

A Clinical Study of Blunt Trauma Abdomen with Respect to Management and Outcome in a Tertiary Care Hospital

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ABSTRACT

Introduction: Following injury to the extremities and head, abdomen is the third most commonly injured part of the body. Blunt abdominal trauma (BAT) is particularly deceptive because of the delay in clinical manifestations for hours or even days, even though the damage to the internal organs might be serious and lethal. Road traffic accident (RTA) is the most common mode of injury to cause BAT. Diagnostic modalities like FAST and CT scans have caused a significant change in the trends regarding management from surgical to a more conservative approach. Current research aimed to study the blunt trauma abdomen with respect to management and outcome in a tertiary care hospital.

Material and methods: This observational study is based on 50 cases of BAT who presented in Rohilkhand Medical College & Hospital with respect to clinical presentation, investigations, management and outcome. Results and outcomes will be depicted in various tables.

Results: In the present study, demographic data like age and sex, the mode of injury, presenting Hb (in gm%), commonly injured organs, the management done and the associated mortality was observed and compared. It was found that BAT commonly involves young males in the age group of 30-40 years. RTA is found to be the most common mode of injury. Spleen was the most commonly injured solid organ followed by liver. Hollow viscus injury was seen in 10 out of 50 patients in our study. Conservative management was done in 37 out of 50 patients. Mortality was observed in 3 out of 50 cases.

Conclusion: The study was conclusive of the fact that young males who sustained BAT due to RTA were the most commonly affected group. It also was conclusive that spleen and liver are the most commonly injured organs in BAT and conservative management should be followed wherever possible. Mortality was significantly higher in patient presenting with decreased hemoglobin.

Keywords: Blunt Abdominal Trauma, Solid Organ Injury, Hollow Viscus Injury

resulting in one of the largest threats against human lives and safety.¹ India is the leading country in the number of deaths due to Road traffic accidents.²

Following injury to the extremities and head, abdomen is the third most commonly injured part of the body. Abdominal trauma can be broadly classified into two major categories- 1) Penetrating trauma to the abdomen 2) Blunt trauma to the abdomen. Among the two, Blunt trauma to the abdomen is the more common form of injury.

Amongst the many causes of blunt abdominal trauma, common modes are Road traffic accidents, Warfare injuries, Battering, Fall from Heights, Sports accidents, Martial arts, Athletics, Mountaineering etc. Road traffic accident is the most common cause of blunt trauma abdomen. Blunt trauma abdomen can result from deceleration, crushing or external compression mechanism.^{3,4}

Blunt trauma to the abdomen needs to be carefully evaluated to increase the chances of patient survival. Swift use of diagnostic modalities and vigorous therapy to attend immediate life-threatening problems should be administered. Focused assessment with sonography for trauma or FAST has emerged as a useful tool in the evaluation of blunt injury abdomen. Unavailability or unaffordability of diagnostic modalities mandate opening the abdomen for diagnosis rather than waiting.⁵

Concealed hemorrhage is the second most common cause of death after blunt trauma abdomen, and missed abdominal injuries are a frequent cause of morbidity and late mortality in patients who survive the early period after injury. Close vigilance and early institution of proper therapy results in decreased morbidity and mortality.^{6,7}

The main complications of abdominal trauma are haemorrhage and sepsis. Early mortality following abdominal trauma are usually due to haemorrhage. Blood can be surprisingly non-irritant and large volumes can be sequestered within the abdominal cavity before any clinical signs become evident. Blunt trauma frequently causes injuries to solid organs such

INTRODUCTION

Trauma has been called the neglected disease of modern society, despite its close companionship with man. Trauma is the leading cause of death and disability in developing countries and the most common cause of death under 45 years of age.

Countries across the world are going through major urbanization, motorization, industrialization and alteration in the socioeconomic values. India is no different to this changing trend. Due to these changes, road traffic accidents have become the most important public hazard in the world,

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as the spleen and liver.⁸

Sepsis is the most common cause of death occurring after 48 hours after injury. Hollow viscus injury leading to spillage of gut contents is the usual cause of intraabdominal sepsis following trauma and occurs frequently with penetrating trauma. In stab wounds it is easier to predict the injured organs as the injuries are usually confined to the tract.⁹ Blunt abdominal trauma can also result in rupture of intra-abdominal, retroperitoneal and pelvic hollow viscera. Blast is a potent cause of blunt trauma in military practice, especially affecting gas-filled viscera.^{10,11}

The management of blunt trauma abdomen has undergone a paradigm shift from immediate explorations, as was the norm, to a conservative and more selective management today because of better intensive monitoring of patients aided by noninvasive technology. Development of newer therapeutic modalities - such as embolization of bleeding vessels, ultrasound or CT guided drainage and advances in critical care management have increased the chances of nonsurgical management.¹² Availability of intensive monitoring is also important. The patient is strictly observed by serial physical and radiological examinations. Operative interventions need to occur expeditiously in hemodynamically unstable patients.¹²

Current research aimed to study the blunt trauma abdomen with respect to management and outcome in a tertiary care hospital, with the objectives to study the pattern of blunt injury abdomen and the mode of injury and involvement of various abdominal organs, to study the various investigations modalities and their application in the management of blunt abdominal trauma, to study the post-traumatic management with respect to conservative and surgical modalities in patients of blunt abdominal trauma and to study the morbidity and mortality among patients admitted to our hospital with blunt injury abdomen.

MATERIAL AND METHODS

It was an observational study of 50 patients presented to Department of General Surgery Rohilkhand Medical College, Bareilly with history and presentation of blunt trauma abdomen and filtered through the pre determined inclusion and exclusion criteria. Informed consent was obtained from all the participants. Ethical approval for the study was obtained from the Institutional Ethical Committee. After admission data for my study was collected by:

1. Direct interrogation with the patient or patient relatives accompanying the patient and obtaining a detailed history.
2. Thorough clinical examination and relevant investigations done giving priority to life saving procedures.
3. Clinical findings and relevant investigations reports are entered in the proforma prepared for the study.

Documentation of patient's data which included identification, history, clinical findings, diagnostic test, operative findings, operative procedures, complications during the stay in the hospital and during subsequent followup period, were all

recorded on a proforma specially prepared. Demographic data collected included the age, sex, occupation and nature and time of accident leading to the injury. After initial resuscitation and hemodynamic stability, all patients were subjected to careful examination, depending on the clinical findings; decision was taken for further investigations such as diagnostic peritoneal lavage, x ray abdomen and FAST, CT abdomen. The decision for operative or non-operative management depended on the outcome of the clinical examination, hemodynamic stability and findings of CECT abdomen and other relevant investigations.

The results are presented in frequencies, percentages and mean \pm SD. The Chi square test was used to compare the categorical variables. The p-value <0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version.

RESULTS

A total of 50 patients were observed and the observations were interpreted in form of charts and tables.

About one third of the patients were of 20-30 years age (34%) followed by 31-40 (26%), >40 (24%) and <20 (16%) years. The mean age of patients was 34.20 ± 15.48 years. Among all the patients, 42 (84%) were males (table-1).

About half of the patients had RTA (48%) followed by assault (30%) and self fall (22%) as their mode of injury (figure-1). Spleen was found to be the most commonly organ injured on USG (44%). Liver was found to be the second most commonly organ injured on USG (36%) (figure-2).

Liver was found to be the most common organ injured in CT

Age in years	No. (n=50)	%
<20	8	16.0
20-30	17	34.0
31-40	13	26.0
>40	12	24.0
Mean \pm SD	34.20 \pm 15.48	

Table-1: Depicts the various age group of the presenting population.

Organ injured	No. (n=38)	%
Spleen	11	36.7
Liver	12	40.0
Kidney	1	3.3
Hollow viscus	4	13.3
RPH	2	6.7

Table-2: Depicts the commonly injured organ in CT Scan.

Hb	No. of patients	Death		Improved		p-value ¹
		No.	%	No.	%	
<8	2	2	100.0	0	0.0	0.001*
8-10	24	1	4.2	23	95.8	
>10	24	0	0.0	24	100.0	

Table-3: Depicts the mortality and its association with the presenting Hb.

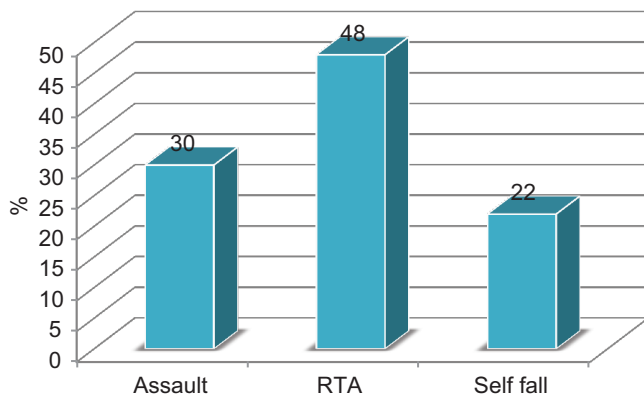


Figure-1: Depicts the various mode of injury in the presenting population.

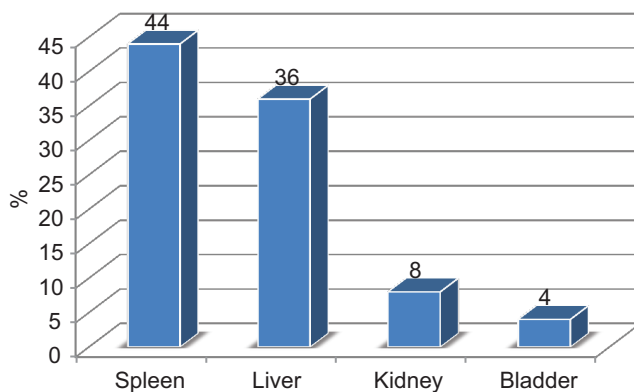


Figure-2: Depicts the commonly injured organs on USG.

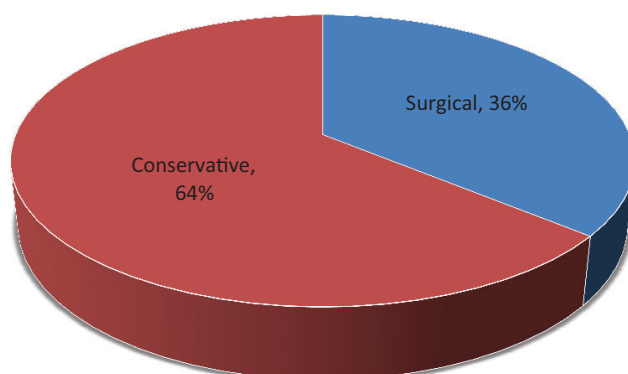


Figure-3: Depicts the modality of treatment assumed in presenting population

findings (40%). Spleen was the second most common organ injured in CT findings (36%) (table-2).

36% (18) of the patients underwent emergency laparotomy because of pneumoperitoneum, or hemodynamic instability or peritonitis. 64% (32) patients were managed conservatively (figure-3).

Mortality was observed in 3 (6%) of the patients. All the mortality were in the patients who had Hb<8. The association of outcome with Hb was significant ($p=0.001$) (figure-3).

DISCUSSION

Blunt abdominal trauma is a hazardous task even to the best of traumatologists. Abdominal findings may be absent in 40% of patients with hemoperitoneum. Sometimes clinical evaluation of blunt abdominal injuries may be masked by

other more obvious external injuries.⁹

Trauma is one of the most common causes of death in the young population (age group between 1 and 45 years). Blunt abdominal trauma (BAT) is very common, and the prevalence of intra-abdominal injury following it has been reported to be as high as 12–15%. The mechanisms resulting in BAT were motor vehicle collision (73%), motorcycle collision (7%), auto-pedestrian collision (6%) and fall (6%).¹⁰

The abdomen is the third most common injured region, in 25% of cases who require surgical interference. Abdominal trauma is classified as either blunt or penetrating. Penetrating abdominal trauma is easily diagnosed, while blunt trauma complications can be missed if the clinical signs are not evident.¹¹ Hemodynamic instability, disturbed level of consciousness and presence of other injuries in the skull, chest, pelvic bones or extremities, all explain the need of an accurate and rapid imaging tool to diagnose associated abdominal visceral injuries.¹²

Present study was carried out in the Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh with the objective to study blunt trauma abdomen with respect to management and outcome in a tertiary care hospital.

A total of 50 blunt trauma abdomen patients were included in the study. In the present study, about one third of patients were 20-30 years (34%) followed by 31-40 (26%), >40 (24%) and <20 (16%) years. The mean age of patients was 34.20 ± 15.48 years. Anarase and Anarase (2019)¹³ found that of the 260 patients of blunt trauma abdomen, the most common age group was 21-40 years. In the study by Umare et al (2018)¹⁴, the most cases of blunt abdominal trauma were between the age group of 11-40 years (76%). Rahman and Das (2018)²⁰ found that the commonest age group was 21 to 30 years comprised about 39% of BAT patients. The average age was 30.82 years. Shah et al (2017)¹⁵ studied 34 patients of BAT. 29.4% of patients were in the age group of >20-30 years with the mean age 35.29 ± 15.84 years.

Majority of patients were males (84%) in this study. As in this study, Anarase and Anarase (2019)¹³ found that male predominance (62.70%) seen in patients of blunt abdominal trauma. Umare et al (2018)¹⁴ also found that males were predominantly affected of blunt abdominal trauma.

About half of the patients sustained RTA (48%) followed by assault (30%) and self-fall (22%) in the present study. Anarase and Anarase (2019)¹³ also found that road traffic accidents were the predominant cause of trauma. In the study by Rahman and Das (2018)¹⁶, the most common cause of BAT was found to be road traffic accidents (67%) which was slightly higher than the present study. Shah et al (2017)¹⁵ also found that road traffic accident was responsible for 79.4% of blunt abdominal trauma cases. Arumugam et al (2015)¹⁷ showed that road traffic accidents (61%) were the most frequent mechanism of injury followed by fall from height (25%) and fall of heavy object (7%).

Ultrasound is non-invasive, portable investigation using non ionizing radiation, repeatable, and easily performed in the emergency unit, at the same time with resuscitation methods. Focused abdominal sonography for trauma (FAST) is a fast

examination method that could demonstrate intraperitoneal fluid. Several studies found this technique to be sensitive (79–100%) and specific (95.6–100%), particularly in hemodynamically unstable patients.¹⁸

In the present study, spleen was the most commonly injured organ on USG finding (44%). Liver was the second most common organ injured on USG finding (36%). Liver was the most commonly injured organ in CT findings (40%). Spleen was the second most commonly injured organ on CT findings (36%). Anarase S, Anarase (2019)¹³ found that spleen and liver were the most commonly injured organs, 37.69% and 25% respectively. Another solid organ i.e. kidney is having an incidence of 2.3%. Hollow viscous injury was less than solid organ injury. The findings of this study were similar as reported by Parreira et al (2015)¹⁹ and Mehta et al (2014).²⁰ While Ravikanth et al (2015)²¹ found liver injury (26%) more than splenic injury (20%). Associated injuries as head injury, chest injury, pelvic fracture and other orthopedic injuries were seen in 108 (41.53%) patients.

In this study, conservative management was done in more than half of patients (64%). With respect to operative management, Bowel perforation repair was done in more than half of patients that were operated (55.55%) followed by Splenectomy (27.77%) and Peri hepatic packing for liver trauma (16.66%). Anarase and Anarase (2019)¹³ showed that the commonest procedure done was Splenectomy (34.8%). Umare et al (2018)¹⁴ showed that 58% patients of BAT were managed conservatively while operative interventions were required in 42% patients. Common surgeries performed in the studied cases included splenectomy (28.57%), primary closure of perforation (23.80%) and resection and anastomosis (19.04%). Rahman and Das (2018)¹⁶ showed that 53.52% of patients having solid organ injured were managed conservatively. Out of 60 operative cases, 25 (41.7%) cases were operated within 3-6 hours. Shah et al (2017)¹⁵ showed that 9 (26.5%) patients underwent exploratory laparotomy. 25 were selected for non-operative management. Kurane and Ugane (2017)²² showed that Ileum was the most commonly site of perforation, and postoperative complications were seen in 66% of patients.

This study found that the mortality was observed in 6% of patients. Shah et al (2017)¹⁵ found that mortality was among 8.8% BAT patients. Kurane and Ugane (2017)²² found higher mortality rate than the present study which was 22.22% of patients. Arumugam et al (2015)¹⁷ found that the overall mortality was 8.3% and late mortality was observed in 2.3% cases mainly due to severe head injury and sepsis. The predictors of mortality were head injury, ISS, need for blood transfusion, and serum lactate levels.

In this study, the mortality was found to be higher among the patients of age 20- 30 years (11.8%). However, the association of outcome with age was insignificant ($p>0.05$). In this study, the mortality was found to be higher among female patients (12.5%) than males (48%). However, the association of outcome with gender was insignificant ($p>0.05$). In this study, the mortality was higher among who had self-fall (9.1%) than assault (6.7%) and RTA (4.2%).

However, the association of outcome with mode of injury was insignificant ($p>0.05$). In the best knowledge of the researcher, none of the studies had reported such associations, hence comparisons could not be made.

CONCLUSION

It was observed that road traffic accidents was the most common cause of blunt abdominal trauma in this study, involving younger age group between 30-35 years most commonly. Males sustaining blunt abdominal trauma outnumbered the females. Diagnostic investigations like FAST, X-ray erect abdomen and CT scan form an important tool in the management of these trauma patients. Among the solid organs, spleen and liver were the most commonly injured organs and bowel injury was also seen in a significant number of patients. As stated before, conservative approach is preferred over surgical approach as it is safe and effective if followed judiciously. Strict adherence to the traffic rules, improving the road conditions, pedestrian lights, pedestrian overpasses etc may reduce the chances of accidents and therefore abdominal trauma. Delayed presentation, involvement of more than one intra-abdominal organ, presence of extra-abdominal injuries and associated comorbid diseases increases the morbidity and mortality in these patients. Early diagnosis, aggressive resuscitation and timely surgical intervention may improve the outcome in trauma patients.

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