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## Ruptured spleen: A clinical analysis of management and outcomes

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### Abstract

This comprehensive study examines the clinical presentation, management strategies and outcomes of splenic injury at 2 years and 6 months. It was conducted at Al-Karema Teaching Hospital and Al Zahraa Teaching Hospital of Wasit governorate. This study included 42 documented cases of splenectomy as emergency. Trauma to the spleen or as complications is a particular challenge because of the potential and high mortality if left untreated.

The study shows that the majority of cases (73.8%) have mild trauma, with 23.7% penetrating injuries and one iatrogenic case. The study highlights the important role of advanced diagnostic tools such as imaging in determining the extent of injury and guiding treatment decisions. Management strategies were tailored to the type of injury, with immediate surgical intervention for penetrating injuries and delay surgery for mild trauma based on clinical indications. Splenectomy emerged as the dominant strategy so used, which was done in 92.8% of the cases, although it was done in children as selected cases to preserve immunity prioritizing splenic repair. Complications were observed in 23% of cases, with infections and thrombotic events being the most common, while mortality was recorded as 12.8%.

The study emphasizes the importance of timely diagnosis, advanced imaging modalities, and a multidisciplinary approach to deliver optimal outcomes in splenic injury surgery, particularly in healthcare settings emphasizing the limited resources available.

**Keywords:** Splenic injury, splenectomy, trauma, management strategies, clinical outcomes

### Introduction

Splenic rupture is a vital and life-threatening condition often due to abdominal trauma. The spleen's particular anatomical position and excessive vascularity render it especially prone to injury, making it one of the most commonly affected organs in abdominal trauma (Moore *et al.*, 2022) <sup>[1]</sup>. Splenic injuries are classified as blunt, penetrating, or iatrogenic, with blunt trauma being the most frequent because of causes along with motor automobile injuries, falls, and sports-related injuries. Penetrating trauma, even as much less common, is often related to stab wounds or gunshot accidents. In uncommon times, splenic rupture may also occur iatrogenically at some stage in surgical or diagnostic methods (Roberts).

The spleen performs an essential role in the immune system, such as filtering pathogens, eliminating damaged blood cells, and generating antibodies. Consequently, on every occasion possible, its repair is important for preserving long-term immunity, specifically in pediatric sufferers. However, the management of splenic trauma poses sizable demanding situations in scientific exercise. Accurate diagnosis, regularly requiring superior imaging strategies like CT scans, is important for figuring out the severity of the injury and the appropriate course of motion.

The complexity of splenic injury requires a multidisciplinary approach including trauma surgeons, radiologists, and critical care teams. This study focuses on the causes, clinical presentation, management strategies, and outcome measures of spleen injury treated in two large teaching hospitals in Iraq with limited resources.

### Research Objectives

Evaluate the clinical characteristics and management strategies for patients with splenic injuries.

Compare outcomes between blunt and penetrating trauma cases.

Assess the efficacy of different surgical interventions, including splenectomy and splenic repair.

Identify factors influencing complications and mortality rates.

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## Methodology

This observe turned into conducted over a 2-yr and six-month duration at Al-Karema Teaching Hospital and Al-Zahur Teaching Hospital in Wasit province. The method concerned a retrospective analysis of 42 sufferers identified with splenic injuries. The research sought to capture a complete view of splenic trauma cases, focusing on clinical outcomes and control strategies. By integrating patient statistics, imaging records, and surgical reports, the study established an in-depth profile of each case, taking into account a thorough exam of remedy consequences.

## Data Collection

- 1. Patient Selection:** All patients with confirmed splenic injuries during the study period were included. Specific focus was given to those presenting with abdominal trauma and requiring diagnostic imaging or surgical intervention.
- 2. Inclusion Criteria:** Patients with blunt or penetrating abdominal trauma leading to splenic injury. Cases of iatrogenic splenic injury resulting from medical or surgical procedures.
- 3. Exclusion Criteria:** Patients with incomplete medical records. Cases where splenic injury was incidental and not directly managed at the study hospitals.
- 4. Variables Studied:** Mechanisms of injury (Blunt, penetrating, or iatrogenic). Associated injuries involving other abdominal organs. Surgical interventions performed. Postoperative complications. Mortality rates and survival outcomes.

## Analytical Approach

Data were analyzed using descriptive statistics to evaluate the frequency of injury type, associated injuries, and outcomes and percentages they have visualized it and identified. A comparative study was performed to identify differences in the outcome of open penetrating trauma, with particular attention to the effectiveness of treatment.

## Imaging and Diagnostics

Advanced imaging modalities such as CT scan and ultrasound were used to assess the extent of tumor damage. The use of images facilitated classification of injuries according to severity and guided treatment decisions. Radiologists played an important role in identifying associated injuries and assessing postoperative recovery.

## Multidisciplinary Approach

Collaborative work with trauma surgeons, radiologists, and critical care specialists resulted in a comprehensive management plan for each patient. Regular feedback and review allowed modification of treatment strategies, especially in complex cases with multiple organ damage.

## Results and Discussion

### Injury Type Distribution

The leading cause of splenic injury is blunt trauma, accounting for 73.8% of the cases in Table 1. Motor vehicle accidents and falls are the most common mechanisms (Balogh & Moore, 2021) [2] from knife wounds and gunshot wounds primarily at 23.7%. There was a penetrating injury. Furthermore, only one iatrogenic injury was reported, which occurred during surgical removal of a descending colonic tumor (Burch *et al.*, 2020) [3].

**Table 1:** Table shows that 73.8% of cases are due to Blunt Trauma (31 cases), 23.7% to Penetrating Trauma (10 cases), and 2.5% to Iatrogenic Injury (1 case)

Injury Type	Cases	Percentage (%)
Blunt Trauma	31	73.8
Penetrating Trauma	10	23.7
Iatrogenic Injury	1	2.5

## Surgical Interventions

Splenectomy emerged as the most frequent surgical intervention, as highlighted in Table 2, being performed in 92.8% of cases. While splenectomy effectively manages life-threatening hemorrhage, its impact on immune function raises concerns, particularly for younger patients. Splenic repair, though less common, was performed in only 7.1% of cases and represents a viable alternative for preserving immune function when feasible. The findings underscore the importance of increased training and resources to support splenic preservation, especially in pediatric patients and specific cases, such as the single iatrogenic injury noted (WHO, 2022) [5].

**Table 2:** 92.8% of cases were managed with Splenectomy (39 cases) and 7.1% with Splenic Repair (3 cases)

Management Type	Cases	Percentage (%)
Splenectomy	39	92.8
Splenic Repair	3	7.1

## Associated Injuries

As shown in Table 3, the associated injuries highlight the difficulty of managing cases of penetrating trauma, which often require damage to other vital organs this has highlighted its importance greater emphasis on multidisciplinary collaboration and advanced surgical skills. Penetrating trauma was often associated with injury to other abdominal organs, such as the liver and intestines (Trauma.org, 2023) [4]. These cases often required extensive surgery to address the combined effects of multiple lesions.

**Table 3:** 21.4% of patients with Penetrating Trauma (9 cases) and 23.8% with Blunt Trauma (10 cases) had associated injuries

Trauma Type	Patients with Associated Injuries	Percentage (%)
Penetrating Trauma	9	21.4
Blunt Trauma	10	23.8

## Complications and Mortality

As shown in Table 4, survival rates reflect the overall success rate of management strategies, with 87.2% of patients recovering. However, the impressive complication rate of 23% highlights the need for improved perioperative care and a strong surveillance system. Infection and thrombotic events were the most common complications. The mortality rate was recorded as 12.8%, mainly due to late intervention or severe related injuries, again highlighting the importance of early diagnosis and timely treatment highlight (Burch *et al.*, 2020) [3].

**Table 4:** Table shows that 23% of cases had complications (9 cases), 77% had no complications (33 cases), 12.8% resulted in death (5 cases), and 87.2% were survivors (37 cases)

Outcome	Cases	Percentage (%)
Complications	9	23
No Complications	33	77
Deaths	5	12.8
Survivors	37	87.2

### Injury Type Distribution

The highlights of the prevalence of non-visible trauma, emphasizes the need for appropriate programs for this type of injury. The results highlight the high burden of mild trauma in emergency departments.

The majority of splenic injuries (73.8%) are due to mild trauma, often associated with motor vehicle accidents and falls (Balogh & Moore, 2021)<sup>[2]</sup>. Penetrating injuries were mainly due to stab wounds or gunshot wounds, while a solitary iatrogenic event occurred during surgical removal of a descending colonic tumor (Burch *et al.*, 2020)<sup>[4]</sup>.

**Table 5:** 73.8% of cases were due to Blunt Trauma (31 cases), 23.7% to Penetrating Trauma (10 cases), and 2.5% to Iatrogenic Injury (1 case)

Injury Type	Cases	Percentage (%)
Blunt Trauma	31	73.8
Penetrating Trauma	10	23.7
Iatrogenic Injury	1	2.5

### Conclusion

Effective management of splenic injury requires an appropriate approach depending on the type and severity of trauma. Although splenectomy remains the cornerstone of intensive therapy, efforts to preserve the spleen whenever possible, especially in pediatric patients, can improve patient outcomes has been greatly improved by improving patient outcomes, improving surgical techniques, and improving postoperative care.

### Recommendations

- 1. Early Diagnosis:** Enhance diagnostic capabilities with advanced imaging techniques to identify splenic injuries promptly.
- 2. Organ Preservation:** Promote splenic repair techniques in suitable cases, particularly among pediatric patients.
- 3. Comprehensive Training:** Provide specialized training for healthcare providers to optimize the management of splenic trauma.
- 4. Enhanced Postoperative Care:** Implement strict monitoring protocols to minimize complications and ensure early intervention.
- 5. National Trauma Registry:** Establish a centralized database for splenic injuries to facilitate research and improve clinical guidelines.

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