collected.
Results: The majority of patients 73/92 (79·3%) were receiving anti-hypertensive medication; 33/92 (35·8%) patients were receiving ACE-I. There was no significant difference in the pre-operative systolic or diastolic BP between the ACE-I and the non ACE-I groups ($p = 0{\cdot}16$ and 0·48 respectively Mann Whitney test). There was no significant difference in the lowest post-operative systolic BP as a percentage of the pre-operative systolic BP between the ACE-I group (median 71·4, i.q. 60·1–79·5) and the non ACE-I group (median 65·6, i.q. 56·8–76·7) $p = 0{\cdot}27$ Mann Whitney test.
Conclusion: Patients on ACE-I inhibitors do not appear to be at an increased risk of post-operative hypotension following carotid endarterectomy.

Vascular/ischaemia-reperfusion 0507

Acceptable outcome following kidney transplantation using 'Suboptimal Donor' grafts

S. Fraser, R. Rajasundaram, A. Aldouri, S. Farid, A. Al-Mukhtar, A. Lewington, C. Newstead, K. R. Prasad, G. Toogood, N. Ahmad
St. James's University Hospital, Leeds

Background: The rate limiting factor in renal transplant is the shortage of donor organs. To meet increasing demands there is an expansion of live and non-heart beating donor programs and the use of suboptimal grafts. Suboptimal grafts are defined by the United Network for Organ Sharing as those from older donors, over 59 years, or from donors 50–59 years with 2 of the following; a history of hypertension, a retrieval creatinine over 130 µmol/L or CVA as the cause of death. The main concern remains poor graft and patient outcome. We retrospectively analysed all cadaveric renal transplants in our unit from 1995 to 2005 to identify whether the present extended criteria influenced outcome.
Methods: The data used for analysis was retrieved from UK transplant's and our unit's computerised database. We analysed donor age, sex, ethnicity, cause of death, duration in ICU, inotropes, donor type, history of diabetes, hypertension, ischemic heart disease, cardiac arrest, retrieval creatinine, graft anatomy and cold/warm ischaemic times.
Results: Total of 1053 cadaveric renal transplants were performed. 325 kidneys met the current criteria for suboptimal kidneys. The median age was 56 for suboptimal and 39 years for optimal donors. Retrieval creatinines were 99·5 and 79 µmol/L respectively. Inotropes, cold/warm ischaemic time, and HLA mismatch were comparable in both groups. The median recipient age was 51 for the suboptimal and 42 years for the optimal group. Recipient's sex and ethnicity were similar in both groups. Delayed graft function was higher in the suboptimal (34·8%) against the optimal group (21·3%). Five-year graft survival (71·27% suboptimal and 73·44% optimal) and patient survival (84·17% suboptimal and 88·08% optimal) were similar. Univariate analysis showed donor hypertension, ischaemic heart disease and moderate to severe atheroma in graft vessels to be significant. On multivariate analysis, donor hypertension ($p = 0{\cdot}007$) and IHD ($p < 0{\cdot}001$) remained significant. Analysis with the factors currently considered suboptimal was non-significant ($p = 0{\cdot}442$).
Conclusion: The use of suboptimal grafts using the current extended criteria provides a comparable patient and graft survival to that of optimal grafts. The most significant donor factors affecting outcomes are previous hypertension and IHD. Thanks to UK Transplant for data.

Vascular/ischaemia-reperfusion 0525

Is asymptomatic peripheral arterial disease (PAD) an underdiagnosed and undertreated condition in the elderly?

R. Fuller[2], S. Ahilathirunayagam[1], S. Homer-Vanniasinkam[3]
[1]School of Medicine, University of Leeds, Leeds, [2]Department of Elderly Medicine, Leeds Teaching Hospitals, NHS Trust, Leeds [3]Leeds Vascular Institute, Leeds Teaching Hospitals NHS Trust, Leeds

Background: PAD is well established marker of a patient's risk of having an atherothrombotic event. Evidence suggests that there may be patients with PAD who may be asymptomatic. Low ankle brachial pressure index (ABPI) is associated with increased risk of Stroke, IHD and poor cognitive function. The early detection of these patients could result in risk factor modification and earlier, aggressive treatment. To date there has been no study in the UK to determine the prevalence of PAD in an elderly population.
Methods: In this ethically approved study, we measured ABPI in 100 older people (Median age 82, Range 68–99 years). Patient demographics and risk factor profiles were routinely recorded. ABPI $< 0{\cdot}9$ in non-diabetics and $< 1{\cdot}15$ in diabetics was taken as abnormal; these patients were questioned for PAD symptoms.
Results: 37% had an abnormal ABPI and thus at increased risk of atherothrombotic events. 20% were asymptomatic, and of those with symptoms, 3% were known to have PAD whilst in 14% this was a new diagnosis. 41% of patients with abnormal ABPI have diabetes compared with only 6·3% with normal ABPI. Of those patients with abnormal ABPI, 56% are not on best medical therapy (BMT).
Conclusion: This study has demonstrated that asymptomatic PAD as elicited by abnormal ABPI (a non-invasive, relatively cheap easily mastered technique) exists in a significant proportion of elderly patients. It is tempting to suggest that in a climate of scarce resources, aggressive BMT should be directed at this cohort of patients to minimise future atherothrombotic events.

Vascular/ischaemia-reperfusion 0613

Simple adaptation of current abdominal aortic screening programmes may allow address of all-cause cardiovascular mortality

R. Cahill, D. Waterhouse, S. Sheehan, F. Sheehan
[1]St Vincents' University Hospital, Dublin, [2]Blackrock Clinic, Dublin

Background: Despite representing only 10% of all deaths due to cardiovascular disease, population screening for abdominal aortic aneurysm (AAA) is cost-justified on the sole basis of its impact on emergency presentations

with AAA rupture. Whether this framework can further evolve to address all-cause mortality is unclear.

Methods: Prospective cohort study examining yield and feasibility of adjoining full cardiovascular assessment [physician-administered health questionnaire, sphygmomanometry (mmHg), anthromorphometry (BMI kg/m^2) and fasting phlebotomy for lipid and glucose profiling] to AAA screening by ultrasound of males over the age of 60 years. Framingham and SCORE project estimations were used to calculate 10-year risks of ischaemic heart disease (IHD) and any cause fatal cardiovascular disease (CVD) respectively.

Results: 481 men were screened of whom 23 (4·8%) had an AAA detected (AAA diameter being less then 5·5 cm in 16 [73%]). Unaddressed obesity, smoking, hypertension, impaired glucose metabolism and hypercholesterolemia were commonly identified among all attending being notably frequent in those without an AAA. 10-year predicted cardiovascular mean risk overall by Framingham/SCORE estimations were 6·77/6·97 but rose to 9/13·5 in those men currently smoking and exceeded the risk of death from any undetected AAA in a significant proportion (> 10%). Full cardiovascular screening of every individual attending increased total costs over AAA screening alone by 2·5%. However reserving concomitant atherosclerotic screening for those with an elevated blood pressure at presentation alone would allow 96% and 95% of those with Framingham and SCORE risks > 10% respectively to be identified while saving 162 individuals (33%) from investigation reducing the cost increment to less then 1·8% overall.

Conclusion: As it is coexisting systemic atherosclerosis that represents the major impediment to longevity in males attending for AAA screening (whether they have an AAA or not), the proven framework for population sifting for this condition provides a unique opportunity to confront latent cardiovascular malady. Sphygmomanometry during ultrasonographic screening for AAA represents the most cost-effective filter parameter and would seem easily incorporated into the currently proposed model.

Vascular/ischaemia-reperfusion 0672

Acutely occluded renal dialysis fistulae – Can they be detected early and is intervention worthwhile?

R. Jaidka, A. Riddell, S. Athreya, J. Moss, R. Edwards, I. Robertson, D. Kingsmore
Western Infirmary, Glasgow

Background: Renal dialysis is best performed through an arterio-venous fistula (AVF), which are difficult to create and often occlude. The management of occluded fistula is uncertain. This study sought to determine whether it is possible to predict if an AVF will occlude, and secondly to determine if interventional procedures to restore patency are worthwhile.

Methods: A retrospective analysis of all interventions performed for patients in the Western Infirmary renal dialysis catchment area who presented with an acutely occluded AVF during the time period 01/03–11/06 was performed. Clinical details included patient factors, details of dialysis, and outcome were obtained from dialysis records and radiology.

Results: 65 Patients had 92 procedures performed, 85% of which were radiological. Technical success was achieved in 67%, among whom 73% were patent at 3 months. There were 7 significant complications, 3 requiring surgical intervention. The only factor that predicted occlusion was increasing venous pressure: there was 13% increase in venous pressure 4 weeks prior to occlusion which increased to 30% in the week prior to occlusion.

Conclusion: AVF at risk of acute occlusion may be detected up to 1 month prior to occlusion. Intervention for occluded AVF is worthwhile, with good clinical results.

Vascular/ischaemia-reperfusion 0674

The effects of nitric oxide and carbon monoxide in renal preservation

S. A. Hosgood[1], A. Bagul[1], H. L. Waller[1], J. Rimoldi[2], M. L. Nicholson[1]
[1] *University of Leicester, Leicester,* [2] *University of Mississippi, Mississippi, United States*

Background: Nitric oxide (NO) and carbon monoxide (CO) have been reported to exert vasodilatory effects minimising ischaemia reperfusion injury. This study used an isolated porcine kidney model to assess the effects of administering the NO donor sodium nitroprusside (SNP) and the CO releasing molecule (CORM-3) during a period of warm preservation (WP) followed by reperfusion.

Methods: Kidneys were perfused under WP conditions after 10 minutes of warm ischaemia and 16 hours of cold storage as follows: Group1: SNP; Group2: Control; Group3: CORM-3; Group4: iCORM-3 (inactive). Renal function and viability were then assessed during reperfusion.

Results: SNP and CORM-3 increased renal blood flow (RBF) during WP [Area under the curve (AUC):SNP 457 ± 144, CORM-3 476 ± 171, control 296 ± 119, iCORM-3 247 ± 89; $P = 0{\cdot}014$]. After reperfusion RBF was significantly improved in CORM-3 group compared to the control group (AUC 751 ± 222, $435 \pm 94{\cdot}9$; $P = 0{\cdot}02$) and comparative to other groups. Creatinine clearance and creatinine fall was significantly improved in CORM-3 group compared to iCORM-3 (AUC; $7{\cdot}4 \pm 7{\cdot}4$ *versus* $1{\cdot}3 \pm 0{\cdot}6$; $P = 0{\cdot}02$ and AUC 1662 ± 538 *versus* 2255 ± 169; $P = 0{\cdot}03$, respectively). Creatinine fall and clearance were numerically lower in SNP and control groups but did not reach statistical significance compared to CORM-3 group. There was a negative correlation between RBF during WP and functional parameters during reperfusion (Creatinine, $r = -0{\cdot}7217$; $P = < 0{\cdot}0001$, sodium excretion, $r = -0{\cdot}9121$; $P = < 0{\cdot}0001$).

Conclusion: The beneficial vasodilatory effects of CORM-3 during WP improved renal function during reperfusion. Although the effects of SNP were comparable to CORM-3 they were less pronounced.

Vascular/ischaemia-reperfusion 0681

The evaluation of carbon monoxide concentrations in an isolated porcine kidney model

S. A. Hosgood[1], A. Bagul[1], M. Kaushik[1], R. Pande[1], J. Rimoldi[2], M. L. Nicholson[1]
[1] *University of Leicester, Leicester,* [2] *Unversity of Mississippi, Mississippi, United States*

Background: The toxic gas carbon monoxide (CO) has been shown to exert cytoprotective actions against ischaemia reperfusion injury. The aim of this study was to evaluate different concentrations of a CO releasing molecule CORM-3 in an isolated porcine kidney model during reperfusion.

Methods: An isolated organ preservation system (IOPS) was used to perfuse porcine kidney with normothermic autologous blood for 3 hours under physiological conditions after a period of 18 hours cold storage. Different concentrations of CORM-3 were infused during the first hour: Group 1: 400 μm; Group 2: 200 μm; Group 3: 100 μm; Group 4: 50 μm.

Results: Renal blood flow (RBF) was significantly better in groups 2, 3 and 4 [Area under curve (AUC) 141 ± 51, 481 ± 182, 643 ± 139, 774 ± 19; $P = 0{\cdot}012$; groups 1–4 respectively]. Renal function was also significantly improved in groups 3 and 4 compared to group 1 (AUC creatinine fall; 2398 ± 416, 1789 ± 59, 1256 ± 143, 1450 ± 335; $P = 0{\cdot}006$ groups 1–4 respectively) and (AUC creatinine clearance; $0{\cdot}4 \pm 0{\cdot}2$, $2{\cdot}8 \pm 1{\cdot}1$, $13{\cdot}1 \pm 1{\cdot}6$, $14 \pm 5{\cdot}8$; $P = 0{\cdot}003$ groups 1–4). Tubular function was also improved in groups 3 and 4 compared to group 1 with less sodium excretion ($P = 0{\cdot}004$). Groups 3 and 4 had a higher total urine output compared to group 1 (778 ± 292, 793 ± 212 v 75 ± 67 ml; $P = 0{\cdot}003$ respectively). In each of the groups there was less than a 1% detection of carboxyhaemoglobin after 1 and 3 hours of reperfusion.

Conclusion: The lower concentrations of CORM-3 demonstrated significantly improved renal function compared to the higher concentrations. Renal function was severely impaired in 400 μm group despite no increased carboxyhaemoglobin levels in the blood.

Vascular/ischaemia-reperfusion 0686

Cranal nerve injuries and the retrojugular approach in carotid endarterectomy

W. Beasley, C. Gibbons
Department of Vascular Surgery, Morriston Hospital, Swansea NHS Trust, Swansea

Background: The retrojugular approach to the carotid bifurcation was originally described for recurrent or high carotid disease but has more recently been applied to primary carotid endarterectomy (CEA) It has been shown to be as safe and possibly faster than the traditional anteromedial approach but concerns have been raised that it may increase the risk of cranial nerve injury (CNI), particularly to the accessory nerve. The aim of this study was to compare the incidence of cranial nerve injuries sustained during CEA employing a retrojugular approach with those of a traditional, anteromedial approach.
Methods: A retrospective nonrandomised continuous cohort study of 91 retrojugular CEAs compared with 145 anteromedial CEAs. All CEAs were performed under LA and with an eversion endarterectomy technique. The χ^2 test was used to compare the incidence of CNI in both groups.
Results: Patient demographics and major complications (death, stroke and myocardial farction) were similar in both groups. CNIs are shown below;

CNI	Retrojugular (91)	Anteromedial (145)	*P* value
Total	8	4	0·08
Marginal mandibular	1	1	0·69
Laryngeal	1	1	0·69
Accessory	3	0	0·11
Hypoglossal	3	3	0·87

Conclusion: The retrojugular approach is not associated with a higher incidence of cranial nerve injury the the anteromedial approach and, in particular, the accessory nerve is not at greater risk of injury.

Vascular/ischaemia-reperfusion 0694

Patient factors associated with wound complications in varicose vein surgery

A. I. Mekako, P. A. Coughlin, J. Hatfield, S. Gulati, M. N. Abdulrahman, B. A. Akomolafe, P. Renwick, B. Johnson, I. C. Chetter, P. T. McCollum
Academic Vascular Unit, Hull Royal Infirmary, Hull, East Yorkshire, United Kingdom

Background: About 50 000 varicose vein operations are performed in the UK NHS annually. Although regarded as clean surgery, wound infection rates of up to 16% have been reported following varicose vein surgery. Several patient-related factors may be associated with wound complications following surgery. We aimed to determine these factors in varicose vein surgery.
Methods: We studied 427 patients (571 limbs) undergoing groin surgery for greater saphenous varicose veins. Demographic characteristics were obtained at baseline, and patients underwent standard consultant-led surgery. A personal wound assessment logbook was completed over the initial 10-day postoperative period, based on an adapted ASEPSIS scoring method. Continuous and categorical data were analysed by the Mann-Whitney and Chi-Squared tests respectively. Logistic regression analyses were performed to determine relationships between patient variables and wound outcome.
Results: Groups were matched for demographics and risk factors for wound infections. Univariate analyses showed good wound outcomes with being female (OR [95% CI]) (1·5 [1·2–2·2]) $p = 0·03$, but poor outcomes with high body mass index (0·95 [0·91–0·99]) $p = 0·03$ and current smoking (0·6 [0·7–0·9]) $p = 0·04$. Redo surgery (0·6 [0·4–1·0]) $p = 0·18$ and high CEAP class (0·8 [0·6–1·2]) $p = 0·34$ were associated with a poor wound outcome, but this did not reach statistical significance.
Multivariate analyses showed that a higher BMI, being male, and current smoking were independent predictors of a worse outcome.
Conclusion: Male patients, current smokers and those with a high body mass index are at a higher risk for poor wound outcomes and infections following varicose vein surgery. These patients should be considered for prophylactic antibiotics to prevent postoperative wound morbidity.

Vascular/ischaemia-reperfusion 0751

Combined anti-platelet therapy does not increase bleeding complications associated with carotid endarterectomy

J. M. J. Richards, J. A. Murie, R. T. A. Chalmers
Vascular Surgical Service, Royal Inifrmary of Edinburgh, Edinburgh

Background: Many patients undergoing Carotid Endarterectomy (CEA) are prescribed multiple anti-platelet agents. In combination with Aspirin, both Clopidogrel and Dipyridamole have an additional benefit over Aspirin alone in preventing further cardiovascular events. Clopidogrel trebles bleeding time and in combination with aspirin increases bleeding time five-fold. There is much debate over whether these agents should be stopped prior to CEA to avoid additional bleeding complications.
Methods: One hundred consecutive patients who underwent CEA by a single surgeon between 2003 and 2005 were identified from the prospective local Surgical audit Database. Information retrieved from case notes included drug history, operative blood loss, transfusion requirement, procedure time (clamp on to clamp off), time to haemostasis (clamp off to end of procedure) and drain loss.
Results: Forty-three patients were taking aspirin alone, 24 aspirin with clopidogrel and 20 aspirin in combination with dipyridamole. A further 13 patients were taking warfarin, clopidogrel or dipyridamole alone and were excluded from sub-group analysis. Indications were stroke in 34 patients, TIA in 33 patients, amaurosis fugax in 19 patients and 1 patient was asymptomatic. Demographic data were similar for all three groups. All procedures were performed under loco-regional anaesthesia with full heparinisation. Eighty-six patients had a patch closure and five required a shunt. There was no difference in clamp time between the three groups. Time required to achieve haemostasis was significantly longer in the aspirin/clopidogrel group compared to aspirin alone (27 mins *versus* 19 mins $p = 0·01$ ANOVA). Blood loss ranged from minimal to 455 ml and drain losses ranged from minimal to 300 ml. No patient required a transfusion. No patient required re-exploration for bleeding. There were no infections or complications of loco-regional anaesthesia. One patient in the aspirin/dipyridamole group died of a stroke and one patient in the aspirin alone group had a transient cranial nerve injury.
Conclusion: Anti-platelet agents can safely be continued until the time of carotid endarterectomy without incurring significant bleeding complications.

Vascular/ischaemia-reperfusion 0806

Femoro-femoral bypass remains a durable and safe procedure

T. Siddiqui, S. McKechnie, G. H. Welch, W. P. Stuart
Southern General Hospital, Glasgow

Background: Changing practice requires continued re-evaluation of standard procedures. Many, if not most, aorto-iliac lesions are now dealt with by endovascular techniques alone. This selection of, perhaps, the simpler and lower risk cases may have undermined the effectiveness of those cases treated surgically. A review was therefore undertaken.
Methods: A case note review was performed of 139 femoro-femoral bypass (FFB) procedures for all indications, with or without radiological donor limb inflow correction to allow grafting (angioplasty ± stenting) (FFB-A/S). End-points were major amputation, secondary salvage procedures and death.
Results: The median age of the 83 male and 56 female patients was 63 (range 42–88) years. The indications were intermittent claudication, in 61%, and rest pain and/or tissue loss, in 39%. There were two deaths within the first thirty days and four patients underwent amputation in that period. 21% underwent adjuvant donor-limb inflow correction (angioplasty ± stenting). The common femoral artery (CFA) was the donor vessel in all but five cases.

		One year	Three years	Five years
Limb loss	FFB	12%	13%	13%
	FFB-AS	14%	14%	14%
Death	FFB	12%	17%	23%
	FFB-AS	25%	32%	46%
Secondary salvage	FFB	5%	11%	13%
	FFB-AS	7%	7%	7%

Median follow-up was 48 (range 0–194) months.

Conclusion: Despite the impact of percutaneous intervention, the results of FFB ± A/S are still acceptable and encourage continued wide use of this procedure. These data demonstrate once more that patient survival is poorer if the burden of arterial disease is greater i.e. in those patients requiring donor-limb inflow correction.

Vascular/ischaemia-reperfusion 0837

Endovascular *versus* open abdominal aortic aneurysm repair in patients with concomitant malignancy

P. Nastro[1], U. Bracale[2], S. Brearley[1], M. Porcellini[2], P. Giordano[1]

[1]Whipps Cross University Hospital, London [2]University of Naples, Naples, Italy

Background: The management of patients with abdominal aortic aneurysm (AAA) and concurrent malignancy is controversial. Aim of this study was to assess retrospectively the outcome of endovascular repair (EVAR) and open repair (OR) for the treatment of AAA in patients undergoing curative treatment for concomitant malignancies.
Methods: Retrospective review of all patients who underwent surgery for a non-ruptured intrarenal AAA of 5·5 cm or greater and concomitant malignancy between 1997 and 2005.
Results: Twenty-five patients (22 male; mean age of 70·3) with non-ruptured infrarenal AAA of 5·5 cm or greater (mean size 6·4 cm) and concomitant malignancy amenable for curative treatment were identified. 11 patients were treated with EVAR and 14 with OR. Endovascular patients had smaller aneurysm size (mean, 5·9 cm *versus* 6·8 cm; $p = 0·006$) than surgical patients. The mean cumulative length of stay for all patients who received treatment for both AAA and cancer was 12·8 (range 4–26) and 18·2 (range 9–42) for EVAR and OR respectively. In the EVAR group there was no peri-operative mortality. In the OR group there were 3 peri-operative deaths (21·4%; p = ns). Post-operative complications occurred in one patient in the EVAR group and 7 in the OR group for a morbidity rate respectively of 9·1% and 50% ($p = 0·04$). In the EVAR group there was one late complication (9·1%). The mean follow-up was 37·7 months (range 16–60) in the EVAR group and 29·6 months (range 11–55) in the OR group. One and 2-year survival rates were 100% and 90·9% in the EVAR group, and 71·4% and 49% in the OR group (log-rank $p = 0·103$).
Conclusion: With low morbidity and mortality EVAR is a safe technique for the treatment of AAA in patients with concomitant malignancy and could be considered as an alternative to OR.

Vascular/ischaemia-reperfusion 0877

The fall in middle cerebral artery velocity on clamping detected by Transcranial Doppler is a more sensitive predictor of stroke than the detection of microemboli during Carotid Endarterectomy

S. D. Patel[1], T. S. Padayachee[1], A. Wadoodi[1], N. Thomas[1], A. J. Arnold[1], P. R. Taylor[2], K. G. Burnand[1]

[1]Academic Department of Surgery and Ultrasonic Angiology, King's College London, London, [2]Department of Surgery, Guy's and St Thomas' NHS Foundation Trust, London

Background: Transcranial Doppler (TCD) has been used to monitor patients having carotid endarterectomy (CE). We have analysed the data from the last 15 years to decide what factors may be associated with poor outcome.
Methods: A retrospective analysis was performed of data collected prospectively from 617 consecutive patients. Shunts were selectively inserted if ipsilateral middle cerebral artery (MCA) velocity falls below 15 cm/s or if pulsatility is lost.
Results: Thirteen ischaemic strokes (2·1%) and 7 deaths (1·1%) occurred, 3 as a result of stroke. Significant factors found to be independently associated with stroke were a greater fall in MCA velocity on cross clamping ($p = 0·002$), and an absolute fall below 15 cm/s ($p = 0·025$). Shunts were inserted in 70% of patients with a fall in MCA velocity below 15 cm/s, and in only 17% with MCA velocity above 15 cm/s. Shunt insertion was associated with an increased stroke rate (3·5% *versus* 1·2%), but this failed to achieve significance with either univariate ($p = 0·054$) or multivariate ($p = 0·59$) analysis. The presence of MCA microemboli was not associated with stroke. A fall in MCA velocity ($p = 0·017$) and the presence of contralateral carotid stenosis > 70% ($p = 0·01$) were independently associated with combined stroke and death rate.
Conclusion: Patients with perioperative stroke had a greater fall in MCA velocity at cross clamping compared to those that did not. MCA microemboli do not appear to increase the risk of stroke in this series. TCD allows MCA velocity to be monitored and a fall to be corrected. The impact of shunting on stroke is uncertain.

Vascular/ischaemia-reperfusion 0927

A controlled trial of the effects of local NO/NO_x application on microcirculatory blood flow and oxygen tension in the skin of patients with severe peripheral vascular disease

F. Cross[1], I. Vranic[2], L. Harris[2], E. Makings[2], A. Tucker[1]

[1]Royal London Hospital, London [2]Barts and the London School of Medicine, London

Background: A novel system of generation and delivery of nitric oxide (NO) and related higher oxides of nitrogen (NO_x) has been developed, which generates exogenous NO/NO_x via the chemical reactions of acidified nitrite. The chemical reaction may be kept separate from the skin, where it may theoretically cause irritation and tissue damage due to low pH, by a selective, gas-permeable, hydrophilic polyester co-polymer membrane (Sympatex 10 μm). The aim of this study was to determine the effects of the system on skin microcirculatory physiology in the lower limbs in patients with sub-critical ischæmia (Fontaine Classification III a/b) and in age and gender-matched non-ischaemic Volunteers.
Methods: Three groups were studied; 17 patients (mean age 71 y) admitted with critical ischaemia of the leg, 17 age and sex matched controls (mean age 69 y) and 17 normal healthy subjects (mean age 23 yrs). The NO/NO_x generation system was applied to the skin for 60 minutes and measurements taken prior to and during application. Microcirculatory responses were assessed non-invasively by simultaneous measurements using Laser Doppler fluxmetry (LDF) and a transcutaneous gas probe (PO_2/PCO_2).
Results: The transmembrane NO/NO_x system was effective in enhancing microcirculatory blood flow and local oxygen availability in all three groups. LDF showed significant increases in both subject groups ($p < 0·003$). Enhancement of microcirculatory velocity was associated with elevation of tissue oxygen levels. In the ischæmic group the increases in PO_2 measurements were significant ($p = 0·01$) and clinically relevant. In contrast, transcutaneous PCO_2 measurements remained unchanged. No reported adverse reactions were noted during the study and the system was well tolerated in all subjects.
Conclusion: This study further elucidates potential applications of the NO/NO_x-generation and delivery system. This novel and evolving system may potentially be beneficial in the management of critical limb ischæmia. These findings, linked with the well-defined anti-microbial activity of NO/NO_x indicate that this system may be advantageous for surgical prophylaxis and possibly wound care management.

Vascular/ischaemia-reperfusion 0947

White blood cell count & cardiac troponins: risk stratification tools in chronic critical limb ischaemia

J. Sarveswaran, S. Asthana, A. Ikponwosa, P. Charalabidis, J. I. Spark
Leeds Vascular Institute, The General Infirmary at Leeds,, Leeds

Background: An elevated White Blood Cell (WBC) count and cardiac troponin has been shown to be predictive of death in coronary artery disease patients. Cardiovascular mortality in chronic critical limb ischaemia (CCLI) is high and early risk stratification in these patients may aid clinical management and therefore improve outcomes. The aim of this study was to investigate if an alteration in the WBC count (and/or its differential) and cardiac troponin I (cTn) play a role in predicting survival in patients with CCLI.
Methods: Patients admitted to a single vascular unit with CCLI were identified prospectively from January 2004. Patient demographics, clinical history, co-morbidity and risk factors for peripheral vascular disease were documented. The admission cTn level, WBC count and differential was noted. Overall patient mortality was the primary outcome variable.
Results: 150 patients have been identified of whom 81 were men. The median age was 72 years (IQR 65·7–81). The median follow up was 8·7 months (IQR 3·1–16). During the follow up period there were 63 deaths (43·4%). Univariate analysis demonstrated that the neutrophil ($p = 0·03$), eosinophil ($p = 0·003$) counts, Neutrophil/Lymphocyte (N/L) ratio ($p = 0·006$) and cTn ($p < 0·0001$) to be predictors of mortality. On multivariate analysis a N/L ratio $> 5·25$ (Hazards Ratio-2·27, CI 1·2–4·2) and an elevated cTn (Hazards Ratio-3·6, CI 1·6–5·6) were found to be independent predictors of mortality.
Conclusion: This study highlights that cTn and the WBC count could provide important prognostic information in patients with CCLI. With regards to the WBC count, a N/L ratio $> 5·25$ was shown to be a useful predictor of survival. These simple, cheap tests may therefore aid risk stratification of these high-risk patients.

Vascular/ischaemia-reperfusion 0951

Endovenous treatment of Varicose veins is feasible in most cases

T. Richards, A. Beech, R. Simpson, N. Altaf, G. Kuhan, S. Goede, S. Macsweeney, B. Braithwaite
Queens Medical Centre, Nottingham

Background: Traditional management of primary Great Saphenous Vein (GSV) varicosities and sapheno-femoral incompetence involves sapheno-femoral ligation, stripping of the GSV and avulsions. Endovenous management of GSV varicosities includes foam sclerotherapy (FS), radio-frequency (RF) and endovascular laser ablation (EVLA). The aim of this study was to assess the suitability of these methods for patients presenting with varicose veins.
Methods: A consecutive series of patients, with symptomatic varicose veins, were studied. Using pre-defined criteria, patients' suitability for the 4 treatment methods was assessed by a senior vascular technologist using a GE Logic 9 Duplex Scanner. A cost analysis was done to determine the cost of the procedures.
Results: Some 577 legs of 403 patients with varicose veins were analysed. The mean age of the patients was 55·4 years (+/− 15·4) and 62% were female. Some 377 legs (65%) had GSV incompetence that was deemed suitable for endovenous treatment. Of these 310 legs (82%) were suitable for treatment with FS, 250 (66%) with RF and 256 (68%) with EVLA. The HRG tariff price paid by our local PCT is £997. Traditional surgery under general anaesthesia as day-case procedure cost £933. FS cost £315. EVLA cost £1250 and RF £1600.
Conclusion: Patients with primary GSV varicosities are often suitable for endovenous therapy. These options should be available and in accordance with GMC guidelines, be part of informed consent for treatment. In this series, if those patients who were suitable were treated with FS, potentially our unit could increase its income by nearly £200,000.

Vascular/ischaemia-reperfusion 1025

Preserved renal function after endovascular aneurysm repair with uncovered supra-renal fixation (SR-EVR) confirmed by a more sensitive index than creatinine methods

P. Davey, R. Peaston, J. Rose, R. Jackson, M. G. Wyatt
Freeman Hospital, Newcastle-Upon-Tyne

Background: Nearly all reports on the renal sequelae of SR-EVR have relied on creatinine methods for biochemical assessment. Serum cystatin C (CC) is a more sensitive marker of early renal injury, that, unlike creatinine is essentially unaffected by non-renal influences. The aim of this study was to assess the renal effect of SR-EVR using this superior renal index.
Methods: This was a prospective trial of all SR-EVR recruited over a 12-month 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) pre-operatively 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 this 12-month period, 65 patients (M : F; 52 : 13, median age 74 years) were enrolled into the study. Fifty-two patients required abdominal aortic aneurysm (AAA) repair (24 SR-EVR and 28 OR) whereas the remaining 13 patients underwent major colorectal resection. Pre-operative renal function and risk factors were comparable 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.
Conclusion: Using this more sensitive marker, there was no detectable evidence of renal dysfunction at up to one-year. Uncovered bare metal struts across renal artery ostia appear to be associated with preserved kidney function following SR-EVR.

Vascular/ischaemia-reperfusion 1080

The impact of routine cell salvage on reducing homologous blood transfusion (HBT) in elective open abdominal aortic aneurysm surgery (EAS)

P. J. Herring, M. Cross, A. R. Bodenham, S. J. Howell, M. J. Gough
The General Infirmary at Leeds, Leeds

Background: Growing evidence suggests that HBT increases post-operative morbidity and a recent study demonstrates a direct relationship between transfusion volume and mortality, renal failure, prolonged ventilatory support, serious infection, cardiac complications, and neurologic events following cardiac surgery. The aim of this study was to assess the impact of routine cell-salvage on HBT in EAS.
Methods: Using a prospective surgical database 139 EAS patients undergoing surgery from 2001–2004 (2001: $n = 32$, 2002: $n = 38$, 2003: $n - 30$, 2004: $n = 39$) were studied. Year groups were well matched for age, sex, cardiac history, length of ITU/HDU stay, supra-renal clamping and the use of bifurcated grafts.
Results: Intraoperative cell salvage was used in 19% (2001), 8% (2002), 13% (2003) and 64% (2004) of patients and 75%, 66%, 43%, and 31% of patients received an intraoperative HBT. Data for any HBT (1 week preoperatively to 2 weeks postoperatively) showed a significant reduction (91%, 84%, 73%, 38%, $p < 0·001$) over time and this was mirrored by a decline in median (± iqr) HBT transfusion (units): 4 (2–10·5); 4 (2–6); 2 (0–4); 0 (0–3), $p < 0·0001$, with 24/39 patients during 2004 receiving no HBT. Nevertheless median pre-discharge haemoglobin was similar for each group: 10·9, 9·9, 10·3 and 10·3 g dl^{-1}.
Conclusion: Whilst early reductions in HBT (2002) may reflect increasing awareness of transfusion risks, routine cell salvage during 2003–4 was responsible for a significant reduction in transfusion requirements. This reduced the median patient cost of HBT during open elective aneurysm repair from £939 to £0, clearly outweighing the cost of cell saver disposables. Although further analysis is required to determine the clinical benefits of avoiding HBT during EAS its routine use seems logical.

Vascular/ischaemia-reperfusion 1085

The fate of the great saphenous vein (GSV) following endovenous laser ablation: does re-canalisation mean recurrence?

N. S. Theivacumar, D. Dellagrammaticas, R. J. Darwood, A. I. D. Mavor, M. J. Gough
The General Infirmary at Leeds, Leeds

Background: Critics of EVLA suggest that it induces thrombotic GSV occlusion with a high risk of re-canalisation resulting in loss of the therapeutic benefit, rather than permanent vein damage. This study has investigated these issues.
Methods: Two groups were studied. Group A: 84 GSVs underwent duplex ultrasound (DUS) at 6, 12 and 52 weeks post-EVLA. Flow, vein diameter, compressibility and echogenicity were recorded. Group B comprised 27 GSVs that were patent 12 weeks post-EVLA (identified from database). They were rescanned at 52 weeks. Aberdeen Varicose Vein Severity Scores (AVVSS) were compared with pre-EVLA scores.
Results: Group A: complete ablation was achieved in 81/84 (96%) limbs Mean GSV diameters were: pre-EVLA: 7·7 ± 2·0 mm; 6 weeks 5·1 ± 1·3 mm; 12 weeks: 3·2 ± 1·2 mm ($p < 0·01$). Echogenicity at 6, 12, 52 weeks was: hypo-echogenic (patent/low density thrombus): 74%. 14·2%, 3·6%; iso-echogenic (occluded): 22·6%, 71·4%, 6%; hyper-echogenic (thrombus/fibrosis): 3·6%, 10·7%, 4·7%. At 52 weeks 85·4% were non-visible on DUS. 3/84 hypo-echogenic veins had normal compressibility following re-canalisation. Group B: 3/27 with reflux > 1 sec had repeat EVLA. In 24/27 DUS (52 weeks) showed no reflux in 16/24 and AVVSS had improved from 13·4 (8·2–19·4) to 2·5 (0·7–3·6), $p < 0·01$. 8/24 had trickle reflux and improved AVVSS: 14·8 (6·3–17·5) to 4·2 (2·2–8·1), $p < 0·01$. All were of small diameter (3·0 ± 0·7 mm v 7·2 ± 2·4 mm pre-EVLA, $p < 0·05$).
Conclusion: EVLA results in progressive GSV shrinkage and transition from a non-compressible thrombosed vein to a fibrotic or non-visible vein by 1 year, confirming permanent GSV obliteration in most patients. Further, when re-canalisation occurred (3·6%) the GSV remained small with no/minimal reflux and persisting clinical benefit in most patients.

Vascular/ischaemia-reperfusion 1101

Durability of Botulinum Toxin treatment for axillary hyperhidrosis

C. Moffat, W. Hayes, K. Cooper, I. Nyamekye
Worcestershire Royal Hospital, Worcester

Background: Botulinum toxin injection effectively treats axillary hyperhidrosis and durability, variably quoted to be 4–13 months, is usually based on self re-referral. However self referral data may be unreliable for a variety of reasons and may under- or over-estimate true duration. Our aim was to determine duration of therapeutic effect by active follow up of patients after axillary botulinum toxin injection for severe hyperhidrosis.
Methods: Patients presenting with severe primary axillary hyperhidrosis as their main symptom were followed for up to 24 months after bilateral intradermal injections of Botulinum Toxin A (Dysport™ 120 units/axilla). A 10 point Likert Scale (1 = worst imaginable symptoms, 10 = absolute resolution) was used. Quality of life was assessed by functional and social domain questions. Patients were interrogated at one day and 3, 6, 12 and 24 months after treatment, and were offered re-treatment when their symptoms returned to the pre-operative state.
Results: We have treated 40 patients with a mean (range) age of 27·8 (15–49) years of whom 31 (78%) were women. Their median (interquartile range) pre-treatment score of 3 (2·75–3) improved to 10 (10–10) on day one. Scores at 3 ($n = 38$), 6 ($n = 35$) and 12 ($n = 25$) months were 10 (10–10), 8 (8–10), and 7 (5–8) respectively. The 24 month score was 3·5 (3–5·25) for 16 patients, of whom 4 still have a score of >= 6 and have not been retreated.
12 patients have been re-treated with a pre-treatment score of 3 (3–4) and post treatment score of 10 (10–10). Their scores at 3 and 6 months are 10 (10–10) and 8 (8–10) respectively.
Conclusion: Botulinum toxin treatment for axillary hyperhidrosis is durable and the majority of patients remain relatively symptom free for 12 months. Patients experience a gradual return of symptoms between 6 and 24 months, however a minority do not require re-treatment even at this time.

Vascular/ischaemia-reperfusion 1114

The rise and fall of MRSA colonisation and infection in Vascular Surgery

N. A. Stephens, R. Mofidi, J. A. Murie, R. T. A. Chalmers
Royal Infirmary of Edinburgh, Edinburgh

Background: MRSA infections have gained increasing notoriety in recent years due to media exposure and public concern. This study aimed to determine if MRSA colonisation was increasing and whether there was a parallel rise in nosocomial MRSA infections in vascular surgical patients.
Methods: A study of all vascular admissions to our unit during 2000 and 2004 was carried out. These years lay either side of the relocation of the hospital to a site with smaller wards and more single rooms. Prospectively collected admission records and microbiology databases were analysed along with a retrospective case note review. Patients admitted for < 48 hours were excluded. MRSA colonisation was defined as a positive swab within 48 hours of admission. MRSA infection was defined as documented cellulitis/infection with a positive swab. Statistical significance was determined using Fishers exact test.
Results: 1018 and 963 patients were admitted in 2000 and 2004 respectively. 100(9·8%) had MRSA positive swabs in 2000 *versus* 97(10·1%) in 2004. Both groups were matched well, other than patients in 2000 having a longer hospital stay – median 21 vs 16·5 days. There was a significant rise in MRSA colonisation from 40(37%) patients in 2000 to 67(63·2%) in 2004 ($p = 0·0002$). In 2000, 16(14·8%) patients were infected on admission; 32(29·6%) developed inpatient infections, 29(90·6%) of whom acquired MRSA whilst in hospital. In 2004, 12(11·3%) patients were admitted with infection, 17(16%) developed inpatient infections of whom only 10(58·8%) acquired MRSA in hospital. The decrease in nosocomial MRSA infections from 2000 to 2004 was found to be statistically significant ($p = 0·0225$). Only one case (0·94%) of MRSA sepsis occurred in 2004, compared with 3 cases in 2000 (2·78%).
Conclusion: This study has shown that MRSA colonisation has substantially risen. However, there has been a decrease in MRSA infections and hospital acquired MRSA, due in part to adherence to strict infection control procedures and an improved ward layout.

Vascular/ischaemia-reperfusion 1174

Cellular telomere content is reduced locally and systemically in abdominal aortic aneurysms

W. R. W. Wilson[1], H. P. Mistry[2], K. E. Hibbert[2], R. A. Hastings[2], B. Williams[2], M. M. Thompson[3]
[1]University Hospital, Nottingham, [2]University of Leicester, Leicester, [3]St George's Hospital, London, United States

Background: Accumulation of DNA damage causes decreased telomere content. Critically short telomere length induces inappropriate smooth muscle cell apoptosis. Despite a higher incidence of abdominal aortic aneurysms (AAA) in the elderly, and apoptosis being a feature of AAA, there is little knowledge of telomere content in AAA. This study addressed the relationship between AAA and telomeric content both locally and systemically.
Methods: Infra-renal aortic biopsies were obtained from the normal aorta (n-A) of organ donors ($n = 18$) and electively repaired AAA ($n = 18$); mean age n-A = 64 ± 4·7, AAA = 65 ± 3·4, $p = 0·201$. Matched blood samples were taken from 12 normal and 8 AAA. Telomere content of biopsy and blood samples was quantified using Q-PCR and expressed relative to the gene acidic ribosomal phosphoprotein.
Results: Tissue and blood telomere content was significantly lower in AAA compared to n-A (tissue AAA = 1·4 ± 0·4, n-A = 2·3 ± 0·6, $p < 0·001$: blood AAA = 0·8 ± 0·2, n-A = 1·3 ± 0·4, $p = 0·007$). Correlation of blood telomere length with age was negative in n-A ($p = 0·086$, $r = -0·5$) but non-significant in AAA ($p = 0·953$, $r = 0·02$). Correlating tissue telomere length with age was

non-significant in *n*-A ($p = 0{\cdot}706$, $r = 0{\cdot}067$) but unexpectedly positive in AAA ($p < 0{\cdot}001$, $r = 0{\cdot}608$). The correlation for telomere content between paired tissue and blood samples was high ($p < 0{\cdot}001$, $r = 0{\cdot}7$).

Conclusion: The reduction in telomere content observed in tissue and blood of AAA patients compared with age-matched normal controls and the correlation between tissue and blood levels supports a systemic process. Lower telomere content in younger AAA suggests a more aggressive process. This data presents a pathway for aneurysm pathogenesis related to telomere attrition rather than gene mutations.

Vascular/ischaemia-reperfusion 1181

Endograft over-sizing causes an acute increase in ruptured aneurysm neck diameter

S. Goode, W. R. W. Wilson, A. Conybeare, B. D. Braithwaite
University Hospital, Nottingham

Background: Endovascular repair of ruptured abdominal aortic aneurysms (AAA) requires an expensive stock of endografts within participating vascular units. Oversizing of the aneurysm neck with larger endografts may allow smaller stocks to be maintained. This study examined the effect of oversizing in the rupture setting.

Methods: Paired pre and post-operative computed tomograms from 14 ruptured AAA patients undergoing aorto-uni-iliac endovascular repair were compared (11/14 male, mean age 77 yrs +/−9). Neck diameter (ND), neck length (NL), maximal aneurysm diameter (AD), aneurysm length (AL) and common iliac diameter (ID) were measured by two investigators. The median graft size was 32 mm (range 24–34) and the percentage endograft oversizing for each AAA was calculated.

Results: The median duration from ruptured AAA repair to first post-operative scan was 6 days (range 1–56). Neck diameter increased significantly following AAA repair (pre 23·9 mm+/− 2·8, post 25 mm+/− 2·4, $p = 0{\cdot}006$). Other parameters did not change significantly – NL 28 mm *versus* 26·6 mm, $p = 0{\cdot}054$, AD 78 mm *versus* 79 mm, $p = 0{\cdot}406$, AL 119 mm *versus* 121 mm, $p = 0{\cdot}421$, ID 16 mm *versus* 16·5 mm, $p = 0{\cdot}111$. Oversizing $\leq 25\%$ resulted in no significant change in ND. Oversizing $> 25\%$ caused a significant increase in ND (pre 23 mm+/−2·1, post 24·6 mm+/−2·6, $p = 0{\cdot}032$).

Conclusion: The repair of ruptured AAA's with oversizing $> 25\%$ may cause an acute significant increase in neck diameter. The long-term clinical and financial implications of stocking large endografts require analysis.

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