

## Frequency and Pattern of Intra-Abdominal Injuries in Patients with Blunt Abdominal Trauma

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### Abstract

**Introduction:** Trauma is the most common cause of mortality among the age group 1-45 years, causing loss of productive days more than other notorious diseases, such as cardiovascular diseases and malignancies. This study was conducted to describe the frequency and pattern of intra-abdominal injuries in patients with blunt abdominal trauma.

**Method:** This was an observational study on blunt abdominal injury, which was conducted in surgical unit III, of Jinnah Post-Graduate Medical centre, Karachi. Study included a total of 50 cases of blunt abdominal trauma (data including from July, 2012 to November, 2012). These cases were above the age of 12 years and of both sexes, who came to Accident and Emergency department.

**Results:** Study included 41 (82%) male and 9 (18%) female patients with ratio of 5.4:1 respectively. There were 15 (30%) patients who suffered from hepatic injuries. Thirteen patients (26%) had splenic injuries. Intestine (from stomach to anal canal) was injured in 11 patients (22%), five patients were with injured small intestine, 2 with stomach and duodenum and rest of the 4 with large gut injuries. Pancreas was injured in 2(4%) patients. Mesenteric tear was found in 3 (6%) patients and 2 (4%) had ruptured diaphragm. Five patients (10%) had retroperitoneal hemotoma. Renal injury was recorded in 3 (6%) patients and 2 patients had urinary bladder injuries.

**Conclusion:** No abdominal organ is safe from injury. Solid organs are injured more in blunt abdominal trauma. In this study, liver is the organ most commonly injured in blunt abdominal trauma followed by spleen, gut, retroperitoneal hematoma and other organs.

**Keywords:** Blunt abdominal trauma; Frequency; Intra-abdominal injuries

### Introduction

In this age of speed and traffic accidents, the incidences of blunt injuries to the abdomen has been at its height due to the evolution of the modern industrial era with the development of the automobile; and the creation of explosive compounds capable of producing enormous compression forces impacting upon human bodies [1]. According to WHO by the year 2020, trauma will become the first or second leading cause of "loss of productive years of life" for both developed and developing countries [2].

Trauma is the most common cause of mortality among the age group 1-45 years, causes loss of productive days more than other notorious diseases such as cardiovascular diseases and malignancies [3]. Usually, abdominal organ injuries lone are responsible for 10% of total-trauma caused mortality [4]. One of the most important reasons for the increase in mortality and morbidity with blunt abdominal trauma is either delay in early diagnosis or misdiagnosis [5].

Most common causes of blunt abdominal trauma are automobile accidents, falls, assaults and industrial accidents [5]. In a previous study, road traffic accidents accounted for 83.6% of blunt abdominal trauma including motor vehicles 45.5% and motorcycle accidents 38.1% [6]. Mortality rates are higher in patients with blunt abdominal trauma than in those with penetrating wounds, because of the lack of early diagnostic facilities and optimal management [7]. It is rather more difficult to diagnose a patient with intra-abdominal injuries because abdominal examination does not reliably categorize all patients with intra-abdominal injuries [8]. The prevalence of intra-abdominal injuries among patients with blunt abdominal trauma is about 13 percent [9].

The spleen was found to be the most commonly injured organ in blunt abdominal trauma occurring in more than 50% of cases [10]. On the contrary some studies reported that liver is the most frequently injured organ followed by the spleen in blunt abdominal injuries [11,12].

However these incongruities have not been solved yet. Therefore this study was conducted to find out the frequency and pattern of intra-abdominal injuries in blunt abdominal trauma and to compare the data with national and international studies.

### Method

This was an observational study of Blunt Abdominal Injury, which was conducted in surgical unit III, of Jinnah Post-Graduate Medical centre, Karachi. Study included a total 50 cases of blunt abdominal trauma (data including from July, 2012 to November, 2012). These cases were above the age of 12 years and of both sexes, who came to Accident and Emergency department. Patients below 12 years, had multiple injuries other than abdomen and penetrating injuries to the abdomen, were excluded from the study.

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All the patients underwent a quick primary survey to evaluate the general condition. Two wide bore cannulas (16 gauges) used to gain access to intra venous lines. Crystalloids and colloids administered as initial replacement therapy. Nasogastric tube and urethral catheterization were done where they were not contraindicated.

Primary survey followed the secondary survey once the patient became stabilize, including history, complete physical examination from head to toe.

Investigations were performed in A & E departments, which included blood grouping and cross match, complete blood count, serum electrolytes, blood urea and creatinine, serum amylase, x-ray chest, x-ray abdomen, x-ray pelvis and ultrasound abdomen and pelvis. In some cases, diagnostic peritoneal lavage was done for those who were stable and other investigations and physical signs were inconclusive.

Exploratory laparotomy was done where clear cut indications were present like patient in shock beside resuscitation, abdominal distention etc. All findings were noted on a performa designed for the study. Data were analyzed by using SPSS version 16.

## Results

A total of 50 patients were included in this study who presented with blunt abdominal trauma. There were 41 (82%) male and 9 (18%) female patients with ratio of 5.4:1 respectively. Fifteen patients were between 13-25 years, 21 between 26-40 years, 12 between 41-55 years and 2 between 56-70 years of age.

Twenty nine (58%) patients were injured due to road traffic accident, 10 (20%) patients had a history of fall, 8 (16%) patients had injury related to violence and 3 (6%) patients had injury due to industrial accidents.

There were 15 (30%) patients, who suffered from hepatic injuries. 11 (73.3%) of them had simple grade I or II injuries, 3 (20%) patients had grade III injuries and 1 (6.7%) had grade IV hepatic injury. Thirteen patients (26%) had splenic injuries, seven (53.84%) had grade I injury, six (46.16%) had grade II injury. Intestine (from stomach to anal canal) was injured in 11 patients (22%), five patients with small intestine, 2 with stomach and duodenum and rest of the 4 with large gut injuries. Pancreas was injured in 2(4%) patients. Mesenteric tear was found in 3 (6%) patients and 2 (4%) had ruptured diaphragm. Five patients (10%) had retroperitoneal hemotoma. Renal injury was recorded in 3 (6%) patients and 2 patients had urinary bladder injuries. Injury incidences of different organs with associated organ injuries with gender differences are present in Table 1.

## Discussion

Karachi being a metropolitan city has many social, financial and law and order problems which contribute to increase incidences of trauma. The roads are in much debilitated condition, drivers especially of public transport, have no respect for the law and they drive their vehicles recklessly leading to a surge in road traffic accidents over many past years. The present study brings light to certain interesting observations which are elaborated below.

In this study it was found that most of trauma victims were between the ages of 20-45 years, which are the most productive years of life. In this study of 50 patients, 21 (42%) were between the ages of 26-40 years. It was almost same as in other studies conducted in USA by Ball and Croley [13] in India by Gupta et al. [14] and in UK by Saad and Alpar [1]. The male to female ratio was 5.4:1. These results are close to the

results of studies conducted by Ahmed [15] in Lahore and in France by Kunin et al. [16].

Fifty eight percent cases were of road traffic accidents. The reason behind this is the public transport in Karachi, which is overcrowded, passengers could be found sitting on roof tops of buses, exposing themselves to grave harm. Besides this most bus drivers work for more than 24 hours at a stretch and mostly are under the influence of various hallucinogens and opiates which results in impaired judgment on their part leading to many fatal accidents. Road traffic accidents are the most common factors which lead to blunt abdominal trauma, as identified by different worldwide studies such as 48% in UK by Khan [1], 67% in France by Kunin et al. [16], 30% in USA by Ball SK [13] and 81.8% in Belgium by Ceelen et al. [17]. The next major cause was fall from height 20%. Most incidences of these falls were found to be in construction workers, working on high rise buildings. While a small proportion could be attributed to fall from stairs at home or fall of heavy objects on the abdomen in industrial accidents were 6%, where iron bars or blocks of concrete fell on the abdomen. In other studies it was 18.18% [18].

In this study the most common organ to be injured was the liver, involved in 15 cases (30%) out of 50 cases. 22.7% liver injuries were reported by Hussain et al. [19] and 15% by Hoyt [20]. In this study 73.3% patients had grade I and grade II injuries whereas Pouch A in Italy document 84.75% hepatic injuries of grade I, II, III [21]. Second common injured organ is spleen in 13 cases (26%). It was associated with left lower rib fracture. This shows that when there is rib fracture on the left side, splenic rupture should also be kept in mind. Third most common organ, which sustain injuries, is GUT (stomach to anal canal) in 11 cases (19.6%), also associated with other organ injuries. On the fourth place in this study is a retroperitoneal hematoma i.e 5 cases (8.9%), associated with kidney and bladder injuries. After this we have kidney and mesenteric tear on the same frequency, 3 cases (5.4%) of each; then pancreatic, bladder and diaphragmatic injuries, 2 cases each. Results of this study are slightly different from other studies result as mentioned in Cuscheri essential [20].

Overall hospital mortality was 10%. It may be compared with mortality rate 13.3% in Faisalabad reported by Hussain et al. [19], 11% in India reported by Gupta et al. [14] and 20% in UK reported by Khan and Alpar [1]. Mortality rate of this study was higher than 8.5% in USA reported by Ball and Croley [13]. Cause of death was hemorrhagic shock, septicemia and multiple organ failure.

## Conclusion

Road traffic accident is the most common cause of blunt abdominal trauma in Karachi while fall from heights closely follows. Males are

Organ	Total	Male	Female	p-value
Liver injury	11	9	2	0.986
Liver injury + Gut Injury	3	2	1	0.476
Liver injury + Kidney Injury	1	1	0	0.636
Splenic Injury	13	10	3	0.580
GUT Injury	8	6	2	0.574
Retroperitoneal injury	5	4	1	0.902
Kidney Injury	2	2	0	0.499
Mesenteric Injury	3	3	0	0.403
Pancreatic Injury	1	1	0	0.636
GUT Injury + Pancreatic Injury	1	1	0	0.636
Diaphragm	2	2	0	0.499

P-value is significant at <0.05

**Table 1:** Injury incidence of different organs with associated organ injuries.

involved much more in blunt abdominal trauma as compared to females because of their outdoor life style and their role as the earner for their families. No abdominal organ is safe from injury. As this study shows solid organs are injured more in blunt abdominal trauma. In this study liver is the organ most commonly injured in blunt abdominal trauma followed by spleen, gut, retroperitoneal hematoma and other organs. The simple and conservative operative procedures are adequate for most injuries. As experienced surgical team is a definitive advantage and has a direct bearing on the patient prognosis. Poor nutritional support to the patient increases the morbidity.

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