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Outcome of Non-Operative Management in Hemodynamically Stable Patients with Blunt Abdominal Solid Organ Injuries.

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Abstract

Background: Non-operative management (NOM) has become the standard treatment for hemodynamically stable patients with blunt abdominal solid organ injuries. Advances in trauma imaging, critical care, and continuous clinical monitoring have significantly improved organ preservation while reducing unnecessary laparotomies. ***Objectives:*** To evaluate the outcomes of non-operative management in hemodynamically stable patients with blunt abdominal solid organ injuries with respect to treatment success, complications, duration of hospital stay, and mortality. ***Materials and Methods:*** This prospective hospital-based observational study was conducted over 18 months (December 2017 to June 2019) at Basaveshwar Teaching and General Hospital attached to M.R. Medical College, Kalaburagi. Fifty patients with blunt abdominal solid organ injuries were included. Following initial resuscitation, hemodynamically stable patients underwent conservative management with serial clinical examinations, continuous monitoring of vital signs, laboratory investigations, FAST, ultrasonography, and contrast-enhanced computed tomography (CT) whenever indicated. Clinical outcomes including complications, hospital stay, and mortality were recorded. ***Results:*** Of the 50 patients, 31 (62%) were managed successfully by non-operative treatment, while 19 (38%) required operative intervention. The spleen (48%) and liver (44%) were the most frequently injured organs. Among conservatively managed patients, respiratory complications and intra-abdominal abscess each occurred in 3 patients (9.7%). The majority of patients were discharged within 20 days, with a mean hospital stay of 16 days. Overall survival in the conservative group was 93.5%, while mortality was 6.5%, which was lower than that observed in surgically managed patients. ***Conclusion:*** Non-operative management is a safe and effective treatment strategy for hemodynamically stable patients with blunt abdominal solid organ injuries. Careful patient selection, appropriate imaging, serial clinical assessment, and close monitoring enable high treatment success with low complication and mortality rates, supporting non-operative management as the preferred approach in stable trauma patients.

Keywords: Blunt abdominal trauma, non-operative management, solid organ injury, hemodynamic stability, conservative treatment, trauma outcomes.

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INTRODUCTION

Blunt abdominal trauma is a major cause of morbidity and mortality worldwide, with the spleen, liver, and kidneys being the most frequently injured solid organs. Over the past two decades, advances in trauma imaging, intensive care, and patient monitoring have shifted management from routine exploratory laparotomy to selective non-operative management (NOM) in hemodynamically stable patients. Ibrahim et al. demonstrated that NOM is a safe and effective approach for adult patients with blunt abdominal solid organ injuries, achieving high success rates with careful patient selection and close observation.[1] The World Society of Emergency Surgery (WSES) subsequently proposed evidence-based guidelines for splenic trauma, recommending that treatment decisions should be based primarily on hemodynamic status rather than injury grade alone.[2] Similarly, Leppäniemi reviewed the evolution of solid organ trauma management and highlighted that improvements in computed tomography and critical care have established non-operative management as the standard treatment for stable patients.[3]

The Eastern Association for the Surgery of Trauma (EAST) practice management guidelines further support selective non-operative management for blunt splenic injuries, reserving surgery for patients with persistent hemodynamic instability or failed conservative treatment.[4] Earlier, Croce et al. established through a prospective trial that non-operative management is the treatment of choice for hemodynamically stable patients with blunt hepatic injuries, a principle now extended to other solid organ injuries.[5]

Sartorelli et al. demonstrated that conservative management can also be successfully applied in patients with multiple solid organ injuries when physiological stability is maintained.[6] Giannopoulos et al. confirmed that selective non-operative management is feasible even in district hospitals equipped with appropriate imaging and monitoring facilities.[7] Likewise, Yanar et al. reported favorable outcomes in patients with multiple intra-abdominal solid organ injuries treated conservatively, emphasizing that the number of injured organs alone should not dictate surgery.[8] Teuben et al. further showed that concomitant injuries do not necessarily compromise the success of non-operative management when patients remain hemodynamically stable and are carefully monitored.[9] Therefore, the present study was undertaken to evaluate the outcomes of non-operative management in hemodynamically stable patients with blunt abdominal solid organ injuries, with particular emphasis on treatment success, complications, duration of hospital stay, and mortality.

MATERIALS AND METHODS

Study Design

This was a prospective hospital-based observational study evaluating the outcome of non-operative management in hemodynamically stable patients with blunt abdominal solid organ injuries.

Study Setting

The study was conducted in the Department of General Surgery, Basaveshwar Teaching and General Hospital attached to M.R. Medical College, Kalaburagi.

Study Duration

The study was carried out over **18 months**, from **December 2017 to June 2019**.

Study Population

The study included patients admitted with blunt abdominal trauma involving solid organ injuries. Only patients who were hemodynamically stable after initial resuscitation and suitable for conservative management were evaluated for non-operative outcomes.

Sample Size

A total of **50 patients** with blunt abdominal solid organ injuries were included, of whom **31 patients** underwent non-operative management.

Inclusion Criteria

- Patients with blunt abdominal trauma involving solid organ injuries.
- Hemodynamically stable following initial resuscitation.
- No clinical evidence of generalized peritonitis.
- Patients managed conservatively with serial observation.

Exclusion Criteria

- Hemodynamic instability requiring immediate laparotomy.
- Patients with generalized peritonitis.
- Patients with associated head injuries or thoracic injuries.
- Penetrating abdominal trauma.

Clinical Evaluation

All patients underwent:

- Detailed history and physical examination.
- Continuous assessment of pulse rate, blood pressure, respiratory rate, and abdominal findings.
- Serial abdominal examinations during hospital stay.

Diagnostic Evaluation

Investigations included:

- Hemoglobin and hematocrit estimation.
- Urine microscopy.
- FAST examination.
- Ultrasonography of the abdomen in all patients.
- Contrast-enhanced CT scan in hemodynamically stable patients.
- Diagnostic peritoneal lavage and four-quadrant aspiration whenever clinically indicated.

Non-Operative Management Protocol

Patients selected for conservative treatment were managed with:

- Strict bed rest.
- Intravenous fluids and supportive care.
- Hourly monitoring of vital signs.
- Serial abdominal examination.
- Repeat ultrasonography whenever indicated.
- Immediate reassessment for operative intervention if clinical deterioration occurred.

Outcome Measures

Primary Outcome

- Success of non-operative management.

Secondary Outcomes

- Complications during conservative treatment.
- Duration of hospital stay.
- Mortality.
- Requirement for delayed operative intervention.

Statistical Analysis

Data were analyzed using descriptive statistics. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized using mean values and ranges. Statistical significance was considered at **p <0.05** wherever applicable.

Ethical Considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from all patients or their legal representatives, and confidentiality of patient information was maintained throughout the study.

RESULTS

A total of 50 patients with blunt abdominal solid organ injuries were included in the study. Of these, 31 patients (62%) were hemodynamically stable and successfully underwent non-operative management (NOM), while 19 patients (38%) required operative intervention. The following analysis focuses exclusively on the outcomes of conservatively managed patients.

Table 1. Baseline characteristics of patients managed by non-operative treatment (n=31)

Variable	Number	Percentage (%)	p value
Age group (years)			
11–20	2	6.5	
21–30	14	45.2	
31–40	9	29.0	
>40	6	19.3	0.041*
Gender			
Male	25	80.6	
Female	6	19.4	0.002*
Mode of injury			
Road traffic accident	18	58.1	
Fall from height	8	25.8	
Assault	5	16.1	0.048*
Clinical findings			
Abdominal pain	28	90.3	
Abdominal distension	16	51.6	
Guarding/Rigidity	6	19.4	
Shock	2	6.5	<0.001*

*Statistically significant (p<0.05).

Among the 31 patients managed conservatively, **80.6% were males**, and the majority (**45.2%**) belonged to the **21–30-year** age group. Road traffic accidents accounted for **58.1%** of injuries. Abdominal pain was the predominant presenting symptom (**90.3%**), whereas only **6.5%** of patients presented with shock, confirming that most conservatively managed patients were hemodynamically stable (**p<0.001**).

Table 2. Organ injuries and radiological findings among conservatively managed patients (n=31)

Variable	Number	Percentage (%)	p value
Organ injured			
Splenic injury	16	51.6	
Liver injury	13	41.9	
Renal injury	6	19.4	
Pancreatic injury	1	3.2	0.036*
FAST/USG positive	31	100.0	
CT scan performed	31	100.0	
Multiple organ injury	2	6.5	0.184

*Statistically significant (p<0.05).

The **spleen (51.6%)** was the most frequently injured organ among conservatively managed patients, followed by the **liver (41.9%)**. Renal and pancreatic injuries were less common. Only **6.5%** of patients had multiple organ injuries, indicating that isolated injuries were more suitable for successful conservative treatment.

Table 3. Clinical outcomes of non-operative management (n=31)

Outcome	Number	Percentage (%)	p value
Successful conservative management	31	100.0	—
Respiratory complication	3	9.7	
Intra-abdominal abscess	3	9.7	1.000
Mortality	2	6.5	0.184
Survival	29	93.5	
Mean hospital stay	16 days	—	

All 31 hemodynamically stable patients completed non-operative treatment without requiring delayed surgery, indicating a 100% success rate within the selected conservative cohort. Respiratory complications and intra-abdominal abscess each occurred in 9.7% of patients. The survival rate was 93.5%, while mortality was 6.5%. Mortality remained low and was not statistically significant (p=0.184).

Table 4. Duration of hospital stay among conservatively managed patients (n=31)

Duration of stay	Number	Percentage (%)	p value
1–10 days	14	45.2	
11–20 days	12	38.7	
21–30 days	3	9.7	
>30 days	2	6.4	0.029*
Mean hospital stay	**16 days**	—	

*Statistically significant (p<0.05).

Most patients (**83.9%**) were discharged within **20 days**, reflecting favorable recovery following conservative treatment. Only **16.1%** required hospitalization beyond 20 days because of prolonged recovery or complications. The **mean hospital stay was 16 days**, demonstrating satisfactory clinical outcomes with non-operative management.

DISCUSSION

The present study demonstrated that non-operative management (NOM) was successful in the majority of hemodynamically stable patients with blunt abdominal solid organ injuries, with low complication and mortality rates. These findings are consistent with current evidence supporting conservative treatment as the standard approach for appropriately selected patients.

Coccolini et al., in the WSES 2020 liver trauma guidelines, emphasized that hemodynamic stability should be the primary criterion for selecting patients for non-operative management, irrespective of injury grade. The successful outcomes observed in the present study support this recommendation, with most stable patients recovering without surgical intervention.[10]

Johnsen et al. reviewed the surgical management of solid organ injuries and concluded that operative intervention should be reserved for patients with persistent hypotension, ongoing hemorrhage, or failed conservative treatment. In the present study, surgery was performed only in patients with hemodynamic instability, while stable patients achieved favorable outcomes with non-operative management.[11]

Kanlerd et al. summarized contemporary evidence showing that non-operative management achieves high success rates for splenic, hepatic, and renal injuries when combined with careful clinical monitoring and appropriate imaging. Similar findings were observed in the present study, where conservative treatment was successful in the majority of patients.[12]

Podda et al. recommended structured follow-up, serial clinical examination, and repeat imaging in patients managed non-operatively to detect delayed complications and improve patient safety. The low complication rates observed in the present study highlight the value of close monitoring during conservative treatment.[13]

Chu et al. reported that minimally invasive interventions, including delayed laparoscopic peritoneal washout, may be beneficial in selected patients who develop complications during non-operative management. Although such procedures were not routinely required in the present study, vigilant observation enabled early identification and management of complications.[14]

Karachentsev demonstrated that non-operative management can be successfully implemented even in resource-limited settings when careful patient selection and continuous monitoring are practiced. The present study similarly achieved favorable outcomes with conservative treatment in hemodynamically stable patients.[15]

More recently, Mukharjee et al. reported high success rates of CT-guided conservative management for blunt solid organ injuries, reinforcing the importance of computed tomography in treatment planning and follow-up. The present findings further support the role of CT in selecting suitable candidates for non-operative management and improving clinical outcomes.[16].

CONCLUSION

The present study confirms that non-operative management is a safe and effective treatment strategy for hemodynamically stable patients with blunt abdominal solid organ injuries. Careful patient selection, timely radiological evaluation, serial clinical monitoring, and prompt recognition of treatment failure are essential for achieving high success rates while minimizing complications and mortality.

REFERENCES

1. Ibrahim W, Mousa G, Hirshon JM, El-Shinawi M, Mowafi H. Non-operative management of blunt abdominal solid organ trauma in adult patients.Afr J Emerg Med. 2020;10(3):123-126. doi:10.1016/j.afjem.2020.02.002.
2. Coccolini F, Montori G, Catena F, Kluger Y, Biffl WL, Moore EE, et al. Splenic trauma: WSES classification and guidelines for adult and pediatric patients. World J Emerg Surg. 2017;12:40. doi:10.1186/s13017-017-0151-4.
3. Leppäniemi A. Nonoperative management of solid abdominal organ injuries: From past to present. Scand J Surg. 2019;108(2):95-100. doi:10.1177/1457496919833220.
4. Stassen NA, Bhullar I, Cheng JD, Crandall ML, Friese RS, Guillamondegui OD, et al. Selective nonoperative management of blunt splenic injury: An Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg. 2012;73(5 Suppl 4):S294-S300. doi:10.1097/TA.0b013e3182702afc.
5. Croce MA, Fabian TC, Menke PG, Waddle-Smith L, Minard G, Kudsk KA, et al. Nonoperative management of blunt hepatic trauma is the treatment of choice for hemodynamically stable patients: Results of a prospective trial. Ann Surg. 1995;221(6):744-753. doi:10.1097/00000658-199506000-00013.
6. Sartorelli KH, Frumiento C, Rogers FB, Osler TM, Osler TM, Rogers A. Nonoperative management of hepatic, splenic, and renal injuries in adults with multiple injuries. J Trauma. 2000;49(1):56-61. doi:10.1097/00005373-200007000-00008.
7. Giannopoulos GA, Katsoulis IE, Tzanakis NE, Patsaouras PA, Digalakis MK. Non-operative management of blunt abdominal trauma: Is it safe and feasible in a district general hospital? Scand J Trauma Resusc Emerg Med. 2009;17:22. doi:10.1186/1757-7241-17-22.
8. Yanar H, Ertekin C, Taviloglu K, Kabay B, Bakkaloglu H, Guloglu R. Nonoperative treatment of multiple intra-abdominal solid organ injury after blunt abdominal trauma. J Trauma. 2008;64(4):943-948. doi:10.1097/TA.0b013e3180342023.
9. Teuben MPJ, Spijkerman R, Blokhuis TJ, Pfeifer R, Teuber H, Pape HC, et al. Safety of selective nonoperative management for blunt splenic trauma: The impact of concomitant injuries. Patient Saf Surg. 2018;12:32. doi:10.1186/s13037-018-0179-8.

10. Coccolini F, Coimbra R, Ordonez C, Kluger Y, Vega F, Moore EE, et al. Liver trauma: WSES 2020 guidelines. World J Emerg Surg. 2020;15:24. doi:10.1186/s13017-020-00302-7.
11. Johnsen NV, Betzold RD, Guillamondegui OD, Dennis BM, Stassen NA, Bhullar I, et al. Surgical management of solid organ injuries.Surg Clin North Am. 2017;97(5):1077-1105. doi:10.1016/j.suc.2017.06.013.
12. Kanlerd A, Auksornchart K, Boonyasatid P. Non-operative management for abdominal solid organ injuries: A literature review. Chin J Traumatol. 2022;25(5):249-256. doi:10.1016/j.cjtee.2021.09.006.
13. Podda M, De Simone B, Ceresoli M, Virdis F, Favi F, Wiik Larsen J, et al. Follow-up strategies for patients with splenic trauma managed non-operatively: The 2022 World Society of Emergency Surgery consensus document. World J Emerg Surg. 2022;17(1):57. doi:10.1186/s13017-022-00457-5.
14. Chu M, How N, Laviolette A, Bilic M, Tang J, Khalid M, et al. Delayed laparoscopic peritoneal washout in non-operative management of blunt abdominal trauma: A scoping review. World J Emerg Surg. 2022;17(1):37. doi:10.1186/s13017-022-00441-z.
15. Karachentsev S. Blunt trauma to abdominal solid organs: An experience of non-operative management at a rural hospital in Zambia. Pan Afr Med J. 2021;38:89. doi:10.11604/pamj.2021.38.89.20061.
16. Mukharjee S, B V D, B S V. Evaluation of management of CT scan proved solid organ injury in blunt injury abdomen—a prospective study.Eur J Trauma Emerg Surg. 2024;50:2753-2763. doi:10.1007/s00068-024-02501-2.