



Visceral Injuries In Blunt Abdominal Trauma (Original Research Article)

Authors

Dr Dipak Kr. Sarma¹, Dr Mostafa Md Mottaquin²

¹Associate Professor of Surgery, Gauhati Medical College and Hospital, P.O. Indrapur, Guwahati-32, Assam Pin-781032

²Post Graduate Trainee, Department of Surgery, Gauhati Medical College and Hospital P.O. Indrapur, Guwahati-32, Assam, Pin-781032

Corresponding Author

Dr Dipak Kumar Sarma

Associate Professor of Surgery, Gauhati Medical College and Hospital
P.O. Indrapur, Guwahati-32, Assam Pin-781032

Email: dipakkumarsarma@hotmail.com, Ph: +919864064974(m)

ABSTRACT

Introduction: Blunt abdominal trauma is a common indication of emergency exploratory laparotomy. There are different modes of injury in Blunt abdominal trauma and a variety of abdominal viscera are injured. There is insufficient literature on it in this part of the country.

Aim of study: To observe mode of injury and visceral injuries in patients with blunt abdominal trauma who underwent exploratory laparotomy.

Materials and Methods: All operated adult patients with blunt trauma of abdomen in a teaching hospital from 1st May 2015 to 30th April 2016 were included in the study. Children below 12 years of age were excluded from study. This is a retrospective observational study. The mode and nature of visceral injuries were noted. Related data from history sheets and operation records were collected. Data are analyzed by statistical methods.

Results: Total number of operated patients was 57. Among them only one was female. Modes of trauma were- RTA in 43(75.4%) patients, fall from height in 7(12.3%) patients, physical violence in 5(8.8%) patients and fall of heavy object on abdomen in 2(3.5%) patients. Twenty(36.84%) patients had splenic injury, 11(19.3%) patients had hepatic injury, 23(40.35%) patients had small bowel injury, 1(1.75%) patient had stomach injury, 1(1.75%) patient had duodenum injury, 5(6.67%) patients had mesenteric tear, 1(1.75%) patient had retroperitoneal haematoma, 1(1.75%) patient had inferior vena cava injury and 1(1.75%) patient had colon injury. Some patients had combined visceral injuries.

Conclusion: Road traffic accident is commonest mode of injury that needed exploratory laparotomy for blunt abdominal trauma. Most common visceral injury is small bowel injury followed by splenic and hepatic injury. Multiple visceral injuries are seen in some patients.

Keywords: Blunt abdominal trauma, mode, injury, visceral

Introduction

Abdominal injury is a very common injury seen in day to day life. It has been observed that in patients with polytrauma abdomen is the third most frequently involved body part.¹ It is next to head injury and injury to the extremities.² Blunt and penetrating abdominal trauma are mostly responsible for morbidity and mortality of the patients. Between these two modes blunt abdominal trauma is more common.^{3,4} Literature reports that up to ninety percent of abdominal injuries are due to blunt abdominal trauma.⁵ Studies show that there is a variation in mode of injury in blunt abdominal trauma from place to place. Different visceral injuries that are detected during the course of treatment also differ in terms of frequency of involvement. There is insufficient data in this regard in this region of the country. The aim of this study is to find out different modes of injury and types of visceral injuries in the patients with blunt abdominal trauma.

Materials and Methods

The patients with blunt abdominal trauma who were admitted and operated upon in the emergency unit of a teaching hospital from 1st May 2015 to 30th April 2016 were included in the study. Children below 12 years of age were excluded from study. This is a retrospective observational study. Data from history sheets and operation records were collected regarding age, sex, mode of trauma and detail of visceral injuries. Data were analyzed by statistical methods. Modes and pattern of injury were noted.

Results

Total number of operated patients was 57. There were 1 female and 56 male in the study. The peak incidence of blunt abdominal trauma was found in the third decade of life closely followed by second decade of life.

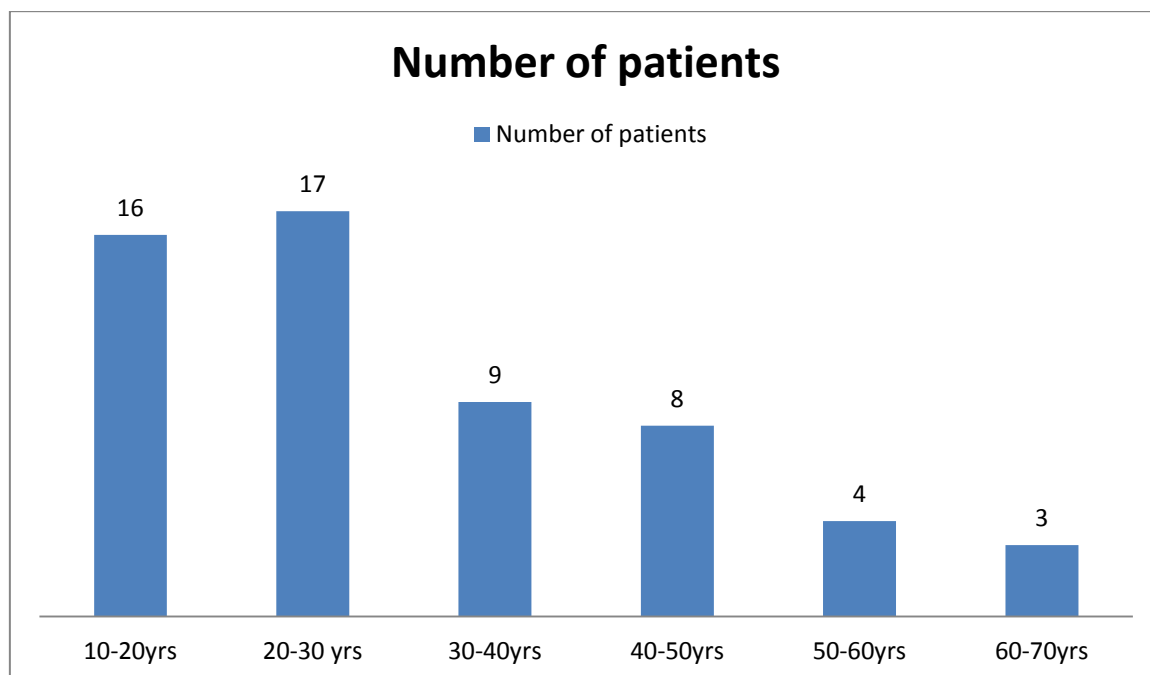


Chart 1 Age distribution

Modes of trauma in blunt abdominal trauma were- RTA in 43(75.4%) patients, fall from height in 7(12.3%) patients, physical violence in 5(8.8%) patients and fall of heavy object on abdomen in 2(3.5%) patients.

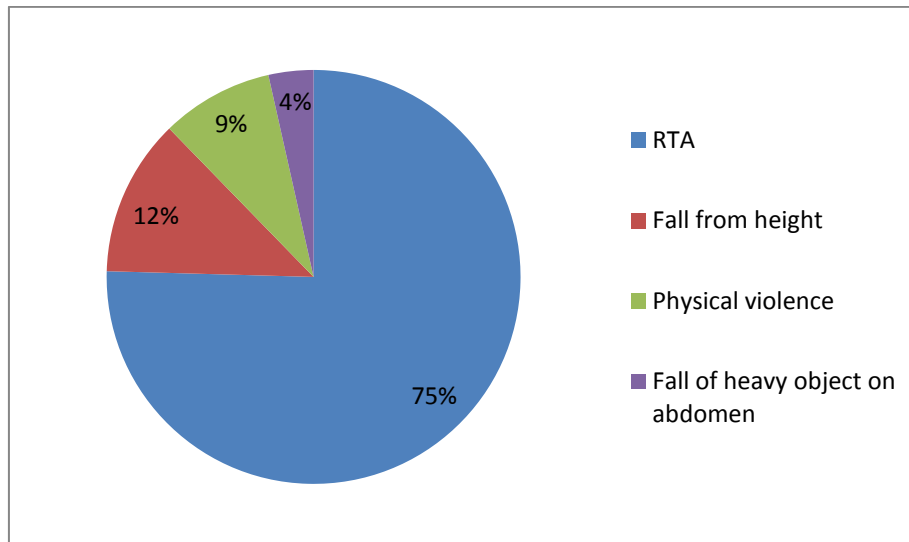


Chart 2 Modes of trauma

It has been observed that commonest injury detected in laparotomy was bowel injury(40.35%) followed by splenic injury(36.84%) . Incidence of liver injury was 19.3%. The detail of the visceral injuries are shown in table 1.

Table 1 Visceral organ injury due to blunt abdominal trauma

Injured organ	Number of Patients (%)	Type of injury	Comment
Spleen	21(36.84%)	From splenic laceration to completely shattered spleen	19 had isolated injury, 1 had with liver injury, 1 had with bowel injury
Liver	11(19.3%)	From subcapsular haematoma, capsular tear to parenchymal laceration	9 had isolated injury, 1 had with liver injury, 1 had with IVC injury
Bowel	23(40.35%)	12 had jejuna perforation, 10 had ileal perforation, 1 had both jejunal and ileal perforation	19 had isolated injury, 3 had with mesenteric tear, 1 had with duodenal injury
Stomach	1(1.75%)	Single perforation at greater curvature	
Duodenum	1(1.75%)		This patient had associated jejunal injury
Mesentery	5(6.67%)	2 had isolated injury, 3 had with bowel injury	Only reported when the injury needed repair, 2 had isolated injury, 3 had associated bowel injury
Retroperitoneal haematoma	1(1.75%)		Reported when intervention needed
Inferior vena cava	1(1.75%)		IVC injury, associated with liver injury
Colon	1(1.75%)		Sigmoid colon perforation with mesenteric tear and a gangrenous area of ileum

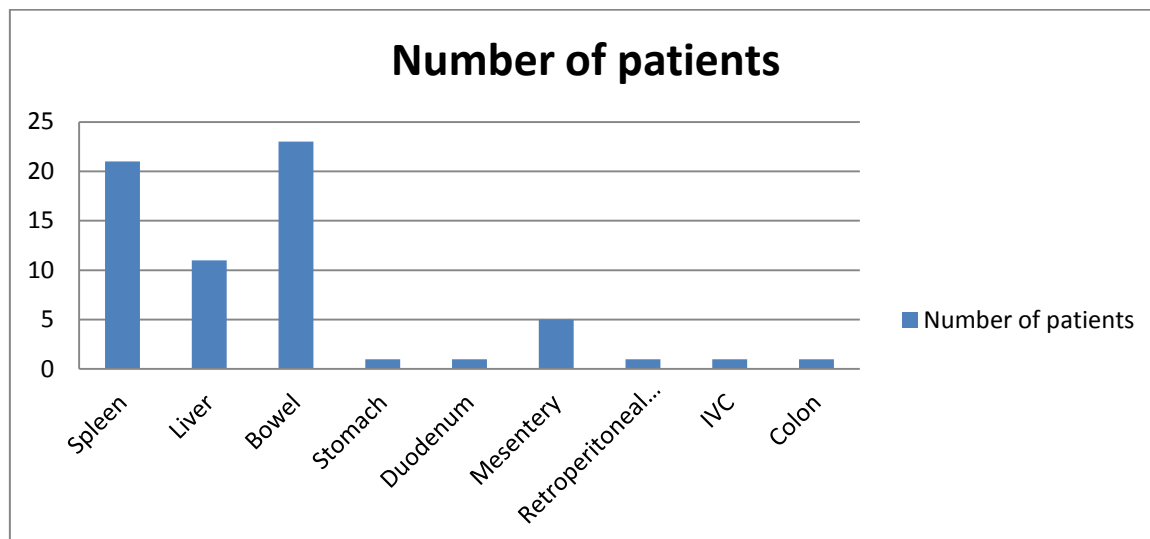


Chart 3. Visceral injury in blunt abdominal trauma

Discussion

It has been estimated that about 25% of all abdominal trauma needs exploration.^{6,7} Exploratory laparotomy findings gives an accurate estimation of the visceral injuries that are occurring after blunt trauma.

It has been observed that blunt trauma of abdomen usually affects the younger persons. It is more or less universally seen in all places of the world. Way back in 1975 Davis JJ et al observed the peak incidence of blunt abdominal injury in the age group of 21-30 yrs. Several studies of the recent times have found the peak age incidence of blunt abdominal trauma in the third decade of life.^{5, 8-10} In some studies the next affected age group was the 4th decade^{8,9}, while in others it was the 2nd decade.¹⁰

High predominance of male was observed in the study. There was only one female in the series. It might be because of more outdoor activity of the male for livelihood which made them more vulnerable to accident. Male was found to be affected more in blunt abdominal trauma in many places of the world where customarily male had to do more outdoor activities than female.^{8,11-14}

The most common cause of blunt abdominal trauma is road traffic accident. In our study 75% of the patient had blunt abdominal trauma due to road traffic accident. In the study of Davis JJ et al

road traffic accident was found to be responsible in 70% of the blunt abdominal injuries. In two other studies the incidence was found to be 60% and 58.3%.^{13,15,16} RTA was found to be the commonest mode of trauma in many other studies.^{4,8,17-21}

The next common cause of blunt abdominal trauma in our series was fall from height (12.3%). Some other studies have also found fall from height as a cause of blunt abdominal trauma next to road traffic accident^{4,20, 21} Smith J et al found it next to road traffic accident and interpersonal violence.⁴ Davis JJ et al found fall from height as a cause in 6% of all blunt abdominal traumas. The incidence is higher in recent times. Tuma *et al* showed that falling off from height at construction sites was common in Qatar.²¹ Similar observation was noted in the patients who reported from the urban areas in our series. High rise construction is a recent phenomenon seen in urban and semi urban areas of this region.

Physical violence is another cause of blunt abdominal trauma. Davis JJ et al found that 17% of their patients had history of blow over the abdomen.¹⁵ Mohammad A Gad et al found it as a cause next to road traffic accident.²⁰ Physical violence was found in 5(8.8%) patients of our series.

Fall of heavy object on abdomen was found in 2(3.5%) patients in our study. Suresh Arumugam S et al found that road traffic accidents were the most frequent mode of injury (61%) followed by fall from height (25%) and fall of heavy object over the abdomen(7%).⁵

The visceral injuries that were detected in blunt abdominal injury were more or less same in all studies. But, the frequency of involvement of the organs varied. In some studies solid organ injury was found to be commonest. But, in some other studies hollow viscus injuries were common. There were variations in frequency of involvement of different solid organs. Similarly variations existed in frequency of involvement of different parts of hollow viscus in different studies.

In many studies spleen was found to be the most common organ involved among the solid organs in blunt abdominal trauma.^{13,15,22-25} The incidence was found to be approximately 42% in two studies.^{13,22} In our study twenty one patients (36.84%) had splenic injury. Nineteen patients had isolated splenic injury, one patient had splenic injury with liver injury and another patient had associated bowel injury. Ponifasio thought that was because of tropical splenomegaly prevalent in some areas of Africa. The spleen became more susceptible to rupture even following minor trauma.²⁴ Tropical splenomegaly is also not uncommon in our country.

Some other studies have shown that the liver is the most commonly injured solid organ followed by spleen in blunt abdominal injury.^{4,26-28} In one study of blunt trauma abdomen due to road traffic accident, liver was found to be the most common injured organ (35%), followed by spleen (32 %) and small gut (30 %).²⁹ In some autopsy based studies the liver was found to be the most commonest injured organ.^{29,30}

There were 23 patients (40.35%) with small bowel injuries in our study. One patient had sigmoid colon perforation with mesenteric tear and a gangrenous area of ileum. Hildebrand et al found that 21% of his patients had small or large or both

types of bowel injuries.³¹ Costa et al have found that 10% of his patients with blunt abdominal trauma had small bowel injury and 6% had large bowel injuries.³² Watts et al found that 3% of his patients had small bowel injury and 0.9% had large bowel injury.³³ In the study of Arumugam S et al small bowel injury was 12% and large bowel injury was five percent.⁵

In some studies hollow viscous injuries are reported as a least common injury in blunt abdominal trauma.³³⁻³⁵ The high incidence of small bowel injuries found in this study might be due to the study design. In this study only operated patients were included. Many solid organ injuries of liver and spleen are now a day managed conservatively. But, all bowel perforations are treated by operative methods. This might be a reason for high incidence of bowel injuries in the study. This information will be helpful for a surgeon who is going to operate in a patient with blunt abdominal trauma.

There were injuries in the stomach of one patient and injuries in duodenum of one patient in our series. Duodenal injury was associated with jejunal injury. Both the injuries are rare. Everard F Cox has found a single patient with duodenal rupture in his 5-year analysis of 870 patients who underwent laparotomy for blunt abdominal trauma.²² In our study a patient had small inferior vena cava injury which was associated with liver injury. One patient with retroperitoneal haematoma was reported who needed intervention. Retroperitoneal hematomas were usually not opened unless evaluation of specific organs in this space was required.²² Five patients(6.67%) in our series had mesenteric injury that needed intervention. Two had isolated mesenteric injury and three had associated bowel injury. Minor mesenteric injuries were seen sometimes in bowel injuries which did not require intervention. Cox EF in his study found that 13% of his patients had mesenteric injury that required repair.²²

Conclusion

Males are predominantly affected in blunt abdominal trauma. The peak age is the third decade closely followed by the second decade. Road traffic accident is the commonest cause in the patients who needs exploratory laparotomy. Most commonly injury is seen in small intestine closely followed by injury to the spleen. As most of the affected persons are young and road traffic accident is the commonest mode of injury measures should be taken to reduce road traffic accidents.

Conflicts of interest: None declared.

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