MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.8.189.193

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Key Words
Blunt trauma abdomen, solid organ injury, non-operative management, FAAST grading, arterial angioembolisation

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Received: 20 May 2024
Accepted: 29 June 2024
Published: 15 July 2024

Citation: Vinayak R. Byateppanavar, Vasant Kumar Teggimani, M.S. Suhas, and Akshatha K. Gowda 2024. A Study of the Outcome of Non-Operative Management of Blunt Abdominal Trauma with Solid Organ Injury. Res. J. Med. Sci., 18: 189-193, doi: 10.36478/makrjms. 2024.8.189.193

A Study of the Outcome of Non-Operative Management of Blunt Abdominal Trauma with Solid Organ Injury

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Abstract
Road traffic accidents (RTAs), falls from a height, bull injuries and assaults are the main causes of blunt abdominal trauma. To minimize consequences, early diagnosis and treatment of these patients are crucial. Along with a thorough clinical examination, radiological examinations are crucial to the evaluation of patients. In order to lower morbidity and mortality in these patients by better radiological evaluation, non-operative management, or N.O.M., is currently becoming more and more popular than surgical management. Hence, this study aimed to evaluate the advantages and safe outcomes after N.O.M and to assess conversion rates into operative management. This is a Prospective observational study in patients admitted in KIMS, Hubballi, with blunt abdominal trauma with solid organ injury subjected to N.O.M. after necessary assessment clinically, blood investigations and radiological investigations including FAST and CT abdomen and pelvis. Out of 63 N.O.M-treated subjects, 92% affected were males, primarily aged 21-30 (38%). RTA (61.9%) and falls from a height (30.2%) were the most common injuries. There were 3.17% failures and a 96.82% N.O.M. success rate. Low hemoglobin, tachycardia, and hypotension had no effect on outcome. Based on comprehensive clinical, laboratory and radiographic examinations, the initial chosen therapy for blunt trauma abdomen is non-operative care. The availability of ICU treatment and the existence of emergency operating rooms are taken into account.

INTRODUCTION

Abdominal injuries occur in 31% of polytrauma patients, including 13% and 16% of liver injuries and 28% of pelvic injuries, therefore differential diagnosis of pelvic or difficult-to-treat abdominal injuries is difficult[1,2]. Patients who exhibit clear symptoms of bleeding and are hemodynamically unstable should have a laparotomy., however, choosing such patients is still difficult, particularly in cases of polytrauma. In patients with hemodynamically stable blunt abdominal trauma, the high rate of surgical sequelae led to a paradigm shift from surgery to nonoperative treatment (NOM)[3,4]. With trauma surgeons, more advanced imaging modalities, an ICU, a high dependency unit (HDU) and other support services, NOM can be successfully used in trauma centers[5]. Therapeutic decision-making relies heavily on repeated clinical evaluation, supported by contemporary imaging and laboratory testing, to prevent needless laparotomies. Given that the liver has a higher success rate as a supportive organ[6,7]. Regardless of the extent of damage, liver and spleen lesions that are hemodynamically stable can be treated conservatively[8-10]. With a success rate of more than 90% in renal lesions, NOM is likewise exceedingly effective[11]. For patients who are hemodynamically stable, the NOM for solid abdominal lesions has now been defined. This study examines the results of blunt abdominal polytrauma injuries at a tertiary trauma hospital prospectively. Patients who showed clear symptoms of bleeding and were hemodynamically unstable had emergency laparotomies, although the choice to treat polytrauma is still difficult[12].

Aims and Objectives:

- To assess the severity of solid organ injuries in blunt abdominal trauma using clinical examination, laboratory investigations and radiological techniques.
- To determine the advantages and safe outcomes of nonoperative management.
- To analyze the conversion rates into operative management.

MATERIALS AND METHODS

- **Study Design:** Prospective observational study.

Source of Data: Patients presenting to KIMS, Hubballi with history of blunt trauma to the abdomen who satisfies inclusion and exclusion criteria as listed below.

- **Study Period:** January 2021 to January 2023.

Sample Size:

- P value 87%.
- q=13%, 10% allowable error.
- n=1.96 (square root of p*q)/l.
- n=44

Inclusion Criteria

- All cases with a history of blunt trauma to the abdomen due to various causes likeroad traffic accidents, fall from height, assault to the abdomen with a blunt object.
- Patient having a clinical suspicion of trauma to the abdomen.
- Injury occurring during natural calamity.

Exclusion Criteria

- Patient with penetrating abdominal injury (e.g., stabbing and gunshot injuries).

Statistics: The data was entered in Microsoft excel and SPSS Version 20 software was used for analysis. Continuous data was represented as mean+/- standard deviation and categorical data were represented as absolute numbers and percentages. Chi-square test was applied to find out the statistical significance between the group ($p<0.05$ was taken as significant).

Method of Collection of Data: Patients with blunt trauma abdomen who were admitted to the Karnataka Institute of Medical sciences Hubballi were given intensive assessments, including a comprehensive history, clinical examination and appropriate laboratory and radiological investigations (FAST/CT scan).

A prepared pro-forma was used to record clinical findings, accident history, patient information and ongoing monitoring during the comprehensive data collection process.

The choice between surgical and non-operative management (N.O.M.) was made on the basis of radiological examinations (such as DPL, FAST and CT scans of the abdomen and pelvis), hemodynamic stability and diagnostic tests. Selected N.O.M. patients had repeated diagnostic testing, rigorous bed rest, hourly monitoring, and were sent to the intensive care unit (SICU). Failure in N.O.M. was defined as laparotomy done more than 12 hours after the initial consideration of N.O.M. Success was defined as controlling solid organ injury without surgery.

Cases were monitored until they were released and results were noted. In order to determine the effectiveness of non-operative methods for blunt

trauma abdomen, the study examined all cases that were converted to operative therapy as well as those that were continued with non-operative management.

RESULTS AND DISCUSSIONS

The minimum age was 15yrs and maximum age was 75yrs, with Mean age 32.41+12.67 yrs. Among the study subjects, 92% were males, and 8% were females (i.e. 58 patients were males and 5 were females).

Graph 1. Shows the mode of assault. Majority of the patients had RTA (62%), followed by h/o fall (30%), assault (5%) and 3% of bull gore injury respectively.

Table 1, shows distribution of subjects according to associated other injuries with the blunt abdominal injury. Among 63 patients, majority of the patients presented with thoracic injury (30.16%), followed by 14.3% of the patients had presented with the orthopedic injury, 11.4% of the patients presented with the combined injury of thoracic and orthopedic injuries and least was presented with head injury (3.17%).

Table 2. Shows the distribution of study subjects based on clinical parameters. 12.7% of the patients had hypotension, rest of the 87.3% of the patients had normal blood pressure.47.6% were found to have tachycardia and rest of them were found to have normal pulse rate (i.e. 52.4%). Majority of the patients presented with tenderness of abdomen (i.e., 93.7%), followed by guarding (38.1%) and distension of abdomen (9.5%).Majority of the patients found to have positive outcome of positive peritoneal lavage (i.e., 61.9%). 34.92% of patients had presented with moderate anemia followed by mild anemia (17.46%) and severe anemia (9.5%).30% of the patients had transfused blood and remaining 70% of the patients did not get transfusedwith the blood respectively.

Table 3. Shows the outcome of non-operative management. Among 63 patients, majority of the patients (61 patients) showed the success rate of 96.83% and rest of the 2 patients had failure on the non-operative management (i.e., 3.17%) respectively.

Among the study population of 63 participants, 58 (92%) were male patients and 5 (8%) were female patients, In contrast, 42 (87.5%) of the 48 patients in the study by Atish N. Bansod and Rohan Umalkar[13] were male, while 6 (12.5%) were female. Men are marginally more likely than women, which may be related to their involvement in assaults, RTAs and bull gore injuries. Most people who drink and drive are men.

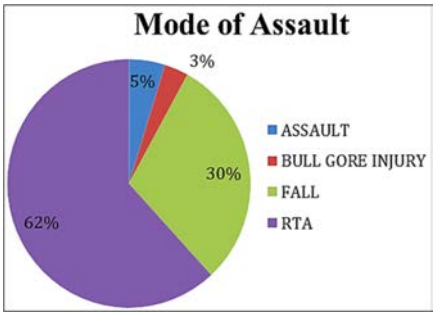
Out of 63 patients, participants were distributed according to age and minimum age was found to be 15yrs and Maximum age was 75yrs, with mean age of 32.41+12.67 years, with most of them falling between 21-30 years. Additionally, it was shown that the majority of patients were older than. Of the 63 participants in the study, 58 (92%) were 50-year-old males. In a study conducted by Atish N. Bansod and Rohan Umalkar[13], the age groups of 21-30 years (41.66%) and 31-40 years (31.25%) accounted for the majority of instances among the 48 patients.

This study indicated that traffic accidents were the most prevalent cause of injuries, accounting for 61.9% (39) and 30.2% (19) of all injuries, respectively. Falls from height were the second most common cause of injuries. Bull gore injuries and assaults accounted for 2 (3.2%) and 3 (4.8%) of the remaining forms of injury. In a study by Atish N. Bansod and Rohan Umalkar[13], it was discovered that 28 (66.67%) of the 48 patients' cases were related to traffic accidents.

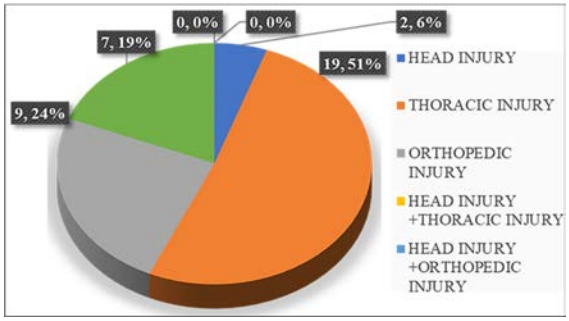
According to this study, at initial presentation, 8 patients presented with hypotension, that is systolic blood pressure 90mmHg or less that accounted for 12.7% of study participants.

This study indicated that at the time of initial presentation, 33 patients had a normal pulse rate and 30 patients had tachycardia, accounting for 52% and 48% of the cases, respectively.

This study found that 24 (38.1%) out of 63 patients had guarding of respective quadrants, 59 (93.7%) out of 63 patients had discomfort in respective quadrants, and 6 (9.5%) out of 63 patients had abdominal



Graph 1: Distribution of subjects according to the mode of injury



Graph 2: Distribution of subjects according to associated other injuries with the blunt abdominal injury

Table 1: Distribution of subjects according to associated other injuries with the blunt abdominal injury

Associated Injuries	Frequency	Percent
Head Injury	2	3.17
Thoracic Injury	19	30.16
Orthopedic Injury	9	14.3
Head Injury + Thoracic Injury	0	0
Head Injury + Orthopedic Injury	0	0
Thoracic Injury + Orthopedic Injury	7	11.4
Total	63	100.0

Table 2:Distribution of subjects based on clinical parameters

Clinical Parameters	Sub-variables	Frequency, Percentage
Blood Pressure	Normal Hypotension	55 (87.3%) 8 (12.7%)
Pulse Rate	Normal Tachycardia	33 (52.4%) 30 (47.6%)
Clinical features	Distension of abdomen Tenderness Gaurding	6 (9.5%) 59 (93.7%) 24 (38.1%)
Outcome of diagnostic peritoneal lavage	Positive Negative	39 (61.9%) 24 (38.1%)
Anemia	<8 8-11 11-12 ≥12	6 (9.52%) 22 (34.92%) 11(17.46%) 24(38.09%)
Blood transfusion	Done Not done	19(30%) 44(70%)

Table 3: Based on Outcomes of non-operative management

Outcome	Frequency	Percent
Success	61	96.83
Failure	2	3.17
Total	63	100.0

distension. This meant that the most typical symptom would be abdominal discomfort and the most common indicator would be tenderness in any quadrant of the belly. Few cases of blunt trauma were asymptomatic on presentation.

According to a study by Atish N. Bansod and Rohan Umalkar[13] out of 48 patients, 28 (66.67%) cases had abdominal pain as the commonest symptom while tenderness in 38 (79.17%) cases.

This study found that 24 (38.1%) patients had negative results in DPL and 39 (61.9%) individuals had hemorrhagic peritoneal aspirate on diagnostic peritoneal lavage. This study shown that hemoperitoneum is not ruled out by a negative DPL. Nineteen patients (14.3%) had long bone fractures and pelvic bone fractures associated with their thoracic injuries, two patients (3.17%) had head injuries including brain parenchymal contusions and seven patients (11.4%) had head injuries associated with their thoracic injuries. 34 (53.96%) of the patients in this study had liver damage, followed by 17 (26.98%). 3.17%, meaning that two patients required an exploratory laparotomy., hence, the N.O.M-F. is 3.17%, which is in line with the findings of the subsequent research. Eighty (88%) of the eighty cases in the Hsieh *et al.* study had nonoperative management with a failure rate of 3.7% (3/80).

In a study by Atish N. Bansod and Rohan Umalkar[13], conservative therapy was found to be effective in 40 (83.33%) of the 48 patients and it was unsuccessful in 8 (16.67%) of the cases. The study's mortality rate was 1 (2.08%) instance.

CONCLUSION

Based on comprehensive clinical, laboratory, and radiographic examinations, the initial chosen therapy for blunt trauma abdomen is non-operative care. The availability of ICU treatment and the existence of emergency operating rooms are taken into account.

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