

MANAGING HEMOPERITONEUM IN BLUNT ABDOMINAL TRAUMA: A TERTIARY CARE CENTER EXPERIENCE

Medical Science

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ABSTRACT

Background: Blunt abdominal trauma leads to significant morbidity and mortality across all age groups, primarily due to road traffic accidents, falls from heights, and physical assaults. This study aimed to assess the management outcomes of hemoperitoneum resulting from blunt abdominal injuries. **Methods:** This is a prospective longitudinal study involving 60 cases of blunt abdominal injury during the period from 1 st July, 2023 to 30th June, 2024 in Darbhanga Medical College and Hospital, Darbhanga, Bihar. Documentation of the patients which included the identification, history, clinical findings, diagnostic tests, operative findings, operative procedures, complications during hospital-stay was done. The decision regarding operative or non-operative management was made by specialist surgeon. **Results:** The majority of the patients belonged to 21- 30 years age group. 42 cases were male while 18 were female. 54 patients were managed conservatively while 6 patients were operated. Most common mode of injury was road traffic accident (RTA) (75%) followed by fall from height (16.7%). Most common organ to be injured was spleen (50%) followed by liver (40%). 90 % patients underwent non-operative management while 10% were operated. Mortality rate was 0% among the non-operative and 16.67% in operative cases. **Conclusion:** Non operative management in patient with hemoperitoneum with regular monitoring of vitals and repeated clinical assessment can reduce the operative need, morbidity and length of hospital stay. Non-operative Management (NOM) for blunt abdominal injuries was found to be highly successful in 90% of the patients in this study.

KEYWORDS

Blunt abdominal trauma, Hemoperitoneum, Non operative management

INTRODUCTION

Blunt abdominal trauma represents a prevalent reason for emergency hospital visits in developing nations and stands as the primary cause of morbidity and mortality among individuals under 45 years old(1). Splenic injuries account for 40% and liver injuries for 20% of abdominal organ traumas, often resulting in hemoperitoneum(2)(3). Approximately 25% of abdominal injury cases necessitate surgical intervention, while stable patients can be conservatively managed with vigilant monitoring(4).

This interpretation emphasizes the profound implications of blunt abdominal trauma, the prevalent organ injuries (such as spleen and liver), and the critical management considerations based on the patient's hemodynamic stability and clinical status. "Hemoperitoneum" denotes the presence of blood in the peritoneal cavity, often stemming from these injuries. The crucial lesson underscores the necessity for vigilant patient monitoring and readiness to transition to surgical intervention if their condition deteriorates despite initial attempts at non-operative management(5).

There is a growing trend towards non-operative management (NOM) of blunt trauma, encompassing approximately 80% of cases, with failure rates ranging from 7-8%. Effective pre-hospital transportation, initial assessment, comprehensive resuscitative measures, and accurate diagnosis play pivotal roles in trauma management(6).

The objective of this study was to assess the outcome of management of hemoperitoneum in blunt injury abdomen.

MATERIALS AND METHODS

Study Design

This prospective longitudinal study included patient for 12 month – 1st July 2023 to 30th June 2024, from the Surgery Department of Darbhanga Medical College and Hospital, Darbhanga, Bihar. This study was conducted after approval from the Ethical Committee of the Institute. Patients' consent were taken before data collection and proper data collection and proper statistical analysis was done.

Inclusion Criteria

- All patient with blunt trauma abdomen of any age and sex that

were admitted via Surgery Emergency Department of the Institute and who gave consent for the study.

- Patients with associated non life threatening limb, spine, chest and head injuries were included

Exclusion Criteria

- Patients have not given consent to participate in the study.
- Patient with penetrating injuries (stab or gunshot).
- Patients with hollow viscus injury.
- Patients below 10 yr of age
- Patients with associated life threatening limb, spine, chest and head injuries were excluded

METHODOLOGY

All patients were assessed in accordance with ATLS (Advance trauma life support) protocol.

Detailed history including mechanism, mode and site of injury formed an important part of evaluation. Mechanism of injury was defined as a road traffic accident (RTA) or non - RTA. Patients were categorized to stable vs unstable.

Patients with (Heart Rate) HR< 100/ min, systolic (blood pressure) BP> 90 mm Hg on arrival or following initial resuscitation, were considered stable. All patients underwent FAST (focussed assessment with sonography for trauma) scan, X ray chest.

Unstable patients were further evaluated with chest abdomen and pelvis CT scan. Isolated organ injury (liver, spleen, kidney), multiple solid organ injury, extra abdominal injuries were recorded.

The patients with other associated injuries like limb trauma, chest injury, head injury or other solid organ injuries which were not life threatening were included in the study.

Non operative management of unstable patients involved admission to ICU (intensive care unit), close monitoring with repeated clinical assessments. Pulse, BP, temperature, respiratory rate, urine output, hemoglobin, hematocrit, abdominal girth for the first 72 hours were assessed and recorded. Follow-up ultrasonography of abdomen or CT scan were done, if hemoglobin dropped despite 3 units of blood

transfusion, progressive distension of abdomen, tachycardia, signs of infection, vomiting, tachypnea.

Stable patients were admitted in surgical ward monitored with cardiac monitor device and pulse oximeter. In our study, there was not a cut-off hematocrit value and therefore, transfusion was rather empirical. Patient who required transfusion in the first hour were kept under observation and the need for further transfusion was evaluated during the period of next 48 hours. No patient from this series was transferred to a higher level trauma centre.

Statistical Analysis

All data were analysed by Statistical Package for Social Sciences (SPSS). Categorical data were represented by frequency (%), bar-diagrams and pie-charts.

RESULTS

Demographic Profile –

We include 60 blunt trauma patients (42 male and 18 female) with mean age of 31.8 years. The most common age group involved was 21-30 years (33.3%)(figure 1).

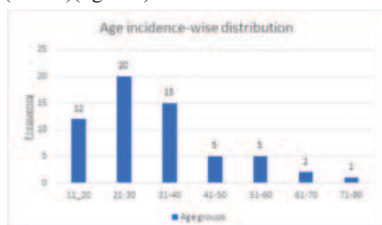


Figure 1. Bar Diagram Showing Frequency Distribution Of Age Group In Cases

The majority of the mode of injury was road traffic accident accounting 75% followed by fall from height with frequency of 16.7% (figure 2).

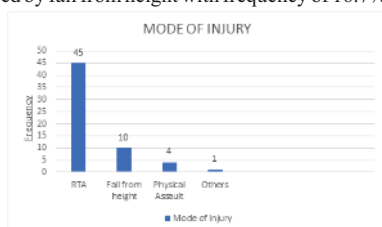


Figure 2. Bar Diagram Showing Frequency Distribution Of Mode Of Injury

The associated extra abdominal injuries were found in 19 case out of 60. The maximum associated extra abdominal injury was seen in head (20%) followed by thoracic (13.3%) (Table 1 & figure 3).

Table 1. Frequency Distribution Of Mode Of Injury.

Associated Extra-abdominal injuries	FREQUENCY	PERCENTAGE (%)
Thoracic	08	13.3
Head	12	20.0
Limb	04	6.7
Spine	01	1.7
No associated Injury	41	68.3
TOTAL	60	100.0



Figure 3. Pie Chart Showing Frequency Of Patients With Associated Injuries

The abdominal x-ray findings of the patients showed ground glass opacity in 53 cases (88.3%).

Out of all patients subjected to ultrasound examination, 100% were with free fluid with solid organ injury followed by 50% with splenic injury and 40% with liver injury respectively (Table 2).

Table 2. Frequency Of Patients With Different Types of USG Findings.

USG findings (Organ involved)	FREQUENCY	PERCENTAGE(%)
Spleen	30	50.0
Liver	24	40.0
Combination	06	10.0
TOTAL	60	100.0

The most common abdominal CT finding was splenic injury in 50% cases followed by liver injury in 40% cases (figure 4).

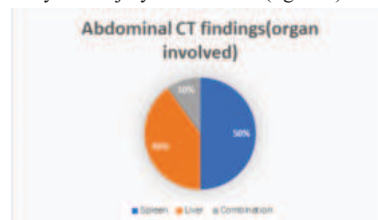


Figure 4. Pie Chart Showing Abdominal CT Findings

Multiple organ injuries which was present only in 10% cases in which 50% cases like multiple organ (liver & spleen) injuries as shown in Table 3.

Table 3. Frequency Of Patients With Multiple Organ Injuries

Multiple organ Injury	FREQUENCY	Percentage (%)
Liver & Spleen	03	05.00
Kidney & Spleen	01	01.67
Pancreas & spleen	01	01.67
Spleen & small bowel	01	01.66
Not present	54	90.00

Out of 60 cases, 54 were treated conservatively i.e., non-operative procedure while remaining 06 were underwent operative procedure (Figure 5).



Figure 5. Percentage Of Mode Of Management

The total mortality was only One{1} found following operative procedure with percentage of 16.67% while Five{5} cases i.e., 83.33% that underwent operative procedure shows improvement.

DISCUSSION

The advent of newer imaging techniques with high resolution CT scanners has enabled the clinicians to exactly diagnose the extent of intra-abdominal organ injury(7). With the publication of many reports of success during the last 20 years, NOM has become an established and accepted management protocol for solid organ injuries in hemodynamically stable patients.

In our study, the mean age group was 31.8 years. Majority of them are in the age group 21-30 years which constitutes 33.3% of the total cases followed by 31-40 years which constitutes 25.0% of the total cases which is in accord to study by Allen RB et al(8). The male to female ratio was 2.33:1 in our series while it was 7.5:1 in Dauterive et al(9). Allen R.B. and Clury CJ (1957) had male, female ratio 3:1(8). Mehta et al. found the male, female ratio to be 3.76:1.6(6). Thus, above findings were suggestive of injuries being common in males around 21 to 30 years of age suggesting the active group.

The most common mode of injury was RTA (Road Traffic Accident) accounting for 75.0% of total cases which is similar to findings in other study.(6,8,9)

Out of 60 patients, 41 cases were not associated with any extra abdominal injury. The most common associated injury was head injury with 20 % cases followed by thoracic injury in 13.3% . The common associated extra-abdominal injuries included chest (35%), musculo skeletal (32%), and head injury (24%) in the study conducted by Arumugam S et al(10). One hundred-twenty (27%) of the 437 patients had blunt chest trauma in case of JJ Davis series(11).

In our study, x-ray abdomen was done in all 60 cases. Ground glass opacity was found in 53 cases . All 60 patients underwent USG abdomen/ pelvis. Ultrasound examination revealed 100% were with free fluid in abdomen with solid organ injury i.e. 50% with splenic injury and 40 % with liver injury respectively. CT abdomen revealed 50% cases to have splenic injury followed by 40% cases of liver injury. Most common organ to be injured was spleen. Commonest intra abdominal injury was splenic injury in 53% followed by liver injury in Mehta et al. series(6). These results were consistent with findings from JJ Davis series(11).

In this study, multiples organ injuries which was present only in 10% cases. 90 % patients were subjected to non-operative management while 10% underwent different operative procedures. In case of non-operative management, the failure rate was 0 % ie. 90% patients who were managed conservatively, all survived. But, in cases in which operative procedures were undertaken, 1 out of 6 cases expired i.e. with mortality rate of 16.67% in operated cases. In the study conducted by JJ Davis et al(11) , 269 cases were operated among whom 40 deaths occurred resulting in mortality rate of 14.8% in operated case. In the same series, 3 out of 153 patients who were managed non-operatively died amounting to 2% mortality rate. NOM for blunt abdominal injuries was found to be highly successful in 89.98% of the patients in study conducted by Raza et al(12).

CONCLUSION

Road traffic accidents form the most common mode of injury. Males are predominantly affected. Spleen is the most common solid organ to be injured in case of BAT followed by liver injury. Thorough clinical examination and investigations like X- Ray, ultrasonography and CT Scan play valuable role in the management of blunt injury of abdomen. Non-operative management of hemoperitoneum in case of blunt injury of abdomen was found to be highly successful and safe in our analysis.

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