

# Clinical Outcome of Blunt Abdominal Trauma in Tertiary Care Teaching Hospital

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## ABSTRACT

**Introduction:** Blunt abdominal trauma occurs when injury to organs inside abdominal cavity is present due to external forces exerted over abdomen as result of trauma. Wide spectrum of clinical presentation is seen ranging from milder forms of injury to fatal solid organ injuries with irreversible shock and ongoing bleeding. Management ranges from watchful observation to emergency laparotomy. Aim of this study was to evaluate different clinical presentation, organ specific injury and management of blunt abdominal trauma.

**Material and Methods:** A retrospective study with 25 patients sustaining Blunt abdominal trauma who came to Trauma centre in Guru Gobindsingh Government Hospital, Jamnagar attached to medical college from 2016 to 2018 were included. The patients were selected randomly.

**Results:** Blunt abdominal injury was seen in all age from 1 to 60 years. Highest incidence noted in age group 11 to 20 years. Male predominance was noted with Male: Female ratio 21:4 of 5.25:1. Most common mode of injury was road traffic accident (44%). Most common injured organ was Liver (32%). Liver and spleen injuries were associated with rib fractures. Abdominal pain and tenderness was most common clinical presentation (90%). Patients with hemodynamic instability had more mortality.

**Conclusion:** Blunt abdominal injury is one of the commonest injuries encountered in polytrauma patients. Morbidity and mortality can be prevented by timely initial resuscitation and correct diagnosis as well as management (operative or non operative) which depend on patient's hemodynamic stability and findings of imaging studies.

**Keywords:** Blunt Abdominal Trauma, Hemodynamic Instability, Road Traffic Accidents, Tenderness, Abdominal Pain

## INTRODUCTION

Trauma remains the most common cause of death for all individuals between the ages of 1 and 44 years and is the third most common cause of death regardless of age.<sup>1,2</sup> The abdomen is a diagnostic black box. Abdominal injury is a significant cause of morbidity and mortality; expedient diagnosis and treatment of intra-abdominal injuries are essential to prevent morbidity and death.<sup>1</sup> Most common causes of blunt abdominal trauma are automobile accidents, falls, assaults and industrial accidents.<sup>3</sup>

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.<sup>4</sup> It is rather more difficult to diagnose a patient with intra-

abdominal injuries because abdominal examination alone does not reliably categorize and differentiate all patients with intra-abdominal injuries.<sup>5</sup> Delay in management of blunt abdominal trauma increases morbidity and mortality due to bleeding from solid organs or vascular injury.<sup>6</sup> Pre-hospital transportation, initial assessment, thorough resuscitative measures and correct diagnosis are of utmost importance in trauma management. The present study was undertaken keeping in view the above facts which re-instate the role of the surgeon in management of such patients and thereby to increase the better outcomes following blunt abdominal trauma.

## MATERIAL AND METHODS

This Retrospective study was conducted on 25 patients of blunt abdominal trauma admitted in a Tertiary Care Hospital affiliated to a Medical College during the years 2016-2018.

### Inclusion criteria

All patients with blunt abdominal trauma.  
Patients of all age groups.

### Exclusion Criteria

Penetrating abdominal injury.  
All deaths on arrival.  
Pregnant females.  
Selection of cases was done as above and study was conducted based on the following points:

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Detailed clinical history was recorded including age, sex, symptoms, mode of injury, associated injuries, external bleeding and mental status.

Thorough physical examination was carried out to assess hemodynamic stability, vitals, systemic examination, severity of injury and other associated injuries. Detailed examination of the abdomen along with the neurological status also, was done.

### Investigations

Baseline investigations like blood investigations, chest x-ray, x-ray abdomen were carried out.

Special investigations like Ultrasonography, Computed Tomography, Color Doppler, Intravenous Pyelography, Retrograde Urethrography were done as per the hemodynamic stability of the patient and according to the suspicion of the organ/viscera/vessels involved.

Age group (years)	No. of patients	Percentage
1-10	5	20
11-20	6	24
21-30	5	20
31-40	3	12
41-50	4	16
51-60	2	8

**Table-1:** Age wise distribution

Clinical Features	No. of patients	Percentage
Abdominal pain	15	60%
Tenderness	24	96%
Abdominal guarding	19	76%
External superficial injury	05	20%
Hypotension(systolic blood pressure <90 mm of Hg)	06	24%
Extremity fractures	04	16%
Rib fractures	06	24%
Head injury	10	40%
Abdominal Distension	03	12%
Vomiting	01	04%
Pelvic fracture	05	20%
Hematuria	00	00%

**Table-2:** Clinical Presentations

Class	Total	Survived	Percentage of survival	Dead	Percentage of mortality
Stable(Pulse <100/min, BP >90mm of Hg)	20	20	100%	-	-
Unstable(Pulse >100/min, BP <90 mm of Hg)	05	04	80%	01	20%
Total	25	24		01	

**Table-3:** Relation between hemodynamic stability at time of presentation and mortality

Outcome	No. of patients	Percentage
Survived	16	64
Discharged	8	32
Dead	1	4
Total	25	100

**Table-4:** Outcome of blunt abdominal trauma

### Management of patients

Patients were assessed and resuscitated to achieve and maintain hemodynamic stability according to Advanced Trauma Life Support (ATLS) guidelines.

IV fluids, blood transfusions were given based on monitoring of urine output and blood pressure. Patient's vitals, urine output, abdominal girth were also measured and monitored. Patients were prepared for emergency exploratory laparotomy as per their hemodynamic stability, nature of injury and findings of USG and other investigations.

The surgical procedures were performed according to the intra-operative findings. Total amount of blood in peritoneal cavity, presence of fecal matter and biliary contamination of peritoneal cavity were looked for and recorded. Injury to any organ, extent of injury and status of other viscera was recorded.

Post operatively patients were managed with IV antibiotics, IV fluids, vaccines (in splenectomy), analgesics and blood transfusion as per requirement. Complications, if any were recorded and dealt with accordingly. Discharge was given on complete recovery and follow up was advised in outpatient department.

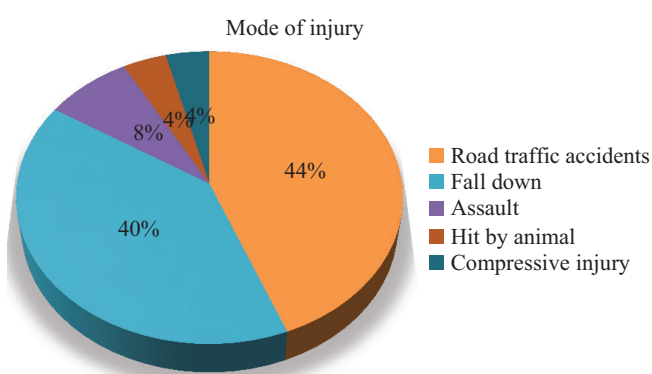
### RESULTS

Blunt abdominal trauma was seen highest in age group (table-1) 11-20 years i.e. 24% (6 out of 24). Male predominance seen with Male: Female ratio 21:4 of 5.25:1.

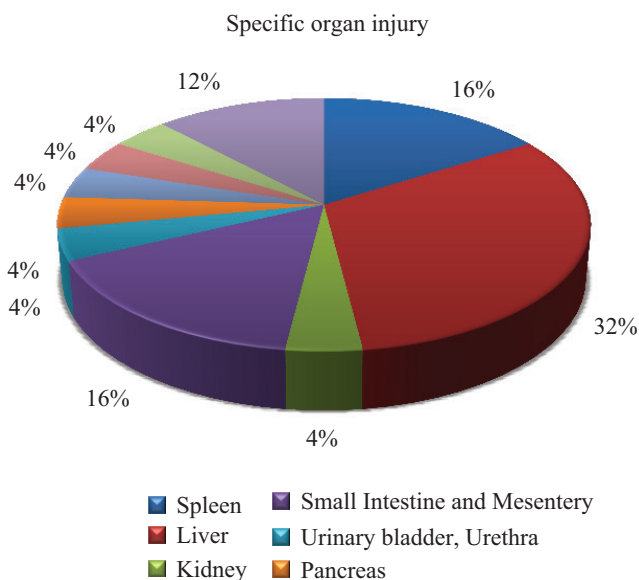
The road traffic accidents were the most common mode of injury associated in 44% of patients (11 out of 24) (figure-1). In presence of associated head injury and chest injury, mortality was higher. The liver and splenic injuries were associated with rib fractures (5 out of 16 patients). Liver was the most commonly injured organ (8 out of 25 patients). Solid organs like Liver and Spleen were more commonly injured in road traffic accidents and small intestine and mesentery were injured in fall down (figure -2). Most common clinical presentation was abdominal pain (66%) and tenderness (96%) following injury. Other clinical presentations were abdominal distension, vomiting, hypotension and hematuria (table -2). 20% of patients were hemodynamically unstable with pulse rate >100/min and blood pressure < 90 mmHg systolic

Organ Injury	No. of patient (present study)	J.L. Kumawat <sup>10</sup>	Smith J <sup>13</sup> (n=1224)	Davis J <sup>7</sup>	Hemang A. Panchal <sup>11</sup>	Adnan Aziz <sup>12</sup>	Nikhil Mehta <sup>9</sup>
Spleen	4 (16%)	38 (13.91%)	195 (15.93%)	108 (24.71%)	15 (40.54%)	13 (26%)	42(53%)
Liver	8 (32%)	72 (26.37%)	210 (17.50%)	72 (16.47%)	13 (35.13%)	14 (28%)	25 (35%)
Kidney	1(4%)	33 (12.06%)	144 (11.76%)	30 (6.86%)	05 (13.51%)	02 (04%)	12 (17%)
Stomach and Duodenum	-	-	23 (1.87%)	06 (1.37%)	0	-	01 (01%)
Small Intestine and Mesentery	4 (16%)	62 (22.70%)	160 (13.07%)	34 (7.78%)	09 (24.32%)	06 (12%)	20 (28%)
Colon	-	16 (5.86%)	104 (8.74%)	20 (4.57%)	0	-	-
Urinary bladder, Urethra	1 (4%)	6 (2.19%)	48 (03.92%)	-	01(2.70%)	08 (16%)	02 (03%)
Pancreas	1 (4%)	3 (1.09%)	40 (3.26%)	08 (1.83%)	02 (05.40%)	01 (02%)	-
Multiorgan injury	3 (12%)	-	-	-	-	-	-
Adrenal gland	1 (4%)	-	-	-	-	-	-
Muscular/Vasular Hematoma	1 (4%)	35 (12.82%)	59 (04.82%)	-	11 (29.72%)	05 (10%)	14 (20%)

**Table-5:** Comparison of Organ Specific Injury



**Figure-1:** Mode of Injury



**Figure-2:** Specific Organ Injury

(table -3). Mortality rate was higher in hemodynamically unstable patients. Patients with hemodynamic instability, intestinal injury and American Association for the Surgery of Trauma (AAST) grade IV and V Liver and Splenic injury had undergone operative management (9 out of 25 patients). Mortality rate was 4%. Outcome of blunt abdominal trauma in our 25 patients, 16 patients survived, 8 patients discharged, 1 patient died (table-4).

**DISCUSSION**

Results of our study were compared with similar studies in relation to different modes of injury, specific organ injury, age and sex wise distributions.

Out of 25 cases in our study 50% of patients were in 11-40 years of age group. This goes in accord with studies of Davis J et al.<sup>7</sup> and Nikhil Mehta et al.<sup>9</sup> In our study, 84% cases were males and 16% were females with an M: F ratio of 5.25:1. Increased incidence of trauma in male is attributed to their work outside house, frequent travelling, more social activities and influence of alcohol sometimes. Road traffic accident was the most common mode of injury. Commonest intra-abdominal injury was liver injury in 32% followed by splenic injury (16%). Commonest hollow organ injury was small bowel perforation(16%)(TABEL-5). Procedures done for splenic trauma were splenectomy in 3 (12%) cases. Splenectomy was done for most of grade 4 and 5 trauma and hemodynamically unstable patients of lesser grades. Hemodynamically stable patients were managed non operatively with strict monitoring of hypotension, tachycardia, abdominal rigidity.

Kidney and urethral injuries are frequently associated with pelvic fractures. All patients of renal trauma who were managed conservatively were followed with regular CT scans and all performed well in their course. Most grade I-IV renal injuries can be managed non-operatively. The absolute indications for surgery include renal pedicle injury, shattered kidney, expanding hematoma, and hemodynamic instability. In patients with urethral injuries suprapubiccystostomy was done in 1 case. Primary suturing of small bowel perforation was carried out in 5 patients. Out of this 5 patients, 1 patient expired postoperatively, due to late presentation (>24 hours) and post-operative complications like septicemia and anastomotic leak (in 1 patient). One patient having hemoperitoneum due to mesenteric tear and injury to ileocolic vessels was treated by repair of tear and ligation of the bleeders.

One patient having graded 4 liver injuries in both the lobes was managed by closure of liver laceration. Patient survived and discharged thereafter uneventfully. In our

study, abdominal injuries were associated with various extra-abdominal injuries amongst which isolated head injury was present in 16% cases, isolated chest injury 4% cases and combined head and chest injuries were 16% of cases. Rib fractures were present in 5 patients out of 16 in liver and spleen trauma patients. The higher amount of rib fractures were probably due to increased number of upper abdominal trauma.

Mortality rate in our study was 4% i.e. 1 patient. The major cause of mortality was delayed presentation of the patients and poor general condition of the patients. The earliest presentation was at 1 hour with one case presenting as late as 2 days after the injury. The early presentation of our patients helped us to start appropriate resuscitation at time and save their lives.

So patients of blunt abdominal trauma presenting to hospital should be resuscitated with the help of IV fluids, blood transfusions, etc. Delay in either diagnosis or presentation of patient can worsen patient's outcome. Patients should be evaluated quickly with all routine and special investigations like CT scan; and then depending on the patient's hemodynamic condition, decision regarding management should be taken.<sup>14</sup>

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#### CONCLUSION

Trauma is the leading cause of morbidity and mortality throughout the world. Blunt abdominal trauma is one of the commonest injuries encountered after orthopedic injuries and Head injuries.

No abdominal organ is safe from injury with injuries of solid organs being more in blunt abdominal trauma. Prompt primary resuscitation and timely definitive treatment are the goals of the surgeon for treating blunt abdominal trauma victims with important being the initiation of management within the golden hour. CT scan along with assessment of hemodynamic stability is required to decide surgical intervention or non-operative management.

A combined evaluation comprising of physical examination, imaging techniques, hemodynamic assessment and monitoring the patients have decreased the number of non-therapeutic laparotomies and have increased the non-operative management of solid organ injuries.

In short, morbidity and mortality can be prevented by timely initial resuscitation and correct diagnosis as well as management (operative or non-operative) which depend on patient's hemodynamic stability and findings of imaging studies.

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