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Emergency Splenectomy in Splenic Trauma: A Seven-Year Retrospective Study

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Abstract **Original Research Article**

Background: The spleen plays a central role in immune defense and blood filtration. Emergency splenectomy remains a life-saving procedure in cases of splenic trauma with hemodynamic instability. The widespread adoption of non-operative management (NOM) and splenic artery embolization has significantly refined its indications. This study aims to define the current indications for emergency splenectomy and evaluate its outcomes. ***Methods:*** A retrospective study was conducted at the Department of Visceral and Digestive Surgery, Mohammed VI University Hospital, over a seven-year period (2018–2025). All patients presenting with splenic trauma managed on an emergency basis were included. Demographic characteristics, clinical and radiological data, therapeutic modalities, morbidity, and mortality were analyzed. ***Results:*** A total of 83 patients were included. The mean age was 35 years, with a male predominance. Non-operative management was the primary strategy (96.4%), while total splenectomy was performed in only 3.6% of cases. Splenic artery embolization was employed in 1.2% of patients. Complications included hemorrhage (55%) and infectious events (45%). The post-splenectomy sepsis rate was 5%. No mortality was recorded. ***Conclusion:*** Emergency splenectomy retains a critical role in the management of splenic trauma, but its indications are increasingly restricted in favor of conservative strategies. An individualized approach guided by hemodynamic status and available resources is essential to optimize patient outcomes.

Keywords: splenectomy · emergency surgery · splenic trauma · non-operative management · visceral surgery.

INTRODUCTION

The spleen fulfills essential immunological and hematological functions, including phagocytosis of encapsulated bacteria and antibody production. Consequently, its removal carries significant long-term implications, particularly regarding the risk of overwhelming post-splenectomy infection (OPSI). Despite this, emergency splenectomy remains an indispensable surgical intervention in the context of blunt abdominal trauma presenting with hemodynamic compromise.

Over the past three decades, the management paradigm for splenic injuries has undergone a substantial shift toward conservative strategies. The development of high-resolution computed tomography, standardized injury grading systems, and advances in interventional radiology — particularly splenic artery embolization — have collectively expanded the scope of non-operative management. Nevertheless, splenectomy retains an important role in specific emergency scenarios.

The objective of this study is to delineate the current indications for emergency splenectomy within our institution and to assess its associated morbidity and mortality outcomes over a seven-year period.

MATERIALS AND METHODS

Study Design	**Retrospective cohort study**
Setting	Department of Visceral and Digestive Surgery, Mohammed VI University Hospital (CHU Mohammed VI)
Study Period	January 2018 – December 2025 (7 years)
Study Population	Patients admitted on an emergency basis for splenic trauma
Inclusion Criteria	All confirmed cases of splenic trauma regardless of injury grade

The variables collected included patient demographics (age, sex), mechanism of injury, hemodynamic status at admission, CT scan findings with injury grading according to the American Association for the Surgery of Trauma (AAST) classification, therapeutic modalities employed, intraoperative data, postoperative complications, and in-hospital mortality.

RESULTS

Over the study period (2018–2025), 83 patients were admitted for splenic trauma requiring emergency management. The mean patient age was 35 years (range: 18–72 years), with a clear male predominance. Road traffic accidents were the predominant mechanism of injury.

Treatment Modalities

Non-operative management was the predominant therapeutic strategy, employed in the vast majority of patients:

- **96.4%** of patients were successfully managed non-operatively
- **3.6%** required total splenectomy
- **1.2%** underwent splenic artery embolization as the primary intervention

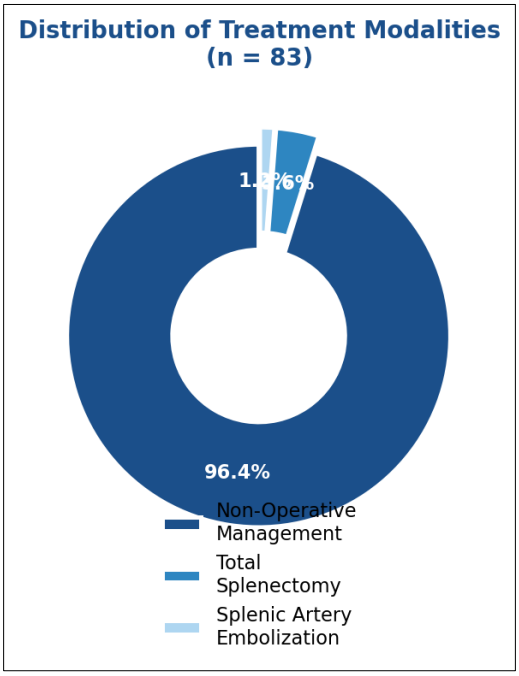

Figure 1. Distribution of treatment modalities across the study cohort (n = 83)

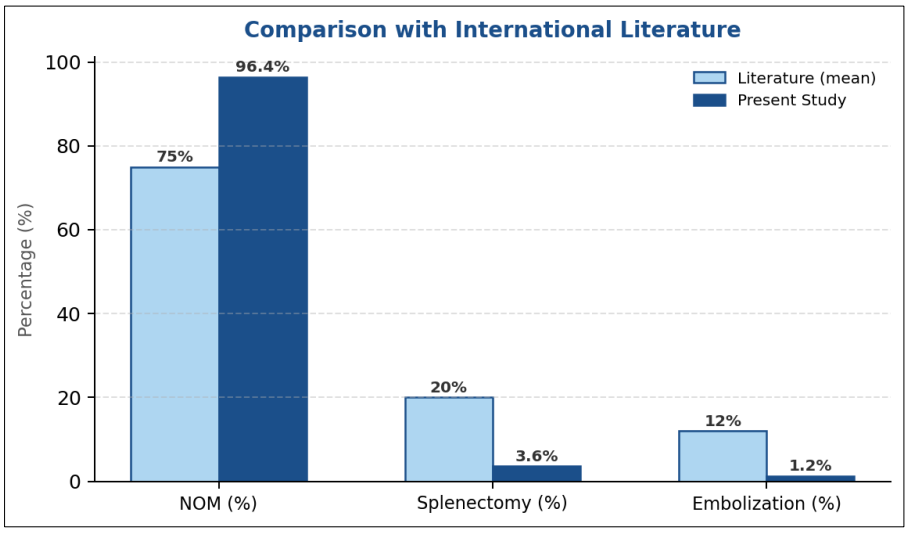

Figure 2. Comparison of therapeutic strategy utilization rates between the present series and international literature benchmarks

Morbidity and Mortality

The overall complication profile was as follows:

- **Hemorrhagic complications:** 55% of all recorded complications

- **Infectious complications:** 45% of all recorded complications
- **Post-splenectomy sepsis (OPSI):** 5% incidence rate
- **In-hospital mortality:** 0% — no deaths were recorded in the study cohort

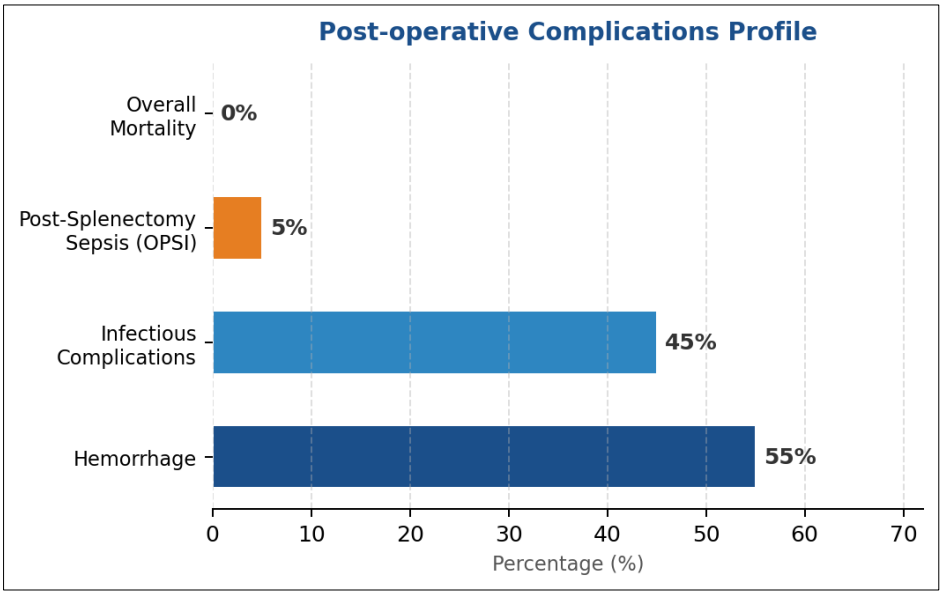

Figure 3: Post-operative complication profile in patients undergoing emergency splenectomy

DISCUSSION

The management of splenic trauma has undergone a paradigm shift over recent decades, driven by a transition toward organ-preserving strategies. This evolution is underpinned by the guidelines of the World Society of Emergency Surgery (WSES), which position hemodynamic stability as the primary determinant of therapeutic decision-making [1].

Non-operative management.

In our series, NOM was the predominant approach (96.4%), consistent with contemporary literature reporting conservative management rates of approximately 70–80% in hemodynamically stable patients [2]. This strategy relies on rigorous clinical surveillance and serial imaging while preserving the immunological function of the spleen. Current guidelines affirm that NOM represents the gold standard for stable patients, irrespective of injury grade, provided that management occurs at a center equipped with the necessary technical resources [1,3].

Splenic artery embolization.

In the present study, embolization was employed in only 1.2% of cases, likely reflecting organizational constraints and limited after-hours access to interventional radiology in our institution. However, published data demonstrate technical success rates exceeding 90% with significant splenic preservation rates [4]. Embolization is currently recommended in hemodynamically stable patients with evidence of active bleeding or vascular injury on imaging.

Indications for splenectomy

Splenectomy remained indispensable in specific scenarios. According to international guidelines, surgical indications include persistent hemodynamic instability, failure of conservative management, and concomitant injuries requiring exploratory laparotomy [1,3]. In our series, all surgical indications were consistent with these recommendations, confirming that splenectomy has transitioned from a first-line treatment to a salvage procedure.

Post-splenectomy sepsis.

Overwhelming post-splenectomy infection (OPSI) represents one of the most feared long-term complications of splenectomy, with reported mortality rates of 30–70% in some series [5,7]. In the present cohort, the OPSI rate was 5%, underscoring the critical importance of preventive measures, including pneumococcal, meningococcal, and Haemophilus influenzae type b vaccination, as well as long-term microbiological surveillance.

Follow-up of conservatively managed patients.

Recent evidence emphasizes the necessity of structured follow-up for patients managed non-operatively. Repeat clinical, biological, and radiological assessment at 48–72 hours is recommended to detect secondary complications such as pseudoaneurysm formation or delayed splenic rupture [2,4].

CONCLUSION

Emergency splenectomy remains a cornerstone of visceral surgical emergencies; however, its indications

have been progressively narrowed in favor of organ-preserving strategies. It remains indispensable in the setting of hemodynamic instability and failure of non-operative management. The current trajectory points toward individualized, resource-guided decision-making as the optimal approach to splenic trauma management. Future efforts should focus on improving access to splenic artery embolization and standardizing post-splenectomy prophylaxis protocols.

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