

Original Research Article

A RETROSPECTIVE STUDY OF MANAGEMENT MODALITIES OF ISOLATED SPLENIC INJURY IN BLUNT ABDOMINAL TRAUMA

Kaushik Chaudhari¹, Latif Bagwan², Ashishkumar Sureshbhai Katara³, Nitin Chaudhari⁴

¹Assistant Professor, Department of General Surgery, Nootan Medical College and Research Centre, Visnagar, Gujarat, India.

²Associate Professor, Department of General Surgery, Nootan Medical College and Research Centre, Visnagar, Gujarat, India.

³Assistant Professor, Department of General Surgery, School of Medical Sciences, Sehore, Madhya Pradesh, India.

⁴Associate Professor, Department of General Surgery, Ananta Institute of Medical Sciences & Research Centre, Dist-Siyol, Rajasthan, India.

Received : 10/01/2025
Received in revised form : 02/03/2025
Accepted : 17/03/2025

Corresponding Author:

Dr. Nitin Chaudhari,
Associate Professor, Department of
General Surgery, Ananta Institute of
Medical Sciences & Research Centre,
Dist-Siyol, Rajasthan, India.
Email: nitin_chaudhari691988@yahoo.in

DOI: 10.70034/ijmedph.2025.1.328

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (1); 1757-1761

ABSTRACT

Background: Blunt trauma to abdomen is a major contributor to morbidity and deaths, with the spleen being the most commonly affected organ. Advances in trauma care have shifted management strategies from operative to non-operative approaches. This study retrospectively assesses the clinical presentation, management modalities, and outcomes of isolated splenic injuries due to blunt abdominal trauma.

Materials and Methods: A retrospective observational study was conducted on 30 patients with isolated splenic injury managed at a tertiary care medical facility in South Gujarat between July 2012 and July 2017. Eligible patients were aged 18–60 years and were assessed based on clinical presentation, imaging findings, and management approach. Data analysis included demographic distribution, causes of injury, time to intervention, and patient outcomes.

Results: The majority of cases (63.3%) occurred in the 18–30 years age group, with a male predominance (83.33%). Road traffic accidents were the leading cause (63.33%). Conservative management was employed in 90% of cases, while 10% required surgical intervention. The overall discharge rate was 80%, with a mortality rate of 20%. Delayed hospital presentation and associated injuries were significant risk factors for poor outcomes.

Conclusion: Conservative management remains the preferred approach for hemodynamically stable patients with isolated splenic injury. Early recognition, timely intervention, and appropriate monitoring are critical in reducing mortality. Strengthening pre-hospital care, trauma center facilities, and public awareness can further improve outcomes.

Key Words: Splenic Injuries, Abdominal Trauma, Blunt Trauma, Mortality, Emergency Treatment.

INTRODUCTION

Trauma remains a significant contributor to both morbidity and mortality worldwide. It ranks as the fourth leading cause of death in the general population and is the primary cause of fatality among individuals below 45 years of age on a global scale. Among different forms of trauma, injuries involving the abdomen constitute approximately 7% to 10% of all reported cases, with the prevalence varying based on socioeconomic and cultural

factors, as well as the level of economic development of a given region.^[1]

Abdominal trauma is broadly categorized into penetrating and blunt types, based on the underlying mechanism and the causative factor. Blunt abdominal trauma results from an external force impact or countercoup effect without penetration into the peritoneal cavity. In contrast, penetrating abdominal trauma involves a breach of the peritoneum. Blunt trauma to the abdomen accounts for nearly 80% of all abdominal injuries.^[2] Blunt

force trauma to the abdomen occurs when an external object impacts the abdominal region or when the abdomen forcefully collides with another surface.^[3] The pathophysiological mechanisms underlying internal organ damage due to blunt trauma have been extensively investigated.

Blunt trauma to the abdomen can lead to organ injury through four primary mechanisms.^[4] Initially, a rapid change in velocity and momentum may cause direct damage to an organ. Additionally, organs can be compressed or crushed against rigid anatomical structures, leading to structural compromise. Another mechanism involves fractures of bony structures due to the impact, producing sharp fragments that can penetrate and injure internal organs. Lastly, external compression can result in increased intra-abdominal and intraluminal pressure, particularly affecting hollow organs, which may rupture under excessive stress.^[5]

The aim of this study was to assess the mechanisms of abdominal organ injury following blunt trauma. The findings may aid in improving diagnostic accuracy, guiding clinical management strategies, and optimizing therapeutic interventions for patients with blunt abdominal trauma.

MATERIALS AND METHODS

This study involved an evaluation of 30 cases of blunt abdominal trauma that underwent management between July 2012 and July 2017. The study followed a retrospective observational design.

The study included patients diagnosed with blunt abdominal trauma presenting with isolated splenic injury who received treatment at a tertiary care medical facility in South Gujarat between July 2012 and July 2017. Individuals aged between 18 and 60 years, regardless of sex, were eligible for inclusion. Cases with isolated splenic trauma were considered, whether or not they had additional injuries involving the chest or limbs. The patients who were ready for determined period of follow-up were registered in the study. Patients were excluded if they were younger than 18 years or older than 60 years. Cases involving penetrating trauma, injuries to other intra-abdominal organs, or head trauma with a Glasgow Coma Scale (GCS) score below 13 were not considered.

All individuals arriving at the trauma center of the tertiary care medical facility in South Gujarat initially received management from the emergency medicine department. Initial assessment and resuscitation were conducted, which included establishing intravenous access, administering fluid therapy, inserting a catheter, and monitoring vital parameters such as temperature, pulse, respiratory rate, and blood pressure, followed by a comprehensive systemic examination. Each case was assessed clinically, considering the patient's medical history, general physical examination, and abdominal assessment, along with relevant

investigations. The collected data were systematically analyzed based on a structured protocol. Ultrasonography (FAST) was performed for all cases of blunt abdominal trauma up.

RESULTS

The study included a predominance of young adults, with the majority (63.3%) of participants in the 18–30 years age group, followed by 20% in the 31–45 years category, and 16.67% in the 46–60 years group (Figure 1). Males constituted the majority of the study population (83.33%), whereas females accounted for 16.67% (Figure 2). Regarding the etiology of trauma, road traffic accidents (RTA) were the most common cause, contributing to 63.33% of cases. Falls were responsible for 26.67%, while assault accounted for 10% of cases. (Figure 3)

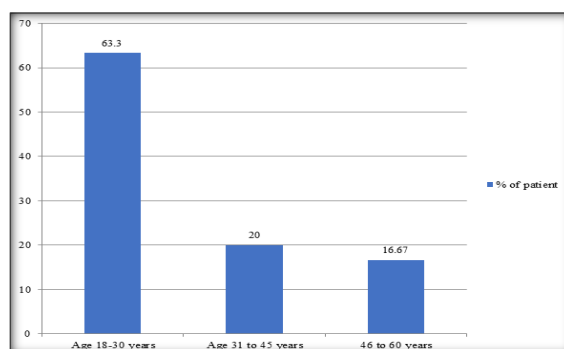


Figure 1: Age distribution of study participants

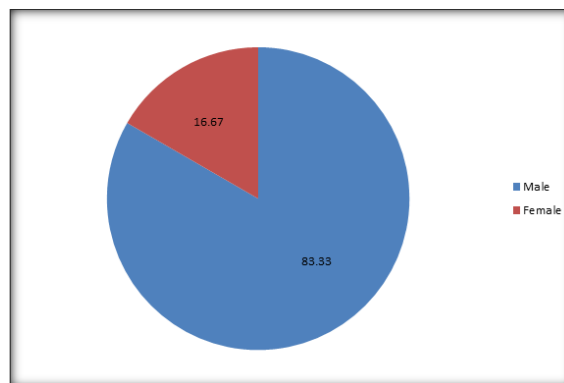


Figure 2: Gender Distribution of study participants

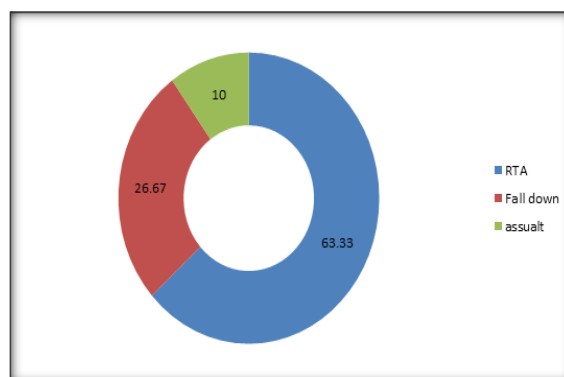


Figure 3: Causes of trauma (%)

The time interval between injury and surgical intervention varied, with 45.45% of patients undergoing surgery within the first six hours, while 27.27% received surgical intervention within 7–24 hours, and a similar proportion (27.27%) underwent surgery beyond 24 hours. Clinically, tenderness was

the most frequently observed sign (60%), followed by guarding (36.67%) and abdominal distension (16.67%). Associated injuries were reported in 50% of cases, with limb injuries (30%) and chest injuries (26.67%) being the most prevalent, while head injuries were less common (6.67%) (Table 1).

Table 1: Clinical profile of study participants

Parameter	n	%
Time interval (from injury to operation)		
0-6 hours	5	45.45
7-24 hours	3	27.27
After 24 hours	3	27.27
Clinical signs		
Soft and non-tender	12	40
Distension	5	16.67
Tenderness	18	60
Guarding	11	36.67
Associated Injuries		
No associated injury	15	50
Head injury	2	6.67
Chest injury	8	26.67
Limb injury	9	30

In terms of management, the majority of cases (90%) were managed conservatively, whereas 10% required operative intervention. The overall discharge rate was 80%, with a mortality rate of 20% (Table 2). Among conservatively managed

patients, 73.33% were successfully discharged, whereas 16.67% succumbed to their injuries. Among those who underwent surgical management, 6.67% were discharged, while 3.33% did not survive (Table 3).

Table 2: Overall Management and Outcomes

	n	%
Conservatively Managed	27	90
Operatively Managed	3	10
Total Discharged	24	80
Total Expired	6	20

Table 3: Outcomes Based on Management Approach

Management Type	Total Cases	Discharged	Expired
Conservative (n = 27)	27 (90%)	22 (73.33%)	5 (16.67%)
Operative (n = 3)	3 (10%)	2 (6.67%)	1 (3.33%)

DISCUSSIONS

The findings of the present study indicate that blunt abdominal trauma predominantly affects males, with approximately 83.33% of cases involving male patients and a male-to-female ratio of nearly 6:1. This pattern is consistent with previous studies that have reported a higher incidence among males. Lone (2001) documented a male-to-female ratio of 4:1,^[6] while Davis et al,^[7] and Ayoade et al,^[8] observed a male predominance of approximately 70%. Further stratification by age suggests that younger males, particularly those aged 18–29 years, are at the highest risk, followed by individuals in the 30–39-year range.^[9] These findings align with previous research,^[7,8] emphasizing that blunt abdominal trauma disproportionately affects individuals in the younger, working-age population. This can likely be attributed to their increased involvement in outdoor activities, including high-risk behaviors such as vehicular travel. Motor vehicle collisions, including pedestrian-related accidents, accounted for 63.33% of blunt

abdominal trauma cases, a figure comparable to previous studies.^[10-13] Blunt force injuries resulting from interpersonal violence and falls from height constituted 10% and 26.67% of cases, respectively.^[7] Additionally, cases of blunt abdominal trauma linked to child abuse or domestic violence were observed. The present study's findings are in agreement with earlier literature, where road traffic accidents were identified as the primary cause in 63.33% of cases, while falls accounted for 26.67%. These results are consistent with those reported by Khanna et al,^[14] who documented that 57% of cases were due to vehicular accidents. Furthermore, 10% of patients sustained abdominal trauma due to violent assaults, mirroring trends in prior studies.^[14] Timely medical intervention plays a critical role in determining outcomes for patients with blunt abdominal trauma. In this study, 57% of patients reached the hospital within six hours of injury. However, less than 43% arrived more than four hours post-injury, and 20% (six cases) who were referred from other centers were admitted over 24

hours after trauma onset. Delayed presentation is a known risk factor for increased morbidity and mortality. As noted by Stewart et al., delays beyond six hours, particularly in splenic injuries, significantly elevate morbidity rates.^[15] A comparison with the findings of Ahmed H et al,^[16] suggests that delayed hospital arrival remains a significant concern in trauma management. The overall mortality rate observed in this study was 20%, which is consistent with reports from various global studies.

Clinical signs remain a crucial determinant in the assessment and management of blunt abdominal trauma. The majority of cases in the present study presented with abdominal tenderness. Approximately 40% of patients exhibited a soft, non-tender abdomen, whereas those with tenderness commonly reported diffuse pain or a combination of epigastric and hypogastric discomfort. Muscle guarding was noted in 36.67% of cases, while abdominal distension was observed in 16.67%. Muscle rigidity was relatively uncommon, seen in only 3.33% of cases. Other clinical presentations, such as scrotal swelling, restricted hip joint mobility, and subcutaneous emphysema, were case-specific and not widely generalizable.

Associated injuries were identified in approximately 50% of cases, consistent with prior research by Ayoade, Davis et al,^[7,8,17] and Coghill. Concurrent limb, chest, and forehead injuries were frequently observed, likely due to the nature of road traffic accidents resulting in multiple impact sites. Additionally, physical assault victims, who constituted 50% of this study's cohort, often sustained multiple injuries, further exacerbating morbidity and mortality.

The role of imaging in trauma assessment remains a subject of discussion. In this study, CT scans were not indicated or performed in 90% of cases. However, in the 10% of cases where ultrasonography detected splenic injuries, CT imaging was deemed necessary.

A substantial proportion of cases were managed conservatively. All patients having splenic injuries required hospitalization, with 10% necessitating surgical intervention. Laparotomy was performed in nearly all surgical cases, with the specific procedure depending on intraoperative findings. The trend toward non-operative management in splenic injuries has been widely accepted since the 1990s,^[18] though some studies have suggested higher failure rates among patients older than 55

The mortality rate in this study was 20%, aligning with figures reported by Davis et al. (13.3%) and DiVincenti et al. (16%).^[19] Mortality was primarily attributed to severe injuries and associated complications. Two cases involved multiple rib fractures, leading to hemothorax, lung contusion, and respiratory failure. One patient with rib fractures and lung contusion suffered bilateral lower limb amputations due to crush injuries, resulting in fatality. Additionally, a case of severe head trauma

following an electrical injury led to hemorrhage and shock-related death. A hemodynamically unstable patient required emergency surgery but did not survive. Delayed hospital admission—exceeding five days post-injury—resulted in shock and multiple organ dysfunction syndrome (MODS), ultimately leading to mortality.

CONCLUSION

Blunt abdominal trauma is a significant public health concern, predominantly affecting males. Road traffic accidents remain the leading cause. While conservative management, supported by advanced diagnostic tools, is gaining acceptance, surgical intervention remains crucial for selected cases. Repeated clinical examinations and appropriate diagnostics play a key role in decision-making. Ultrasound effectively detects solid organ injuries, with the spleen being the most commonly affected. Establishing trauma centers at district hospitals, improving ambulance transport, enforcing traffic laws, and implementing clinical guidelines can enhance early management, reduce mortality, and lessen the economic burden on society.

REFERENCES

1. Costa G, Tierno SM, Tomassini F, et al. The epidemiology and clinical evaluation of abdominal trauma: An analysis of a multidisciplinary trauma registry. *Ann Ital Chir.* 2010;81:95-102.
2. Nishijima DK, Simel DL, Wisner DH, Holmes JF. Does this adult patient have a blunt intra-abdominal injury? *JAMA.* 2012;307:1517.
3. Trollope ML, Stalnaker RL, McElhaney JH, Hrey CF. The mechanism of injury in blunt abdominal trauma. *J Trauma.* 1973 Nov;13(11):962-70.
4. Collopy K, Frise G. Abdominal trauma. *EMS World Education/Training.* Mar 2010. Available from: <http://www.emsworld.com/article/10319768/abdominal-trauma>
5. Williams K. Thoracoabdominal trauma. *Patient Transport: Principles and Practice-E-Book.* 2023 Dec 18:282.
6. Lone GN, Peer GQ, Warn AK, Bhat AM, Warn NA. An experience with abdominal trauma in adults in Kashmir. *JK Pract.* 2001;8:225-30.
7. Davis JJ, Cohn I Jr, Nance FC. Diagnosis and management of blunt abdominal trauma. *Ann Surg.* 1976 Jun;183(6):672-8.
8. Ayode BA, Salami BA, Tade AO, Musa AA, Olawoye OA. Abdominal injuries in Olabisi Onabanjo University Teaching Hospital. *Niger J Orthop Trauma.* 2006;5(2):45-9.
9. Baradaran H, Salimi J, Nassaji-Zavareh M, Khaji A, Rabbani A. Epidemiological study of patients with penetrating abdominal trauma in Tehran, Iran. *Acta Med Iran.* 2007;45:305-8.
10. Frick EJ Jr, Pasquale MD, Cipolle MD. Small bowel and mesenteric injuries in blunt abdominal trauma. *J Trauma.* 1999;46(5):920-6.
11. Goff CD, Gilbert CM. Nonoperative management of blunt hepatic trauma. *Am J Surg.* 1995;61:66-8.
12. Hammond JC, Canal DF, Broadie TA. Nonoperative management of adult blunt hepatic trauma in a municipal trauma center. *Am Surg.* 1991;58(9):551-5.
13. Isenhour JL, Marx J. Advances in abdominal trauma. *Emerg Med Clin North Am.* 2007;25:713-33.
14. Khanna R, Khanna S, Singh P, Puneet, Khanna AK. Spectrum of blunt abdominal trauma in Varanasi. *Q J Surg Sci.* 1999;35(1-2):25-8.

15. Stewart BT, Lee V, Danne PD. Laparotomy for trauma in a regional center: The effect of delay on outcome. *Aust N Z J Surg.* 1994;64:484-7.
16. Ahmed H, Pegu N, Rajkhowa K, Baishya RK, Hiquemat N. Splenic injury: A clinical study and management in a tertiary care hospital. *Int Surg J.* 2016;2(4):652-9. doi: 10.18203/2349-2902.isj20151096.
17. Davis KA, Fabian TC, Croce MA, et al. Improved success in nonoperative management of blunt splenic injuries: Embolization of splenic artery pseudoaneurysms. *J Trauma.* 1998;44:1008-13; discussion 1013-5.
18. Shackford SR, Molin M. Management of splenic injuries. *Surg Clin North Am.* 1990;70:595-620.
19. DiVincenti FC, River JD, Laborde EJ, et al. Blunt abdominal trauma. *J Trauma.* 1968;8:1004.