

DIAGNOSTIC VALIDITY OF BLUNT ABDOMINAL TRAUMA SCORING SYSTEM (BATSS) ON BLUNT ABDOMINAL TRAUMA PATIENTS ADMITTED IN OSMANIA GENERAL HOSPITAL

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Abstract

Background: To determine the diagnostic validity of Blunt Abdominal Trauma Scoring System (BATSS) score in blunt abdominal trauma cases admitted to Osmania General Hospital. **Materials and Methods:** A 50 cases of Blunt abdominal trauma patients admitted in the Department of General Surgery, Osmania General Hospital, Hyderabad from December 2019 to July 2021. **Result:** There are 50 patients, 39 were male (78%) and 11 were female (22%) patients who meet the inclusion and exclusion criteria. In this study, majority of the patients belonged to 21-30 years age group, followed by 31-40 years, with mean age of 31.2 years. The most common mode of injury is Road traffic accidents (66%) followed by fall (22%) and assault (12%). The recovery rate of the patients admitted for blunt injury abdomen is 92%, the mortality rate is 8%. **Conclusion:** Blunt trauma abdomen is a major cause of morbidity and mortality in young and economically productive age-group. Small bowel is the second most commonly injured viscera and majority of them were managed by primary repair. BATSS score, higher values (≥ 12) are associated with increasing need of laparotomy and increasing mortality, lower values are associated with no or low need of laparotomy and no mortality.

INTRODUCTION

Motor vehicle accidents rank 6th among the most common causes of death¹. Blunt injury of abdomen occurs as a result of road traffic accidents, fall from height, assault with blunt objects, sport injuries, and fall from riding bicycle. The most common cause of abdominal trauma is road traffic accidents (RTA) which account for 75-80% of all cases of blunt abdominal trauma. The Indian fatality rates for trauma are 20 times more than that of developed countries.^[1]

The incidence of blunt abdominal trauma is around 80% of all abdominal trauma.^[2] Economic burden caused by trauma is quite significant. It is estimated that 26% of trauma cases end in loss of life, and more than half of these happen in the productive age group.^[3]

The rapid diagnosis of abdominal injury is an important step for management and to prevent morbidity and mortality in cases of blunt abdominal trauma.^[4]

The morbidity and mortality because of blunt injury abdominal injury still remains large despite the advances in management.

The most common organ involved in blunt injury abdomen is spleen followed by liver. The treatment of choice in haemodynamically stable patients with blunt injury abdomen is conservative management.

In view of increasing number of automobiles and road traffic accidents, and as to this date, there is no scoring system used as guidance in predicting injury to intra-abdominal organs, this study has been chosen to study the cases of blunt abdominal trauma with reference to the patients presenting at Osmania General Hospital, Hyderabad.

Aim of the Study

1. To determine the leading cause of blunt abdominal trauma.
2. To evaluate the impact of blunt abdominal trauma on intra-peritoneal organs like liver, spleen and hollow viscera like stomach, small and large intestine.
3. To evaluate various modes of presentation in abdominal trauma.

MATERIALS AND METHODS

A 50 cases of Blunt abdominal trauma patients admitted in the Department of General Surgery, Osmania General Hospital, Hyderabad from December 2019 to July 2021.

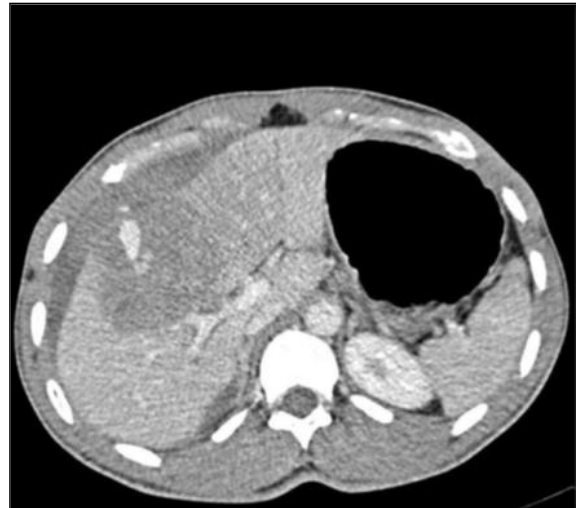
Inclusion Criteria

- Patients aged 18 and over who experienced blunt abdominal trauma admitted at Osmania General Hospital, Hyderabad.

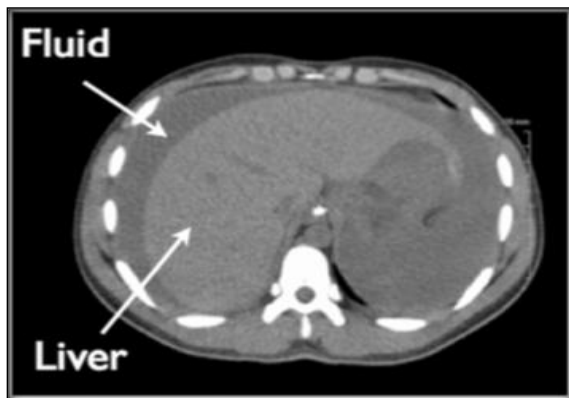
Exclusion Criteria

- Patients with decrease in awareness (GCS) <15
- Pregnant women
- Patients refusing exploration laparotomy
- Patients refusing contrast abdominal CT scan.

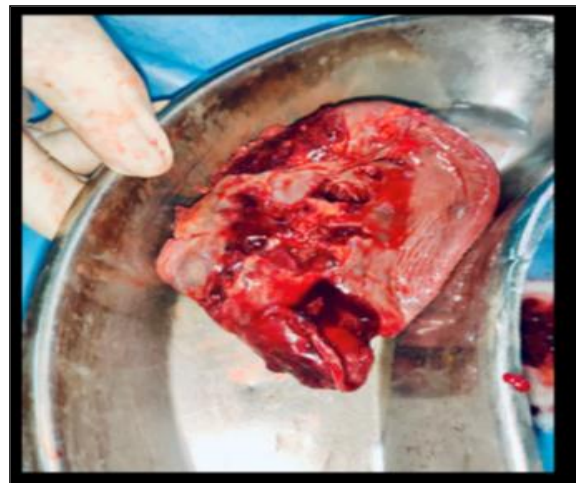
Computerized Tomography of Abdomen (CECT)



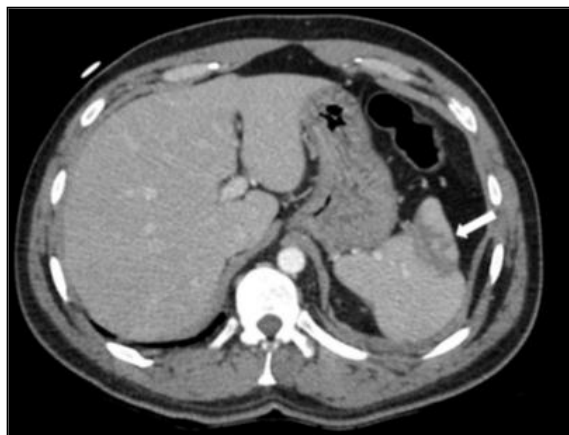
CECT Showing Liver Laceration



CECT showing free fluid



Splenectomy Specimen



CECT Showing Splenic Laceration



Mesenteric Tear with Hematoma



Jejunal Perforation with Mesenteric Tear

RESULTS

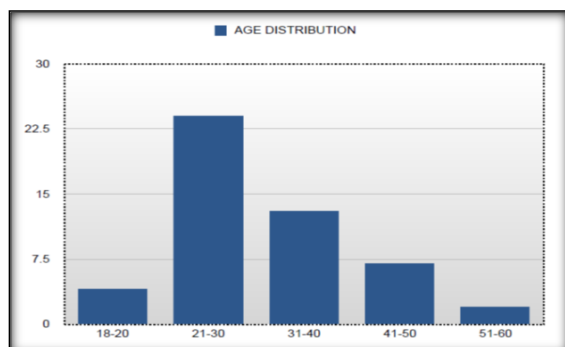


Figure 1: Age Incidence

There are 50 subjects who meet the inclusion and exclusion criteria. The characteristics of the subjects are described in the table.

Table 1: Characteristics

Variable		Respondents (n=50) %
Age (yrs old)		31.2 ± 9.71
Sex	Male	39 (78%)
	Female	11 (22%)
Abdominal pain	Yes	40 (80%)
	No	10 (20%)
Abdominal tenderness	Yes	41 (82%)
	No	9 (18%)
Chest wall sign	Yes	13 (26%)
	No	37 (74%)
Pelvic fracture	Yes	3 (6%)
	No	47 (94%)
Fast	Positive	29 (58%)
	Negative	21 (42%)
SBP	> 100 mm Hg	38 (76%)
	< 100 mm Hg	12 (24%)
Heart rate	> 100 mm bpm	13 (26%)
	< 100 mm bpm	37 (74%)
BATSS Score	< 12	27 (54%)
	≥ 12	23 (46%)
Abdominal scan / Laparotomy	IAI (+)	27 (54%)
	IAI (-)	13 (26%)

Table 2: mode of injury

Mode of Injury	Number	Percentage %
ASSAULT	6	12
FALL	11	22
RTA	33	66

Table 3: batss score

BATSS SCORE	Number	Percentage %
<8	18	36
8 – 11	5	10
> 12	27	64

Table 4: Organ Wise Injury

Organ Injury	No. of Cases	Percentage %
Spleen	16	30
Small bowel	10	20
Liver	4	8
Pancreas	4	8
Urinary bladder	4	8
Kidney	2	4

Table 5: outcome

Outcome	BATSS < (Low Risk)	BATSS < (Medium Risk)	BATSS > 12 (High Risk)
Recovery	18	5	23
Death	0	0	4

Table 6: the validity of BATSS score for diagnosing IAI

Organ Injury	No. of Cases	Percentage %
> 12	24	3
< 12	3	20

DISCUSSION

Abdominal trauma is a frequent cause of death, found in about 7-10% of trauma patients. Incidence of blunt abdominal trauma was 80% of the overall abdominal trauma cases.^[5]

Therefore, it is necessary to consider a screening method that is FAST (Focused Assessment with Sonography for Trauma), precise, and has a fairly high degree of accuracy in the initial assessment and determines patients who are at high risk so that they can provide adequate treatment and ultimately can reduce morbidity and mortality.^[6]

The BATSS score is a scoring system introduced by Shojaee et al,^[7] in 2014 which served as an initial screening to detect patients who had injury of intra-abdominal organs due to blunt abdominal trauma. This scoring system can be used as a reference for diagnosing the injury to intra-abdominal organs. The score variable used is quite simple because it only uses history taking, physical examination, and simple investigations.

This was a prospective study that was conducted on 50 cases admitted with blunt abdominal trauma in Osmania General Hospital, Hyderabad which included 39 males (78%) and 11 females (22%). Their ages ranged from 18 to 59 years included majority of cases from 21-30 49 years (48%). This illustrates that men have higher mobility, especially in productive age.

This is consistent with several studies conducted by Mehta et al,^[8] Reddy et al,^[9] and Behboodi,^[10] who stated that patients who experience blunt abdominal trauma were predominantly male than female with a ratio of 3.7:1 and with the highest age in the 21-30 year age group. This illustrates that men have higher mobility, especially in productive age.

In agreement with our findings, the study of Vanitha and Prasanth,^[11] (2018) reported that the majority of patients admitted with Blunt abdominal trauma by various Medical Colleges belonged to 21-30 years age group, followed by 31-40 years age group and in the 100 cases studied by them, 88 cases were males with females accounting for 12 cases.

The retrospective study of Arumugam et al (2015) reported that 15% had abdominal trauma and the majority was males (93%).^[12]

Abdominal pain is a common complaint that most patients have. In this study, 80% of patients had abdominal pain and 82% had abdominal tenderness. This is supported by several studies by Mehta et al, Pareira et al, And Holmes et al.^[8,13,14]

The study of Karjosukarso et al,^[15] (2019) reported that 75% had abdominal pain, 77.3% had abdominal tenderness, 22.7% had chest wall sign, 88.6% had pelvic fracture, and FAST score was positive in 86.4%.

In the study of Adelgais et al,^[16] it was reported that the sensitivity of abdominal pain and abdominal tenderness will decrease if there is a decrease in consciousness. Other things that can reduce the sensitivity of abdominal pain and abdominal tenderness include the effects of hemoperitoneum and variations in injury from a variety of symptoms of solid or hollow organ injuries that make interpretation difficult, even though there is a multiorgan injury or in a multi trauma patient.

Blunt abdominal trauma patients accompanied by pelvic fractures as many as 6% of patients and without pelvic fractures as much as 94%% of patients. Demetriades et al,^[17] (2012) where in 16.5% of patients experienced blunt abdominal trauma associated with pelvic fractures.

The percentage of patients with lesions on the chest wall was 26%. In patients with right rib fractures, especially in lower parts, injury to the lower organs is often found, especially the liver. The presence of mid-epigastric contusions indicates the possibility of injury to the lower organs such as the duodenum and pancreas.

Moreover, the previous study of Shojaee et al,^[7] (2014) showed that 62.5% had abdominal pain, 10.4% abdominal guarding, 75% abdominal tenderness, 35.4% abdominal wall sign, 20.8% rib tenderness, 16.7% chest wall sign and 16.7% pelvic fracture. Systolic blood pressure (SBP) lower than 100 mmHg, diastolic blood pressure (DBP) lower than 70 mmHg and PR over 100 beats/min were recorded in 64.6%, 31.2% and 33.3% patients respectively. FAST results were positive detection of intra-abdominal free fluid in ultrasound in 87.5% IAI patients.

FAST results were obtained by patients with positive FAST results of 29 (58%) and negative FAST results as many as 21 (42%) patients. The accuracy of this FAST examination is likely to be influenced by the FAST operator's ability.

In the present study, we revealed that 54% were High risk (≥ 12) according to blunt abdominal trauma severity score, 10% was of medium risk (8 – 11), and 18% was of Low risk (< 8).

In a harmony with our findings, Hamidi et al,^[18] (2010) which was a retrospective analysis based on existing, diagnostic CT scan reports taken during a 5-year period from consecutive patients with blunt abdominal trauma, and reported that among the solid organ injuries, the spleen was the commonest organ involved.

56% has undergone conservative method, 44% undergone different surgical procedures, and as regard procedures done, 20% undergone splenectomy, primary repair of small bowel perforation was done in 12%, resection and anastomosis in 8%, bladder repair in 4%.

In contrary to our findings, Howes et al,^[19] (2012) included all blunt torso trauma patients admitted and observed that only 8% of blunt abdominal trauma patients required laparotomy.

In contrast, an earlier study of Hildebrand et al,^[20] (2018) reported an incidence of morbidity following abdominal trauma of 11.3%. In our study, the lower incidence of morbidity could be related in part to the young healthy patients with no associated comorbidities.

In agreement with our study, there is statistical significance between procedure done and blunt abdominal trauma severity score, which was supported by the study of Vanitha and Prasanth (2018) who recommend that, in the high-risk group (score more > 12), immediate laparotomy should be done, moderate group needs further assessments, and low risk group should be kept under observation.

Trauma is one among the leading causes of death. The evaluation of patients who have sustained blunt abdominal trauma (BAT) may pose a significant diagnostic challenge to the most seasoned trauma surgeon. Medical management of blunt abdominal trauma (BAT) relies on judging patients for whom laparotomy is mandatory.

In agreement with the present study, the results of validity of BATSS score showed 91.4% sensitivity and 77.77% specificity in diagnosing injuries of an intra-abdominal organ. BATSS score has a high positive predictive value of about 94.1% for diagnosing some subjects with injuries of an intra-abdominal organ if the BATSS score is ≥ 12 as concluded by karjosukarso et al.

CONCLUSION

BATSS score can be very helpful as an early diagnostic tool for identifying and stratifying the patients with high risk of intraabdominal injuries from blunt abdominal trauma.

BATSS score is obtained by combining clinical examination findings with FAST findings. Our study report that a value more than 12 can be strong predictor for laparotomy with a sensitivity of 88.89% and a specificity of 90.91%. In our study, the positive predictive value is 88.89% and negative predictive value of 90.91%.

A value of 12 or more BATSS is associated with need of laparotomy and such patients should be planned for laparotomy as soon as the patient is received in the casualty. This will help in the triage of patients and in helping in reducing the time in shifting the patient to operative table.

The BATSS score system can be used as an initial screening to predict blunt abdominal trauma outcome and can be the basis of management in patients who experience blunt abdominal trauma.

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