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Research Article

A study of blunt injury abdomen in patients attending the emergency department in a tertiary hospital

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ABSTRACT

Background: Blunt injury to the abdomen is encountered more often these days due to rapid industrialization and the presence of more number of vehicles, thus leading to more number of accidents. Blunt injury to the abdomen can also occur as a result of fall from height, assault with blunt objects, sports injuries, and bomb blasts. Blunt injury abdomen is seen in increasing frequency in emergency rooms and therefore, the early diagnosis and treatment of the patient is very important.
Methods: The study was carried out from July 2012 to June 2015. A total of 60 patients were studied. A thorough history and clinical examination of the patients were carried out. Then, various investigations such as Complete Blood Count (CBC), X-Rays, ultrasound of the abdomen and CT scan of the abdomen were done, in order to arrive at the diagnosis.
Results: In our study, male patients were commonly affected (75%). The younger population between the age group of 21 - 30 years were predominantly affected (45%). The common mode of injury was road traffic accidents (53.3%). The organ that was found to be most commonly injured in our study was the spleen (46.6%).
Conclusions: This research article shows that, blunt injury abdomen is still a major cause of morbidity and mortality in the general population. Patients that are received in the emergency department of a trauma care center should be given immediate attention and a quick and thorough evaluation of the patient must be done.

Keywords: Blunt injury abdomen, Road traffic accidents, Male patients, Younger population, Spleen

INTRODUCTION

In the civilian population, blunt injury to the abdomen is commonly caused due to road traffic accidents. Patients brought to the emergency department require immediate attention and thorough evaluation. Blunt injury to the abdomen can also occur as a result of fall from height, assault with blunt objects, sports injuries, and bomb blasts.[1] Focused assessment with sonography for trauma (FAST) has emerged as a useful tool in the evaluation of blunt injury abdomen.[2-4] The majority of blunt injury abdomen cases are related to motor vehicle collision or automobile versus pedestrian accidents.[5] The spleen and liver are the most commonly injured solid organs in blunt injury abdomen. However, injuries to the pancreas, bowel and mesentery, bladder, and diaphragm, as well as retroperitoneal structures (kidneys, abdominal aorta), are less common but must also be considered. Injuries to the kidney and urinary bladder may be associated with pelvic fractures and retroperitoneal haemorrhage.[6] In a patient who has been in a road traffic accident, injuries to the head, chest, and fractures of any bones must also be ruled out.

METHODS

This study was based on 60 patients. A thorough history was obtained either directly from the patient or from the patient's relatives. Then, clinical examination and the relevant diagnostic investigations performed.

After initial resuscitation and hemodynamic stability, all patients were subjected to careful examination, and depending on the clinical findings; a decision was taken for further investigations such as, X-ray abdomen, FAST and CECT abdomen.

The decision for operative or non-operative management depended on the outcome of the clinical examination, hemodynamic stability of the patient and the results of the investigations done.

Patients selected for conservative management were placed on strict bed rest. They were also subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of the abdomen and other systems. Appropriate investigations, such as the haemoglobin value, and ultrasound of the abdomen were repeated as and when necessary. Sometimes, in cases of liver and splenic injury, if the patient is haemodynamically stable, then the patient can be treated conservatively.[7-9] Non operative management is also found to be successful in certain cases of renal trauma.[10] However, these patients should be monitored closely.

Indications for laparotomy in a patient with blunt injury abdomen include the following:

- Signs of peritonitis
- Uncontrolled shock or hemorrhage
- Clinical deterioration during observation
- Findings such as haemoperitoneum on FAST or DPL.

RESULTS

Table 1: Sex wise incidence of blunt injury abdomen.

Gender	No. of patients	Percentage
Male	45	75 %
Female	15	25 %

Total no. of patients = 60

From the above Table 1, it is seen in our study that, male patients more commonly encountered blunt injury to the abdomen.

From the Table 2, it was found in our study that, young people between the age group of 21 years - 30 years (45%) more commonly encountered blunt injury to the abdomen. This was probably due to the increased speed at which the people of this age group would ride their two wheelers and drive their cars. Their awareness of the several safety measures was also reduced.

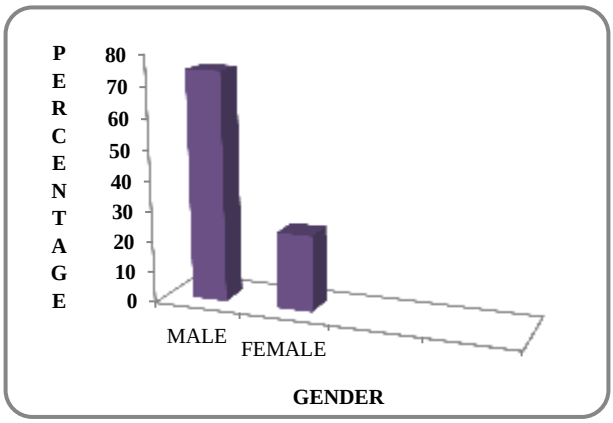

Figure 1: Sex wise incidence of blunt injury abdomen.

Table 2: Age wise incidence of blunt injury abdomen.

Age group (years)	No. of patients	Percentage
11-20	2	3.3 %
21-30	27	45 %
31-40	18	30 %
41-50	6	10 %
51-60	5	8.3 %
61-70	1	1.6 %
71-80	1	1.6 %

Total no. of patients = 60

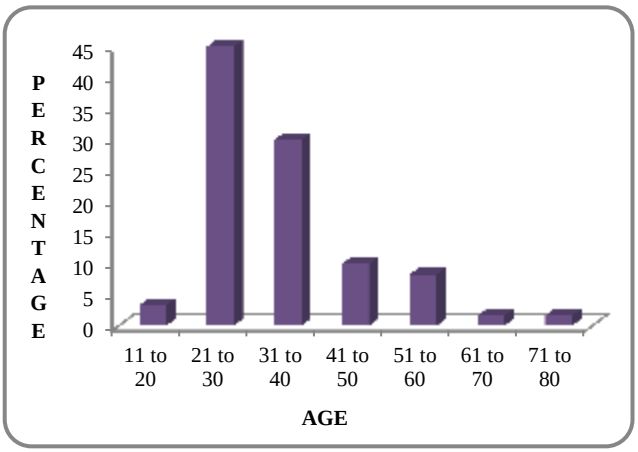

Figure 2: Age wise incidence of blunt injury abdomen.

Table 3: Mode of injury in patients who sustained blunt injury abdomen.

Mode of injury	No. of patients	Percentage
Road Traffic accident	32	53.3 %
Fall from height	10	16.6 %
Assault/injury with blunt object	18	30 %

Total no. of patients = 60

From the above Table 3, it was found in our study that, Road Traffic Accidents (53.3%) were the common cause of blunt injury abdomen. This was due to the increase in the number of vehicles found in the general population today.

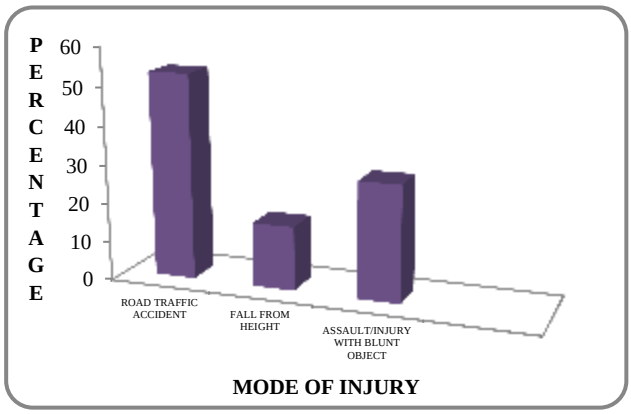

Figure 3: Mode of injury in patients who sustained blunt injury abdomen.

Table 4: Type of Treatment given to patients who sustained blunt injury abdomen.

Treatment	No. of patients	Percentage
Conservative	17	28.3 %
Operative	43	71.6 %

Total no. of patients = 60

The above Table 4 shows that we were able to treat 17 patients (28.3%) conservatively. However, 43 patients (71.6%) required a thorough laparotomy.

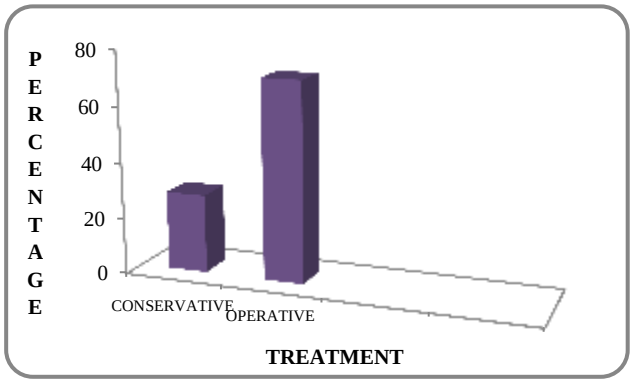

Figure 4: Type of Treatment given to patients who sustained blunt injury abdomen.

From the Table 5, it was found in our study that the spleen (46.6%) was the most commonly injured organ in blunt injury abdomen. This was followed by injuries to the liver. The small and large bowel are commonly affected in penetrating trauma and are affected less in blunt injury abdomen.[11,12] The presence of fluid without solid organ injury is a significant marker of mesenteric or bowel injury.[13] Studies done by Davis et al and Cox et al also show the spleen as the most common organ injured in blunt injury abdomen. However, in the study done by Davis et al the percentage of splenic injury was 25%, whereas in the study done by Cox et al the percentage of splenic injury was 46%.

Table 5: Organs involved in patients who sustained blunt injury abdomen.

Organ	No. of patients	Percentage
Spleen	28	46.6 %
Liver	17	28.3 %
Kidney	5	8.3 %
Bowel injury	8	13.3 %
Pancreas	2	3.3 %

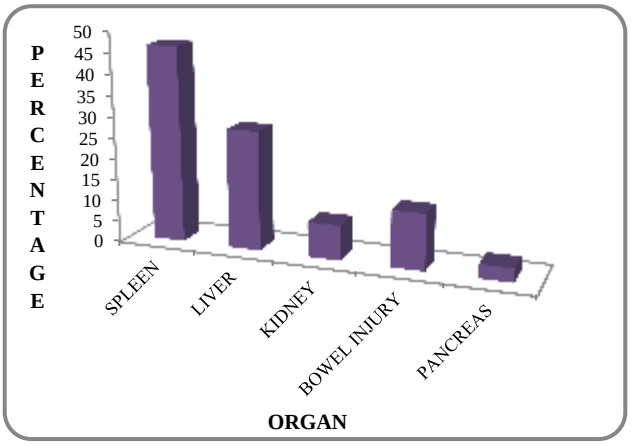

Figure 5: Organs involved in patients who sustained blunt injury abdomen.

Table 6: Specific operative procedures done in patients who sustained blunt injury abdomen.

Procedure done	No. of patients operated	Percentage
Splenectomy	23	53.4 %
Primary suturing of liver laceration	10	23.2 %
Nephrectomy	2	4.6 %
Resection-Anastomosis of bowel	5	11.6 %
Perforation closure of bowel	3	6.9 %

Total no. of patients operated = 43

From the above Table 6, it was found in our study, that splenectomy (53.4%) was most commonly done in patients who sustained blunt injury abdomen.

From the Table 7 it is seen in our study that, some of the patients with blunt injury abdomen could be treated conservatively. This was mainly due to the low grade of injury to the particular organ and the fact that the patient was haemodynamically stable.

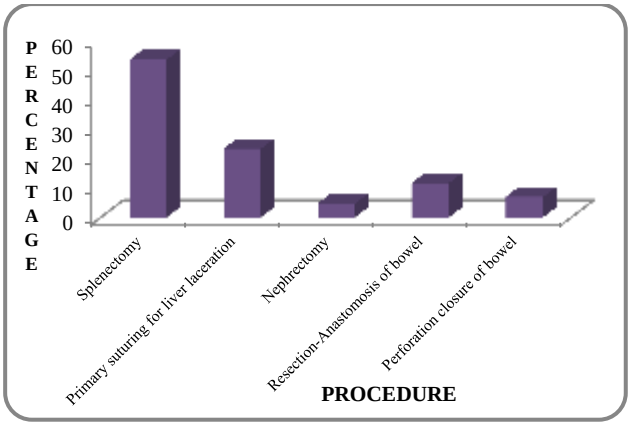

Figure 6: Specific operative procedures done in patients who sustained blunt injury abdomen.

Table 7: Patients for whom conservative management was given in blunt injury abdomen.

Organ injured	No. of patients treated conservatively	Percentage
Spleen	5	29.4 %
Liver	7	41.1 %
Kidney	3	17.6 %
Pancreas	2	11.7 %

Total no. of patients treated conservatively = 17

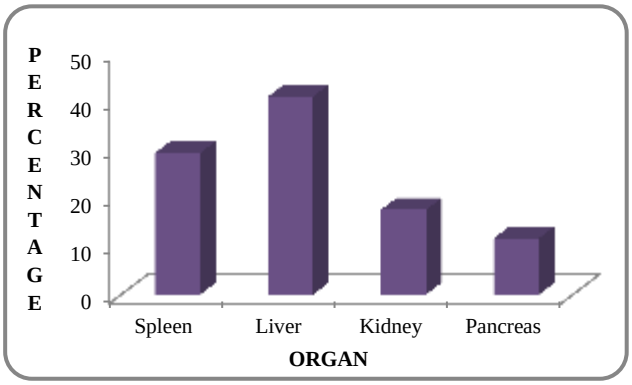

Figure 7: Patients for whom conservative management was given in blunt injury abdomen.

DISCUSSION

The diagnosis of blunt injury abdomen requires good clinical acumen and thorough evaluation of the patient. On examination of the patient, various clinical signs should be looked for. Some of the injury patterns that may predict the potential for intra-abdominal trauma are,

- Lap belt marks: May Correlate with small intestine injury.
- Steering wheel–shaped contusions.
- Ecchymosis involving the flanks: May indicate retroperitoneal hemorrhage, but it might be delayed for several hours to days.
- Abdominal distention.
- Auscultation of bowel sounds in the thorax: May indicate a diaphragmatic injury.
- Abdominal bruit: May indicate underlying vascular disease or traumatic arteriovenous fistula.
- Local or generalized tenderness, guarding, rigidity, or rebound tenderness might suggest peritoneal injury.
- Fullness and doughy consistency on palpation: May indicate intra-abdominal haemorrhage.
- Crepitation or instability of the lower thoracic cage might indicate the possibility of splenic or hepatic injuries.

Blunt force injuries to the abdomen can generally be explained by 3 mechanisms.

- The first mechanism is deceleration. Rapid deceleration causes differential movement among adjacent structures. As a result, shear forces are created and cause hollow, solid, visceral organs and vascular pedicles to tear, especially at relatively fixed points of attachment. Classic deceleration injuries include hepatic tear along the ligamentum teres and intimal injuries to the renal arteries. As bowel loops travel from their mesenteric attachments, thrombosis and mesenteric tears, with resultant splanchnic vessel injuries, can result.
- The second mechanism involves crushing. Intra-abdominal contents are crushed between the anterior abdominal wall and the vertebral column or posterior thoracic cage. This produces a crushing effect, to which solid viscera (e.g. spleen, liver, and kidneys) are especially vulnerable.
- The third mechanism is external compression, whether from direct blows or from external compression against a fixed object (e.g. lap belt, spinal column). External compressive forces result in a sudden and dramatic rise in intra-abdominal pressure and culminate in rupture of a hollow viscous organ (i.e. in accordance with the principles of Boyle's law).

Table 8: Organ injury found in our study compared with other studies.

Organ injured	Our study	Davis et al[2]	Cox et al[16]	Allen et al[17]	Hackam et al[18]
Spleen	46.6 %	25 %	46 %	-	-
Liver	28.3 %	16 %	33 %	24.3 %	-
Kidney	8.3 %	-	-	-	-
Bowel injury	13.3 %	-	-	-	34 %
Pancreas	3.3 %	-	-	-	-

The results obtained in our study have been compared with the results from other studies Table 8 and Table 9.

Table 9: Age group of patients in our study compared with another study.

Age group (years)	Our study	Davis et al [2]
11-20	3.3 %	19 %
21-30	45 %	24 %
31-40	30 %	15 %
41-50	10 %	13 %
51-60	8.3 %	6 %
61-70	1.6 %	3 %
71-80	1.6 %	-

CONCLUSION

From our study it is seen that, blunt injury abdomen mainly affected men and the younger population between the age group of 21yrs-30yrs were predominantly affected. When the patient is received in the emergency department immediate attention must be provided and a thorough evaluation must be done. The patient must be stabilized quickly and investigations must be done without much delay. FAST and CECT abdomen are very useful tools in diagnosing the severity and extent of blunt injury to the abdomen. Heyn et al suggested that in patients with multiple injuries, abdominal ultrasound and CT scan of the abdomen have complementary value.[14] Non operative management can be tried when the patient is haemodynamically stable. Injuries to the liver can sometimes be treated conservatively, due to the firm architecture of the liver.[15] However, careful monitoring is required in such cases. When laparotomy is decided, then a thorough examination of the abdominal organs must be done. In our study the spleen was found to be the most common organ injured in blunt injury abdomen. Thus, hospitals and trauma care centers must adopt a multi pronged approach to diagnose and promptly treat patients with blunt injury abdomen so that the prognosis can be better in these patients.

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Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Sabiston's Text book of surgery. 2012:19(1):455-9.
2. Davis JJ, Cohn I, Nance FC. Diagnosis and management of Blunt abdominal trauma. Ann Surg. 1976;183(6):672-8.
3. Schwab CW. Selection of non-operative management candidates. World J Surg. 2001;25:1389-92.
4. Scalea TM, Rodriguez A. Focused assessment with Sonography for Trauma (FAST): result from an international consensus conference. J Trauma. 1999;46:466-72.
5. Isenhour JL, Marx J. Advances in abdominal trauma. Emerg Med clin North Am. 2007;25:713.
6. Olinde HDH. Non penetrating wounds of the abdomen: a report of 47 cases with review of lite¬rature. South Med J. 1960;53:1270-2.
7. Marmorale C, Guercioni G, Siquini W. Non-operative management of blunt abdominal injuries. Chir Ital. 2007;59(1):1-15.
8. Peitzman A, Ferrada P, Puyana J. Nonoperative management of blunt abdominal trauma: have we gone too far? Surg Infect (Larchmt). 2009;10(5):427-33.
9. Swift C, Garner J. Non-operative management of liver trauma. J R Army Med Corps. 2012;158(2):85-95.
10. Santucci RA, Wessells H, Bartsch G, Descotes J, Heyns CF, McAninch JW et al. Evaluation and management of renal injuries: consensus statement of the renal trauma subcommittee. BJU Int. 2004;93:937-54.
11. Cerise EJ, Scully JH. Blunt trauma to the small intestine. The Journal of Trauma. 1970;10(1):46-50.
12. Root HD. Hollow visceral injuries in Advances in Trauma KI, Maull Ed. Year Book Medical Publishers, Chicago, Ill, USA. 1987;2.
13. Chen ZB, Zhang Y, Liang ZY, Zhang SY, Yu WQ, Gao Y. Incidence of unexplained intra-abdominal free fluid in patients with blunt abdominal trauma. Hepatobiliary Pancreat Dis Int. 2009;8(6):597-601.
14. Heyn J, Ladurner R, Ozimek A. Diagnosis and preoperative management of multiple injured patients with explorative laparotomy because of blunt abdominal trauma. Eur J Med Res. 2008;13:517-24.
15. Bouras A, Truant S, Pruvot F. Management of blunt hepatic trauma. J Visc Surg. 2010;147(6):e351-8.
16. Cox EF. Blunt abdominal trauma. A 5 year Analysis of 870 patients requiring Celiotomy. Ann Surg. 1984;199:467-74.
17. Allen RB, Curry GJ. Abdominal Trauma. Am J Surg. 1957;93:398-404.
18. Hackam DJ, Ali J, Jastaniah SS. Effects of other intra-abdominal injuries on the diagnosis, management, and outcome of small bowel trauma. The Journal of Trauma. 2000;49(4):606-10.

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