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# Clinical profile of blunt trauma abdomen at a tertiary hospital of north India

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**Abstract**
**Introduction**: Blunt trauma continues to be the most common mechanism of injury to the abdomen. Rapid assessment and surgical intervention are of utmost importance for best outcomes.
**Aims and objectives**: To study the clinical profile of blunt trauma abdomen patients I.e. Pattern of internal organ injury and morbidity and mortality.
**Materials and method**: The present study was conducted in patients of blunt abdominal trauma admitted at Rajindra Hospital, Patiala. A rapid clinal and radiological assessment was done. Patients for surgical intervention were identified and per operative findings noted. Post-operative findings on day one, 2n, 4th, 7th and 10th were noted.
**Results**: Small gut and mesentery was the most frequently injured organ (24.3%). This was followed by spleen, liver, large gut, urinary bladder, kidney, pancreas, duodenum, stomach, diaphragm, omentum. Mortality was higher in patients with extra-abdominal injuries and those with multi-organ damage.
**Conclusion**: Extra-abdominal injuries, pre-operative shock and septicemia are associated with increased mortality. Prompt resuscitative measures, early diagnosis and immediate surgical intervention improve results.

**Keywords:** blunt trauma, abdomen, emergency

## Introduction
Trauma has become one of the major causes of morbidity and mortality. Rapid industrialization, road traffic accidents (RTA) and accidents in home are major cause of trauma. Abdominal trauma constitutes major portion of surgical emergencies and is the 3rd most commonly injured region following head and chest. Blunt trauma remains the most prevalent mechanism of injury to the abdomen. The patient with BTA needs to be assessed early clinically and radiologically.

## Review of Literature
In the pre-industrial era abdominal injuries were generally homicidal and hence penetrating in nature but with the advent of mechanics and automobiles, abdominal injuries occur more commonly as accidents and are blunt in nature.
In a study shock was itself a grave finding and implies extensive concealed hemorrhage or contamination by gastrointestinal contents or both [1]. Study of 297 showed involvement of more than one intra-abdominal organ occurred in 14% of the patients [2].
A study illustrated that 34% of patient had generalized pain and 26% had regional or localized pain while 29% patient had nausea or vomiting. 8% of patients had confirmed hematemesis or proctorrhagia. All of the patients had localized or generalized tenderness whereas only 71% had spasm and rigidity on examination. On auscultation, bowel sounds were hypoactive or absent in 89% cases [3].
A record of 518 patients of blunt abdomen showed solid viscera were more frequently ruptured than hollow ones. Spleen was injured in 62.1% followed by liver (23.7%), retroperitoneal hematoma (20.1%), gut (12.1%), urinary bladder (8.4%), kidney (6.5%), diaphragm (5.4%) and pancreas (1.6%) [4].
In a study of 437 patients with blunt abdominal trauma admitted between 1967-1973. Most (70%) of the patients were males. Automobile accidents constituted 70%. Generalized abdominal tenderness and abdominal guarding were the most frequent physical findings, both being present in 75% of all patients. 12% of the patients were in hypovolemic shock on admission. Also 44% of patients with no physical findings eventually required exploration, with operative repair necessary in 75% of them [5].
A study suggested that because of subtle nature of the signs of blunt abdominal trauma ultrasound is an excellent noninvasive technique for assessment blunt abdominal trauma [6, 7].
In a study of 61 patients of blunt abdominal trauma. The mean age was 31.6 years and most were (77%) were males and most (86%) of the patients were injured in road side accidents, 7% in falls whereas 7% in miscellaneous [8].
A study evaluated 100 cases of abdominal trauma with the help of CT scan which proved extremely valuable in assessing the retro peritoneum [9, 10].
A 5 year study of 632 patients of blunt abdominal trauma reported a frequency of splenic injury 57.7%, liver injury 44.6%, colon injury 14.0%, small gut injury 14.0%, kidney injury 8.4%, pancreatic injury 6.2%, duodenal injury 6.0% and urinary bladder injury in 3.8% patients. Intestinal rupture occurred in 24.2% [11].
A study concluded that major factors responsible for missed or

delayed diagnosis of abdominal injuries were haemodynamic instability, head injury, alcohol/drug intoxication and radiological errors [12].

Mortality was found to be significantly higher in patients with more than one intra-abdominal organ injury (25.5%) as compared to those having single intra-abdominal organ injury (13.8%) [13, 14].

The finding of free fluids in the absence of solid organ damage in blunt abdominal trauma is associated with clinically significant visceral injury [15].

A study on 3369 patients, 29% were identified as delayed laparotomies greater than 4 hours after admission. Gastrointestinal tract injuries are usually missed early on, hence leading to delayed laparotomy (58%). Delayed laparotomy in case of solid organ injuries was less frequently (15%) [16].

**Aims and Objectives**

1. To study the pattern of abdominal injuries.
2. To study the relationship between type of injury sustained and mortality & morbidity of these patients.

**Materials and Method**

The present study was conducted in patients of blunt abdominal trauma admitted in Emergency Surgical ward of Rajindra Hospital, Patiala.

After recording vitals and urgent resuscitation, hematology profile was sent for and radiological investigation i.e. x-ray chest, x-ray abdomen and ultrasound were performed. Secondary survey was done which included identification of other associated injuries which could be life threatening and were noted.

A clear cut indication of operative management was outlined based either on radiological diagnosis or by means of repeated physical examination. The intraoperative findings were recorded in the proforma.

The patient was assessed for any postoperative complication on the 1st, 2nd, 4th, 7th and 10th day. The progress of the patient or development of any complications, total stay in the hospital and all the mortality were recorded.

**Discussion**

41 patients of blunt abdominal trauma were evaluated of which 68% of patients were in age group of 11-40 (mean age 28 years). Majority of the patients in this study were males (93%). This study compares well with those of Bagwell and Fergusson (1980) [8] and Cox (1984) [17]. The higher incidence of abdominal trauma in this age group reflects more active and outdoor life of the young.

Road side accidents were the leading cause for blunt abdominal trauma in this study (49% patients). Khanna (1999) [14] and Cox (1984) [17] reported this to be 52 and 69% respectively.

Abdominal pain was present in 90% of the patients. Welch *et al* (1950) [1] found that 80% of their patients had abdominal pain. Neeki reported 14% patients had no history of abdominal pain and no abdominal tenderness on examination. Many of these had positive CT scan results and out of these 1% patients underwent exploratory laparotomy.[18]

Abdominal guarding/rigidity was present in 54% of the patients in present study and tenderness was present in 85.3% patients. Welch *et al* (1950) [1] mentioned that the presence of diffuse abdominal tenderness may connote peritoneal contamination or hemoperitoneum.

In the present study, at the time of admission 22% of the patients were in hemorrhagic shock (BP $\leq$90 mmHg) as compared to Strauch *et al* study (1973) [19] 44% of the patients were in hemorrhagic shock.

In 33 patients, the ultrasound showed fluid or some solid organ injury whereas in 2 patients it had normal finding. 33 patients underwent laparotomy and had intra-abdominal injuries. Thus, USG has a 94.2% positive predictive value in cases with abdominal trauma.

In a study conducted by Richard *et al* (2002) [20] on 396 patients the sonographic detection of free fluid/parenchymal abnormality was having 82% positive predictive value.

In present study, 46% of the patients had extra abdominal associated injuries. Skeletal injuries were most frequent i.e. 22%, chest injuries in 20% and eye injuries in 5%.

Sarin (1993) [13] in his study found that 21.2% patients had associated extra abdominal injuries and head and chest injuries were the commonest.

In the present study, small gut and mesentery was the most frequently injured organ (24.3%). This was followed by spleen, liver, large gut, urinary bladder, retroperitoneal hematoma, kidney, pancreas, duodenum, stomach, diaphragm, omentum. The incidence of various organs injured in other studies is presented in the following figure and table.

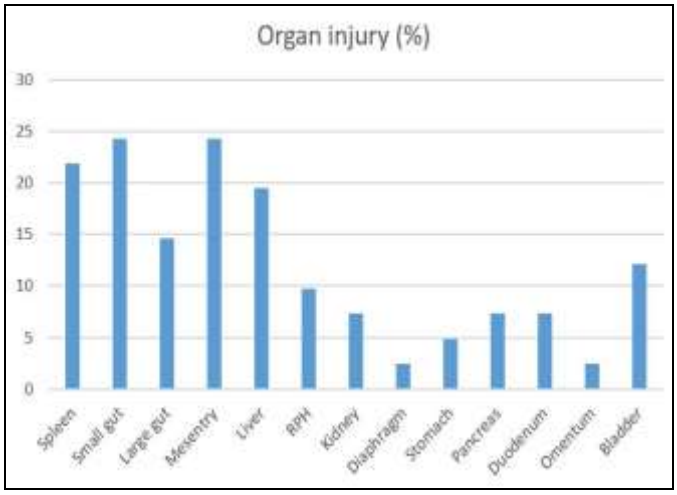


**Fig 1:** Organ injury as percentage.

**Table 1:** Organ injury and comparative results of studies of Cox, Burch, Sarin and Mehta

| | Organ Injured | Our study | Cox [17] | Burch [21] | Sarin [13] | Mehta [22] |
|---|---|---|---|---|---|---|
| 1 | Spleen | 21.9 | 42.1 | 26.2 | 18.5 | 53 |
| 2 | Small gut | 24.3 | 3.44 | 16.2 | 18.5 | 17 |
| 3 | Large gut | 14.6 | 1.26 | _ | 9.7 | _ |
| 4 | Mesentry | 24.3 | 13 | 2.5 | 15.9 | 11 |
| 5 | Liver | 19.5 | 35.6 | 15.6 | 21.2 | 35 |
| 6 | Retroperitoneal Hematoma | 9.75 | 14.5 | 2.7 | 20.3 | 20 |
| 7 | Kidney | 7.31 | 2.64 | 24.2 | 5.3 | 17 |
| 8 | Diaphragm | 2.43 | 5.28 | 1.1 | 2.6 | - |
| 9 | Stomach | 4.87 | 0.02 | 1.6 | 1.7 | 1 |
| 10 | Pancreas | 7.3 | 0.02 | 1.4 | 2.6 | - |
| 11 | Duodenum | 7.31 | 0.05 | - | 3.5 | - |
| 12 | Omentum | 2.43 | - | - | 1.7 | - |
| 13 | Bladder | 12.1 | 3.2 | - | 7 | 3 |

Small gut and mesentery was the most frequent organ injured in this study (24.3%). In present study, patients with small gut injuries had perforation and most of these were closed in 2 layers and only a few needed resection and anastomosis.

In present study spleen was 3rd most frequently injured organ which was managed with splenectomy.

Bagwell and Ferguson (1980) [8] performed splenectomy in 94.7% patients and splenorrhaphy in 7.7% of 30 patients with splenic injuries.

Post-operative complications were seen in 31.7% of the patients in this study. Wound dehiscence was the commonest and was seen in 38.4% of these patients followed by prolonged ileus, pneumonia, re-exploration, postoperative shock. Strauch (1973) [19] reported that postoperative complication occurred in 41.8% of the patients.

In present study, mortality of 7.3% was noted. Berqvist *et al* (1983) [23] and Cox (1984) [18] reported 9.1%and 16.93% mortality in their study respectively. Road side accidents accounted for 17.6% of the deaths. Gad *et al* (2012) reported mortality rate of 11.6% [24].

In present study mortality in patients admitted with shock (BP $\leq$90mmHg) was 33%. Two of 3 patients had septicemic shock due to faecal peritonitis.

Altemeier and Cole (1956) [25] observed that all the patients developing septic shock died. Strauch (1973) [19] found that haemorrhagic shock was present in 74.5% of patient who eventually died. Tan *et al* (2011) [26] observed that patients with colonic peritonitis had a 15% mortality. Sarin (1993) [13] reported that mortality in patients with shock at admission was 26.7% which was significantly higher in patients who did not have shock.

In present study, mortality of 10.5% was present in patients with associated extra abdominal injuries as compared to 4.5% in patients without any associated extra abdominal injuries. Associated injuries were present in two of three patients who eventually died. Sarin (1993) [13] reported a morality 21.2% in patient with associated injuries as compared to 6.1% in patients having abdominal trauma alone. Associated injuries were present in 89.4% of the patients who eventually died.

In present study, mortality was found to be higher in patients with more than one intra-abdominal organ injury. Death occurred in 8% of the patients with 1 organ injured and 10% of the patients with 2 organ injured eventually died. In present study complication rates were higher among the patients with multiple organ injuries (15.3%) as compared to single organ injury. However, 30% of patients with two organ injury, 50% patients with 3 organ injury and 33% of the patient with 4 or more organs injuries developed complication.

In the study conducted by Strauch (1973) [19] the mortality was 12.6%, in patients with injury to one intra-abdominal organ, 20.7% in patients with injury to two intra- abdominal organ, 31% in patients with injury to three intra-abdominal organ and 52.7% patients with injuries to four or more intra-abdominal organs. It is clearly evident from present and previous studies that patient who have extra abdominal injuries or have more number of intra-abdominal organ injuries are prone to complications or die in their postoperative period. So a close monitoring should be done in their postoperative period, so as to reduce the morbidity and mortality among the patients of the abdominal trauma.

## Conclusion

To conclude, abdominal trauma presents with a wide spectrum of problems. The patients with extra-abdominal injuries, pre-operative shock and septicemia are prone to complications and deaths in post-operative period. Institution of prompt resuscitative measures, early diagnosis and immediate surgical intervention can help to decrease the morbidity and mortality in these patients.

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