MedEpicent
Journal of Medical Education and Clinical Research

Delayed Splenic Rupture in an Adolescent Patient: Organ-Sparing Laparoscopic Surgery – A Successful Clinical Case Presentation

MD Farid Khanmammadov
Liv Bona Dea Hospital, Baku, Azerbaijan

DOI https://doi.org/10.64288/gcx7sz51

Keywords: Delayed splenic rupture, abdominal trauma, hemoperitoneum, diagnostic laparoscopy, laparoscopic intervention, organ-sparing surgery

Abstract *Delayed splenic rupture (DSR) is a rare but potentially life-threatening traumatic complication. This presentation discusses a case of DSR in a 15-year-old adolescent who developed the condition one week after sustaining blunt abdominal trauma while riding a jet ski. The patient presented to our clinic with abdominal pain, nausea, and vomiting. Imaging studies revealed extensive intra-abdominal hemorrhage. Emergency diagnostic laparoscopy identified active bleeding at the gastrosplenic and splenocolic ligaments, which was successfully controlled through localized coagulation, preserving the spleen. The laparoscopic procedure was completed without complications, and the patient recovered uneventfully. This case underscores the importance of high clinical suspicion, timely diagnostic intervention, and an organ-sparing approach by an experienced surgeon in managing delayed splenic ruptures. The application of a multidisciplinary team approach and minimal invasive techniques facilitate positive outcomes in such cases.*

1. Introduction

Traumatic abdominal injuries, particularly in children and adolescents, are medical conditions that can lead to severe clinical outcomes. In this age group, the spleen is considered one of the most frequently injured organs in the abdominal cavity. The spleen plays crucial roles in immune response, erythrocyte storage, and the filtration of aged blood cells, making its preservation particularly significant in pediatric and adolescent patients.

While splenic injuries typically manifest with clinical symptoms immediately following trauma, in some cases, a rare and dangerous condition known as delayed splenic rupture (DSR) can occur. DSR is characterized by spontaneous rupture of the spleen more than 48 hours after blunting abdominal trauma, often developing without specific or any clinical signs during the initial trauma period. First described by Baudet in 1907, this condition is associated with a latent period of symptom absence, referred to as the "Baudet latent period." DSR can lead to unexpected hemorrhage and hemodynamic instability, posing significant risks to the patient.

Considering the vital and immunological functions of the spleen, organ-sparing treatment strategies are preferred, especially in children and adolescents. These approaches aim not only to ensure the patient's survival but also to preserve long-term quality of life. The advancement of laparoscopic surgery has introduced new possibilities in the management of traumatic injuries. This technique, used for both diagnostic and therapeutic purposes, reduces postoperative discomfort and facilitates quicker recovery.

This article presents the clinical case of a 15-year-old adolescent who developed DSR following a jet ski accident and was successfully treated with an organ-sparing laparoscopic approach, despite the presence of a large hemoperitoneum. The presentation highlights the critical importance of clinical suspicion, timely diagnostic intervention, and the effectiveness of minimal invasive approaches in managing such rare and life-threatening conditions.

2. Case Presentation

A 15-year-old male patient presented to our clinic with complaints of abdominal pain, nausea, and vomiting that had started the previous day. Initial ultrasound and CT imaging revealed approximately 2 liters of intra-abdominal fluid (blood), prompting urgent referral to our facility. Repeat evaluations showed a significant drop in hemoglobin levels (11.8 → 8.7 g/dL), and contrast-enhanced CT demonstrated widespread, high-density fluid in the abdominal cavity.

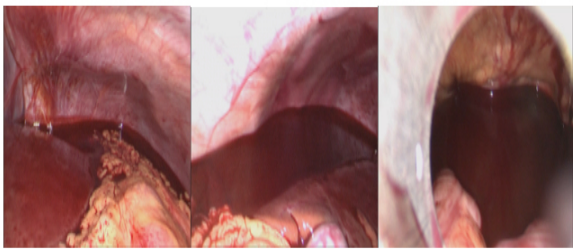

İmage 1: Subdiaphragmatic region, perihepatic area, pelvic cavity

Upon detailed history taking, the patient admitted to falling into the water multiple times while riding a jet ski one week prior. On admission, he was in relatively stable hemodynamic condition (BP: 108/100 mmHg, pulse: 53 bpm), but due to high clinical suspicion, emergency diagnostic laparoscopy was planned.

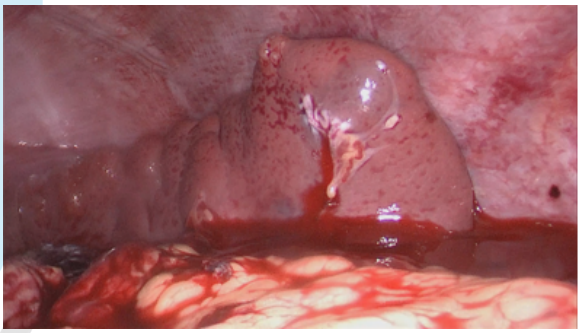

İmage 2: Bleeding spleen

During surgery, 2150 ml of hemorrhagic fluid was aspirated from the abdominal cavity. Lacerations and active bleeding were observed at the gastrosplenic and splenocolic ligaments. Hemostasis was achieved through localized coagulation, and the spleen was preserved. The procedure was completed without complications. The

patient remained under observation for 6 days postoperatively and was discharged in stable condition.

İmage 3: Postoperative outcom

3. Discussion

Delayed splenic rupture (DSR) is a rare but potentially life-threatening complication of blunt abdominal trauma, particularly in children and adolescents. This condition often presents minimal or nonspecific clinical symptoms following the initial trauma, leading to delayed diagnosis and treatment. The patient in this case is a typical example, with initial complaints limited to abdominal pain, nausea, and vomiting, and a history of trauma that was only identified upon further inquiry.

In such cases, clinical decision-making relies not only on imaging and laboratory parameters but also on the surgeon's clinical acumen, experience, and ability to select the appropriate intervention strategy. The patient's significant intra-abdominal hemorrhage and the inability to precisely identify the bleeding source on CT imaging necessitated prompt and decisive action. In this context, the surgeon's clinical intuition and timely decision to proceed with diagnostic laparoscopy were crucial.

During surgery, lacerations and active bleeding were identified at the gastrosplenic and splenocolic ligaments, without direct rupture of the splenic parenchyma. This rare presentation, characterized by ligamentous injuries leading to vascular damage and bleeding, highlights the complexity of such cases. Inexperienced surgeons might have opted for splenectomy in such situations. However, the surgeon in this case correctly assessed the suitability for organ-sparing surgery, effectively controlling the bleeding through localized coagulation and preserving the spleen's functional integrity.

Literature indicates that the success of organ-sparing approaches in high-grade splenic injuries (Grade IV and above) largely depends on the surgeon's experience and real-time assessment during surgery. Less experienced surgeons may be more inclined to perform splenectomy in ambiguous cases. However, preserving the spleen in this age group is critical to prevent postoperative infections and immunodeficiency.

Additionally, the choice of a laparoscopic approach in this case contributed to the diagnosis and reduced invasiveness. Laparoscopic surgery offers advantages such as less pain, shorter hospitalization, and faster recovery, which are particularly beneficial in pediatric patients.

In summary, this clinical case emphasizes the importance of diagnostic

vigilance and surgical expertise in managing delayed splenic ruptures. The surgeon's ability to make swift decisions and prioritize organ-sparing techniques facilitated the patient's recovery without functional organ loss. Such cases underscore the value of a multidisciplinary approach and the necessity of experienced surgical teams in achieving favorable outcomes.

4. Conclusion

This presentation highlights the potential for delayed splenic rupture to present nonspecific symptoms and the life-saving impact of timely diagnostic and surgical intervention. Despite significant blood loss, an organ-sparing laparoscopic approach was successfully employed, preserving the spleen and allowing for an uncomplicated recovery. These cases underscore the importance of experienced multidisciplinary teams and the effectiveness of organ-preserving strategies in the management of traumatic injuries.

5. References

1. Baudet V. La rupture différée de la rate. *Presse Med.* 1907; 15:127–130.
2. Davis JJ, Cohn I Jr, Nance FC. Delayed rupture of the spleen. *Am J Surg.* 1976;132(6):689–693.
3. Stylianos S. Evidence-based guidelines for resource utilization in children with isolated spleen or liver injury. *J Pediatr Surg.* 2000;35(2):164–169.
4. Haan J, Bochicchio G, Scalea T. Nonoperative management of blunt splenic injury: a 5-year experience. *J Trauma.* 2005;58(3):492–498.
5. Smith J, Armen S, Cook CH, Martin LC. Blunt splenic trauma: current therapy. *Adv Surg.* 2012;46:1–20.