

# Pattern of Solid Visceral Injuries in Blunt Trauma Abdomen: A Prospective Study from a Indian Tertiary Care Hospital.

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## ABSTRACT

**Background:** Trauma is the most common cause of death in people younger than 45 years of age and accounts for more years of life loss than cancer, heart disease, and stroke combined. Aim: 1. To establish the pattern and outcome of solid visceral injuries in blunt abdominal trauma, 2. Most reliable investigation for diagnosing a case of solid visceral injury in blunt trauma abdomen, 3. To analyse the various modalities of treatment and interventions done for solid visceral injury in a blunt abdominal trauma patient. **Methods:** Prospective Observational study conducted over one year between august 2016 to august 2017 at Department of surgery, Government Medical College, Kozhikode. **Results:** Among 180 patients, 82 cases [45.6%] were in age group 21-40 yrs . There were 151 males out of 180 cases [83.9 %]. . Male to female ratio was 5.2:1 . Most common mode of injury was road traffic accident [RTA] 47.8%. **Conclusion:** Blunt trauma was the commonest type of abdominal injury seen in our Department of Surgery and the spleen was found to be the most common organ injured in blunt trauma. The most common cause was road traffic accidents.

**Keywords:** Blunt Trauma, Spleen, FAST.

## INTRODUCTION

Trauma is the most common cause of death in people younger than 45 years of age and accounts for more years of life loss than cancer, heart disease, and stroke combined.<sup>[1]</sup> WHO also estimates that, by the year 2020, trauma will be the first or second leading cause of —years of productive life lost for the entire world population in both developed and developing world.<sup>[2]</sup> It is estimated that by the year 2020, 8.4 million people will die every year from injury, and injuries from road traffic accidents will be the third most common cause of disability worldwide and the second most common cause in the developing world.<sup>[3]</sup>

One of the main causes of death after trauma, with numbers ranging from 40 to 80%, is exsanguination due to injuries from abdominal organs.<sup>[4]</sup> Blunt trauma (i.e. motor vehicle accidents and fall from heights) is still the most common mechanism of injury, although penetrating injuries are becoming more common due to increasing violence.<sup>[5]</sup> Motor vehicle accidents account for 75 to 80 % of blunt

abdominal trauma. Blunt injury of abdomen is also as a result of fall from height, assault with blunt object, sport injuries, industrial mishaps, bomb blast and fall from riding bicycle.<sup>[6]</sup>

### Aims and Objectives

1. To establish the pattern and outcome of solid visceral injuries in blunt abdominal trauma
2. Most reliable investigation for diagnosing a case of solid visceral injury in blunt trauma abdomen.
3. To analyse the various modalities of treatment and interventions done for solid visceral injury in a blunt abdominal trauma patient

## MATERIALS AND METHODS

### Study design

Prospective Observational study conducted over one year between august 2016 to august 2017 at Department of surgery, Government Medical College,

### Study subjects

#### Inclusion criteria

- i. Patients presenting with history of recent assault by blunt and heavy object over abdomen
- ii. Road traffic accident with suspected blunt abdominal injury.

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- iii. History of fall from height.
- iv. Injuries occurring during natural calamities like earthquakes and land slides
- v. Patient on whom there is clinical suspicion of blunt trauma to abdomen.
- vi. Blunt trauma abdomen in sports injury.

**Exclusion criteria**

- 1. Patients with penetrating and stab and gunshot injuries.
- 2. Patients of pediatric age group.

**RESULTS**

A total of 180 patients with abdominal trauma managed in the surgical department during the study period were enrolled. Males were 151 and females were 29 with the male to female ratio of 5.2:1. The age range was 10 to 80 years with the mean age of 39.43 years. Eighty two patients (45.6%) were in the age group of 21 to 40 years. Most cases with blunt abdominal trauma were males, 151 out of 180 [83.9%]. Among males majority were in age group 21-40 yrs, while among females there were no age group predilections. Road traffic accident was the most common cause of injury constituting 47.8% of cases. Other causes were fall and assault each contributing to 42.2% and 10% respectively. Distribution of organ involved

Out of 180 cases, liver was found injured in 35% cases, spleen in 42% cases, renal in 23% and gall bladder in 1%. Hence spleen is the most common injured organ in blunt injury abdomen followed by liver. In this study no much association was found between mode of injury and organ involved with p value > 0.05. No renal injury was found in trauma due to assault. Among 180 patients studied, 138 cases [76.7%] were treated conservatively. Surgically managed cases were only 23.3%. A total of 8 patients have pulse rate > 100, of which 4 of them (50%) underwent surgical procedures. In patients with pulse rate < 100, the same was 22.1%. However this difference in patients underwent surgical procedure between the patients with high pulse rate and normal pulse rate is not statistically significant. (p value 0.068). However this shows a borderline association as the p value is very closer to 0.05. It was seen that blood pressure is independent of management as the p value is 0.744. Examination of cell frequency shows that the patients underwent surgical procedures is respectively 22.5% and 24.6% for patients with high systolic blood pressure and patients with normal systolic blood pressure. Mean fall in Hb in our study was found to be 4 gm/dl. So fall in Hb > 4 gm/dl was taken as cut off in our study. It was seen that 95% of the patients with fall in Hb > 4 had undergone surgery. It was significantly lower (14.4%) in patients with Hb fall < 4 (p value < 0.001).

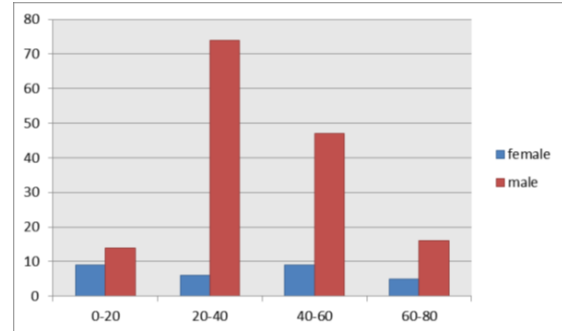


Figure 1: Gender distribution among different age groups.

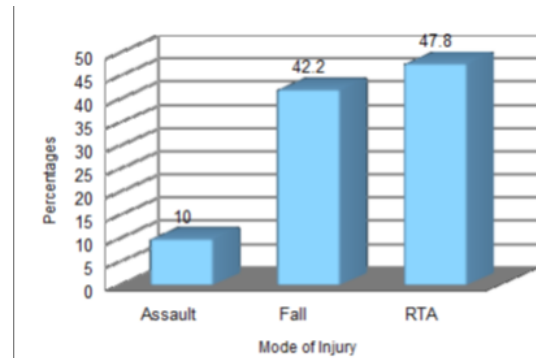


Figure 2: Pattern of mode of injury among study group.

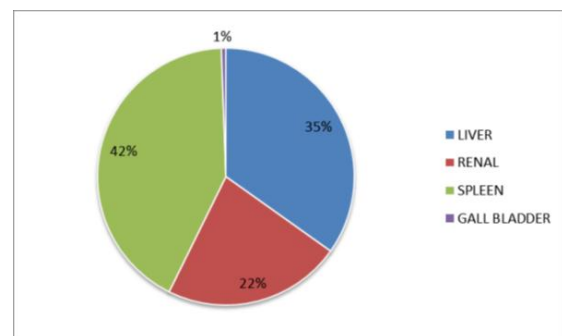


Figure 3: Pattern of organ involvement in blunt trauma.

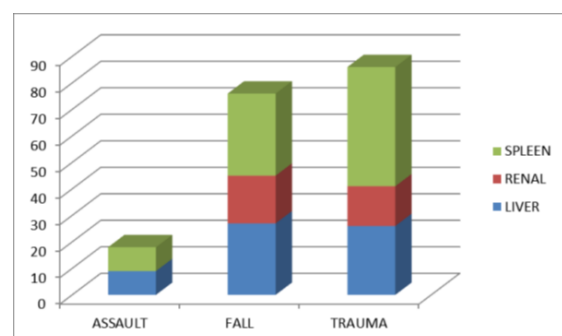


Figure 4: Pattern of organ involvement in various modes of injury.

Overall mortality rate was 3.3%. It was seen that death rate is slightly higher in conservative method. But not significantly different compared to surgical (p value > 0.05). Only one patient died in surgery

group. Surgical management was found to be significantly more preferred for persons with splenic injuries of grade III and IV than those with lower grades of injury ( $\chi^2= 8.962$ ,  $df= 1$ ,  $p= 0.003$ ). There were only 3 individuals who underwent surgical management for renal injury and all of them had grade IV injury. However 3 persons with a higher grade of injury (grade V) were managed conservatively. This could be the reason for lack of any statistically significant association between grade of renal injury and management (Fischer's exact test  $p= 0.098$ ). Of the 42 surgical cases 12 cases have liver injury and USG predicts injury in 83.3 % of them. This means USG have true predictive value (sensitivity) 83.3 %. Similarly liver USG showed 76.7 % (23 out of total 30) accuracy in identifying true -ve cases (Specificity).

## DISCUSSION

Abdominal injuries have remained a challenge to surgeons with an ever-present desire to improve on the outcome of the management. One Eighty patients were recruited and as in other studies elsewhere, the male [83.9%] predominance was striking. The male to female ratio was 5.2:1 and this compared well with other studies, which showed male to female ratio of 4:1.<sup>[7]</sup> The large proportion of male involvement is attributed to occupational hazards and other socio-economical activities men are doing that predispose them to injuries. Males also represent the active group in any society that takes part in high risk activities.

The most common age group affected in this series was between 21-40 yrs [67.4%]. It was consistent with the findings of Mousami singh, amit kumar, Sanjeet kumar and Abhas kumar et al.<sup>[8]</sup> The second most common age group was between 41-60 years of age. It was also consistent with the observations of the previous authors. Persons below 10 years of age contribute very less (<1%) while in the study of Abhas kumar singh et al, the incidence was 3.39%. This reduction in children fatalities could be due to better treatment, better education and more attention by parents

The maximum number of cases of blunt injuries of abdomen was due to crushing by motor vehicles [47.8%]. Next higher were due to fall from height.<sup>[9]</sup> Very few cases were due to assault. Gordon Turner and Price, Keith Simpson and Modi were of same opinion, that accidental crush injuries due to motor vehicles were more common.<sup>[10]</sup>

Spleen was commonest organ injured in 42% cases. Out of 85 cases, 45 cases were due to injury by motor vehicles, 31 cases due to fall from height, 9 case was due to assault., next common organ involved was liver 31%, followed by renal 25% and a single case of gall bladder 1%. this observation from our study is similar to a recent study done by Abhas kumar singh et al who in his study had reported the

incidence of the involvement of spleen, liver, kidney, stomach and urinary bladder were 67%, 30.91%, 18%, 9.09%, 5% cases respectively,<sup>[11]</sup> In contrast to previous study ,we tried to find out association between mode of injury and organ involved in our study. but no significant correlation was obtained  $p$  value >0.05.

About 40% presented to casualty had abnormal vitals, principally manifested as hypotension [69 cases], tachycardia [8 cases] and fall in hemoglobin >4 [20 cases]. about 70% with deranged vitals underwent laparotomy. This finding was almost consistent with previous study which showed twenty percent of the patients had abnormal vital signs, principally manifested as hypotension at admission 99. A striking finding in their study was 80% mortality in patients with blunt abdominal injury having derangement of vital signs. Massive haemoperitoneum with solid organ injury was the commonest finding at laparotomy with ruptured spleen being the commonest solid organ injured followed by liver lacerations. There were also cases of renal injury. This pattern of injuries is consistent with many other studies done in the country and the region.<sup>[12]</sup> Only 1 patient out of the 42 that had laparotomy passed away, due to anesthesia related complications. The laparotomy rate in this study was 23% and the overall mortality rate was 3.3%, comparable to previous studies which reported a mortality rate between 10 and 30%.<sup>[13,14]</sup>

## CONCLUSION

Blunt trauma was the commonest type of abdominal injury seen in our Department of Surgery and the spleen was found to be the most common organ injured in blunt trauma. The most common cause was road traffic accidents. Our study also shows investigative tools such as Ultrasound and CT scan should be used more widely in abdominal trauma where there is doubt on the extent and significance of intra-abdominal injury, in order to reduce the rate of negative and non therapeutic laparotomies. Our study shows lower morbidities in successful NOM justify further attempts for NOM in high-grade BHSI in selected patients aiming at formulating a specific standardized diagnostic/ management algorithm. The findings of this study calls for a bigger study to get sufficient data to be used for formulation and operationalization of protocol for management of patients with abdominal injuries to guide surgeons and other clinicians on management of patients with abdominal injuries.

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