Section: General Surgery

Original Research Article

A RETROSPECTIVE STUDY OF CONSERVATIVE MANAGEMENT IN SOLID ORGAN INJURY IN BLUNT ABDOMINAL TRAUMA WITH HEMOPERITONEUM AT A TERTIARY CARE CENTRE IN SOUTH GUJARAT

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ABSTRACT

Background: Blunt abdominal trauma frequently results in solid organ injury with hemoperitoneum. In hemodynamically stable patients, non-operative management has increasingly become the preferred approach. This study aimed to evaluate the outcomes of conservative management and assess the utility of the Clinical Abdominal Scoring System (CASS) in such cases.

Materials and Methods: A retrospective observational study was conducted at a tertiary care centre in South Gujarat from 2024 to 2026. A total of 50 hemodynamically stable patients with radiologically confirmed solid organ injury and hemoperitoneum were included. Data regarding demographics, mode of injury, clinical presentation, vital parameters, organ involvement, and CASS were collected from medical records and analyzed using descriptive statistics.

Results: Among the 50 patients, 86% were males. The most affected age group was 18–25 years (36%). Road traffic accidents were the leading cause (60%). Most patients (68%) presented within 2 hours of injury. Abdominal pain was present in all cases, while vomiting and loss of consciousness were noted in 18% and 12%, respectively. The majority had pulse rate <90/min (70%) and systolic blood pressure between 90–120 mmHg (80%). Liver was the most commonly injured organ (62%), followed by spleen (26%), kidney (8%), and combined injuries (4%). Most patients had CASS scores between 8–12 (56%), while 44% had scores <8. All patients were managed conservatively with no requirement for operative intervention.

Conclusion: Conservative management is highly effective in hemodynamically stable patients with solid organ injury. CASS is a valuable tool for clinical assessment and management planning.

Keywords: Blunt abdominal trauma, hemoperitoneum, conservative management, solid organ injury, clinical abdominal scoring system.

INTRODUCTION

Trauma remains a major global health concern and is a leading cause of morbidity and mortality, particularly among young individuals. Among all trauma subsets, abdominal trauma constitutes a significant proportion, with blunt abdominal trauma accounting for nearly 85% of cases.[1] In developing countries such as India, the increasing incidence of road traffic accidents has contributed substantially to the rising burden of blunt abdominal injuries.[2]

Solid organ injuries involving the liver, spleen, and kidneys are commonly encountered in blunt abdominal trauma and are important contributors to morbidity and mortality.[3] The liver and spleen are the most frequently affected organs due to their size, vascularity, and anatomical location.[4] Early diagnosis and appropriate management are crucial, as uncontrolled intra-abdominal hemorrhage remains a major cause of preventable death in trauma patients.[5]

Traditionally, operative management was considered the standard approach for such injuries. However, over the past few decades, there has been a paradigm shift towards non-operative (conservative) management in hemodynamically stable patients.[6] Advances in imaging modalities, particularly focused assessment with sonography for trauma (FAST) and contrast-enhanced computed tomography (CECT), have facilitated accurate diagnosis and grading of injuries, thereby supporting selective non-operative strategies.[7]

Current evidence suggests that conservative management is safe and effective in appropriately selected patients, with high success rates and reduced morbidity compared to surgical intervention [6,7]. Careful patient selection, close monitoring, and timely intervention in cases of deterioration are essential components of this approach. In this context, clinical scoring systems such as the Clinical Abdominal Scoring System (CASS) may aid in early assessment and decision-making.

The present study aims to evaluate the outcomes of conservative management in patients with solid organ injury associated with blunt abdominal trauma and hemoperitoneum, and to assess the role of CASS in predicting clinical outcomes in a tertiary care setting in South Gujarat.

MATERIALS AND METHODS

Study Design and Setting: A retrospective observational study was conducted at a tertiary care hospital in South Gujarat, involving patients presenting with blunt abdominal trauma associated with hemoperitoneum due to solid organ injury. The study was carried out in the emergency department, surgical wards, and surgical intensive care unit of the institution.

Study Duration and Sample Size: Medical records from the period 2024 to 2026 were reviewed. A total of 50 patients fulfilling the predefined eligibility criteria were included in the study. Cases were selected based on availability of complete clinical, laboratory, and radiological data.

Inclusion Criteria

- Patients with hemoperitoneum following blunt abdominal trauma
- Radiological confirmation of solid organ injury
- Hemodynamically stable at presentation
- Age ≥18 years

Exclusion Criteria

- Associated fractures (including rib fractures)
- Penetrating abdominal injuries
- Pre-existing abdominal pathology
- Associated pelvic organ injuries
- Hemodynamically unstable patients
- Incomplete or missing medical records

Data Collection: Data were obtained retrospectively from the Medical Records Department using a structured proforma. The collected variables included demographic details, mode of injury, time interval between trauma and presentation, clinical features, vital parameters, laboratory findings, imaging results, management approach, and patient outcomes. Clinical evaluation included detailed history taking, incorporating presenting complaints, personal and social history, past medical and surgical history, and family history. Diagnosis was primarily based on clinical assessment and was supported by radiological investigations where required.

Management Protocol: All included patients were managed conservatively as per institutional protocol for hemodynamically stable solid organ injuries. Continuous monitoring of vital parameters and serial clinical assessments were performed during hospitalization.

Outcome Measures: The primary outcome assessed was the clinical outcome of patients managed conservatively. Secondary parameters included duration of hospital stay and in-hospital mortality.

Clinical Abdominal Scoring System (CASS): Patient outcomes were evaluated using the Clinical Abdominal Scoring System (CASS), which incorporates five parameters:

Time interval from injury to presentation

- <2 hours: Score 1
- 2–6 hours: Score 2
- 6 hours: Score 3

Pulse rate

- <90 beats/min: Score 1
- 90–110 beats/min: Score 2
- 110 beats/min: Score 3

Systolic blood pressure

- 120 mmHg: Score 1
- 90–120 mmHg: Score 2
- <90 mmHg: Score 3

Glasgow Coma Scale (GCS)

- 13–15: Score 1
- 9–12: Score 2
- <9: Score 3

Abdominal clinical findings

- Abdominal pain: Score 1
- Tenderness: Score 2
- Guarding/rigidity: Score 3

The cumulative score was used to assess the severity of injury and to correlate with patient outcomes.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Epi Info™ version 7. Descriptive statistics were applied, and results were expressed in terms of frequencies and percentages.

RESULTS

A total of 50 patients with blunt abdominal trauma and hemoperitoneum were included in the present study. The study population demonstrated a marked male predominance, with 43 males (86%) and 7 females (14%) [Table 1].

The age distribution revealed that the majority of patients belonged to the 18–25 years age group (36%), followed by patients aged less than 18 years

(18%). Other age groups included 26–35 years (14%), 46–55 years (12%), and both 36–45 years and more than 55 years accounting for 10% each [Table 2].

Road traffic accidents constituted the most common mechanism of injury, accounting for 60% of cases. Falls and railway accidents were responsible for 16% each, while assault contributed to 4% of cases. Accidental trauma and unknown causes were observed in 2% of patients each [Table 3].

Regarding the time interval between injury and hospital presentation, the majority of patients (68%) presented within 2 hours of injury. A smaller proportion presented between 2–6 hours (12%), while 20% of patients presented after more than 6 hours [Table 4].

All patients (100%) presented with abdominal pain. Associated symptoms included vomiting in 18% of patients and loss of consciousness in 12% [Table 5].

Assessment of vital parameters at presentation showed that most patients had a pulse rate of less than 90/min (70%), while 30% had a pulse rate between 90–120/min. None of the patients had a pulse rate exceeding 120/min. With respect to systolic blood pressure, 80% of patients had values between 90–120 mmHg, 14% had systolic blood pressure greater than 120 mmHg, and 6% presented with hypotension (systolic blood pressure <90 mmHg) [Table 6].

The liver was the most commonly injured organ, observed in 62% of patients, followed by the spleen in 26% of cases. Renal injuries accounted for 8%, while combined liver and kidney injuries were noted in 4% of patients [Table 7]. Organ-wise management analysis demonstrated that all patients were managed conservatively, with no requirement for operative intervention across all categories of solid organ injury [Figure 1].

Injury severity assessment revealed that the majority of patients (56%) had a score between 8–12, while 44% had a score less than 8. No patients had a score greater than 12 [Table 8].

Table 1: Sex Distribution of Study Population

Sex	Number of Patients	Percentage (%)
Males	43	86
Females	7	14
Total	50	100

Table 2: Age-wise Distribution of Patients

Age Group (years)	Number of Patients	Percentage (%)
<18	9	18
18–25	18	36
26–35	7	14
36–45	5	10
46–55	6	12
>55	5	10
Total	50	100

Table 3: Mode of Injury

Mode of Injury	Number of Patients	Percentage (%)
Road traffic accident	30	60
Fall	8	16
Railway accident	8	16
Assault	2	4
Accidental trauma	1	2
Unknown	1	2
Total	50	100

Table 4: Time Interval between Injury and Hospital Presentation

Time Interval	Number of Patients	Percentage (%)
0–2 hours	34	68
2–6 hours	6	12
>6 hours	10	20
Total	50	100

Table 5: Clinical Presentation

Clinical Feature	Number of Patients	Percentage (%)
Abdominal pain	50	100
Vomiting	9	18
Loss of consciousness	6	12

Table 6: Vital Parameters at Presentation

Parameter	Measurement Range	Number of Patients
Pulse Rate (/min)	<90	35
	90–120	15
	>120	0

Systolic BP (mmHg)	>120	7
	90–120	40
	<90	3

Table 7: Organ-wise Distribution of Injury

Organ Involved	Number of Patients	Percentage (%)
Liver	31	62
Spleen	13	26
Kidney	4	8
Liver + Kidney	2	4
Total	50	100

Table 8: Injury Severity Score Distribution

Score Range	Number of Patients
<8	22
8–12	28
>12	0

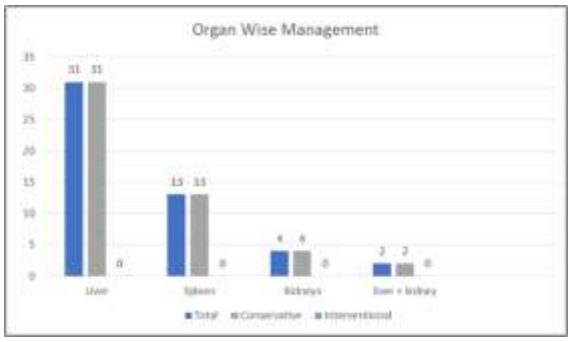

Figure 1: Organ-wise Distribution and Management Modality

DISCUSSION

The present study evaluated the effectiveness of conservative management in patients with solid organ injury following blunt abdominal trauma and demonstrated favorable outcomes in all included cases. The demographic profile observed in this study, with a predominance of young males, is consistent with previously reported literature, where males constitute the majority of trauma victims due to greater exposure to high-risk activities and road traffic accidents.[8,9] Similarly, the peak incidence in the second and third decades of life aligns with other studies reporting a higher burden of trauma in the economically productive age group.[10]

Road traffic accidents were identified as the leading cause of injury in the present study, accounting for 60% of cases. This finding is in agreement with multiple studies, which consistently report road traffic accidents as the most common mechanism of blunt abdominal trauma in developing countries.[8,11] Early presentation within 2 hours in the majority of patients reflects improved access to healthcare facilities and emergency services, which plays a crucial role in determining outcomes.[10]

Clinically, abdominal pain was the most common presenting symptom, observed in all patients, which is consistent with earlier reports emphasizing its diagnostic significance in blunt abdominal trauma.[9] Most patients in the present study were hemodynamically stable at presentation, with the majority having normal or near-normal pulse rate and systolic blood pressure. Hemodynamic stability remains the most important determinant for selecting patients for non-operative management.[12]

In the present study, the liver was the most commonly injured organ, followed by the spleen and kidney. This pattern is comparable to several studies where hepatic and splenic injuries together account for the majority of solid organ injuries due to their anatomical vulnerability and vascular nature.[9,13] However, some studies have reported splenic injury as the most frequent, indicating regional and institutional variations.[12]

All patients in this study were managed conservatively with a 100% success rate and no requirement for surgical intervention. This outcome is in line with recent evidence demonstrating high success rates of non-operative management, often exceeding 90–95% in hemodynamically stable patients.[13] Advances in imaging, continuous monitoring, and adherence to standardized protocols have significantly contributed to these improved outcomes.[11,13]

The CASS was utilized to assess injury severity and guide management. Most patients had moderate scores (8–12), and none had scores >12, which correlates with favorable outcomes. Clinical scoring systems have been shown to aid in early risk stratification and decision-making, particularly in resource-limited settings.[10]

Overall, the findings of the present study reinforce the growing body of evidence supporting conservative management as the standard of care in selected patients with blunt abdominal solid organ injuries. Careful patient selection, close monitoring, and timely intervention in cases of deterioration remain essential to ensure optimal outcomes.

CONCLUSION

The present study demonstrates that conservative (non-operative) management is a safe and effective approach for hemodynamically stable patients with solid organ injury following blunt abdominal trauma, even in the presence of hemoperitoneum. The

majority of patients, predominantly young males with liver and splenic injuries, were successfully managed without surgical intervention, highlighting the reliability of careful clinical assessment and monitoring. The CASS proved to be a useful adjunct in stratifying injury severity and guiding management decisions. Early presentation, stable vital parameters, and appropriate patient selection were key factors contributing to favorable outcomes, with minimal complications and no mortality observed. These findings support the continued adoption of conservative management protocols in appropriately selected patients in tertiary care settings.

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