

MSCT assessment of blunt abdominal trauma in paediatric and adolescent patients: Our experience in Hospital Tengku Ampuan Afzan (HTAA), Kuantan, Pahang

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Introduction

CT scan is the diagnostic technique of choice for the evaluation of abdominal injury due to blunt trauma in hemodynamically stable children¹. CT scan has high sensitivity, specificity and accuracy in the detection of the presence and extent of abdominal injuries^{2,3}.

Although operative intervention in these cases were based on clinical criteria rather than imaging findings⁴, CT information frequently increases diagnostic confidence of the surgeons and influence the success of nonoperative management in most children with solid viscus injury⁵.

Aim

To evaluate the findings of MSCT abdomen performed to rule out blunt intra abdominal injury in paediatric and adolescents in our centre.

Methods

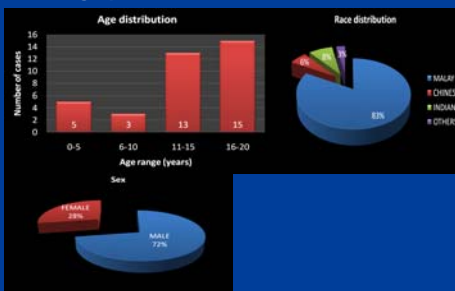
- This is a retrospective study.
- All cases of CT scan performed to rule out traumatic intra abdominal injury in patients 18 years old and below from January 2008 until June 2009 were included.
- CT scan images were retrieved and reviewed.
- The study is positive in the presence of solid organ injury, bony pelvis injury and hollow organ injury.
- Organ injuries were graded according to AAST (American Association of Surgery and Trauma) classification.
- Case notes were traced and the management of patients were documented.
- For all patients who had surgical intervention, correlation of CT scan with intra operative findings were done.

Results

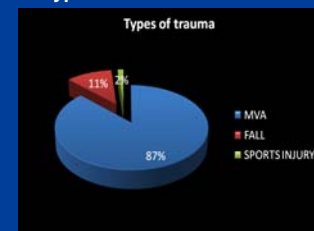
A total of 36 patients were included in this study. Out of these 78% (n=28) showed positive and 22% (n=8) showed negative CT scan findings. However, 2 out of 8 patients who had negative CT scan had incidental findings of hydronephrosis (n=1) and huge ovarian cyst (n=1).

Cases	CT scan findings	Intraoperative findings
Case 1	Grade II spleen injury	Laceration of spleen 4 cm with intact hilar (Grade III) Contusion tail of pancreas
Case 2	Grade IV right renal injury	Liver laceration with clots, no active hemorrhage Non expanding right retroperitoneal hemorrhage Minimal contusion body of pancreas
Case 3	Grade IV spleen injury	Shattered spleen (Grade V) Left retroperitoneal hematoma
Case 4	Grade III spleen injury	Splenic laceration at superior pole (Grade III) Contusion at lesser curvature of stomach
Case 5	Grade V spleen injury	Splenic laceration extending to the hilum, almost fractured Contusion at tail of pancreas
Case 6	Grade III spleen injury	Splenic laceration involving the hilum (Grade IV) Contusion of pancreas and small bowel
Case 7	Grade III spleen injury	Splenic laceration at the upper pole about 6 cm (Grade III) Contusion at tail of pancreas

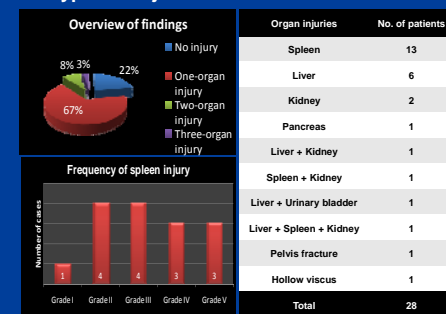
I. Demographic data



II. Types of trauma

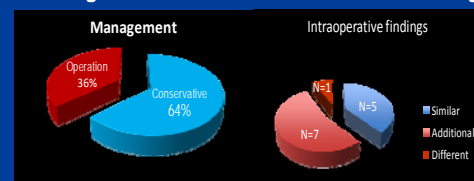


III. Types of injuries seen on CT scan



Organ injuries	No. of patients
Spleen	13
Liver	6
Kidney	2
Pancreas	1
Liver + Kidney	1
Spleen + Kidney	1
Liver + Urinary bladder	1
Liver + Spleen + Kidney	1
Pelvis fracture	1
Hollow viscus	1
Total	28

IV. Management & Correlation with Clinical Findings



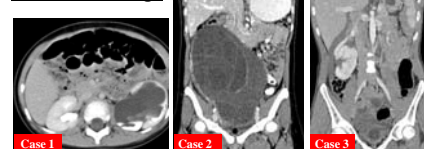
Grade of injury	Management of spleen injury		Management of liver injury		
	Conservative	Operation	Grade of injury	Conservative	Operation
Grade I	1	0	Grade I	3	0
Grade II	1	3	Grade II	5	0
Grade III	1	3	Grade IV	1	0
Grade IV	0	3	Total	9	0
Grade V	1	2			
Total	4	11			

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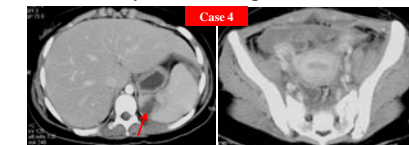
Example of Cases

Incidental findings



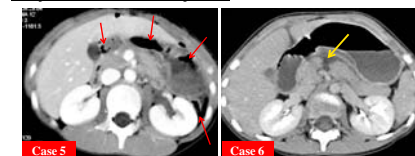
- Case 1:** 3-year old girl – fall. Had hematuria. No organ injury. Gross congenital hydronephrosis of left kidney.
- Case 2:** 18 year old girl – fall. Had abdominal pain. No organ injury. A large cystic ovarian mass was detected.
- Case 3:** 18-year old boy – MVA. Had Grade II spleen injury. Abnormal orientation of right kidney with prominent renal pelvis.

Different intraoperative findings



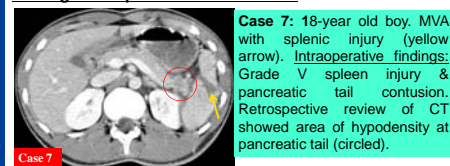
- Case 4:** 13-year old girl – MVA. Had Grade II spleen injury & minimal hemoperitoneum in the pelvic cavity. **Operative findings:**- bleeding from a branch of left ovarian artery, laceration of left broad ligament, lower abdominal wall contusion and minimal hemoperitoneum. Other organs (including spleen) were normal.

Bicycle handle-bar injuries



- Case 5:** 11-year old boy. CT scan showed extraluminal air (red arrows). Intraoperatively, a 2 cm perforation at body of stomach was detected.
- Case 6:** 9-year old girl with transected pancreas (yellow arrow).

Undiagnosed pancreatic contusion



- Case 7:** 18-year old boy. MVA with splenic injury (yellow arrow). **Intraoperative findings:** Grade V spleen injury & pancreatic tail contusion. Retrospective review of CT showed area of hypodensity at pancreatic tail (circled).

Conclusion

- Splenic injury is the most common intra abdominal blunt injury seen in our series.
- Pancreatic contusions were the most common injury undiagnosed based on our CT scan findings. However, retrospective review of the CT images, showed some abnormality were actually present in all these cases.
- No significant correlation is seen between the severity of organ injury and the decision for surgical intervention.

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