VOLUME 02 ISSUE 02 (2023)

AMERICAN JOURNAL OF MEDICAL SCIENCE AND INNOVATION (AJMSI)

ISSN: 2836-8509 (ONLINE)

PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

American Journal of Medical Science and Innovation (AJMSI)

Volume 2 Issue 2, Year 2023
ISSN: 2836-8509 (Online)
DOI: https://doi.org/10.54536/ajmsi.v2i2.2122
https://journals.e-palli.com/home/index.php/ajmsi

Primary Spontaneous Splenic Rupture: A Rare and Life-Threatening Condition

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Article Information

Received: October 07, 2023
Accepted: November 03, 2023
Published: November 07, 2023

Keywords

Splenic Rupture, Acute Abdomen, Hemoperitoneum, Diagnostic Imaging, Laparotomy

ABSTRACT

This case report outlines the presentation, diagnosis, and management of a 26-year-old male with primary spontaneous splenic rupture, a highly uncommon clinical condition. Primary spontaneous splenic rupture necessitates a high index of suspicion for accurate diagnosis. Diagnostic Imaging, particularly abdominal CT scans, is pivotal in its detection. This case underscores the critical importance of timely recognition and intervention. Clinicians should consider various inflammatory, neoplastic, and infectious etiologies in the differential diagnosis of splenic rupture. Physical examination revealed tenderness and guarding, predominantly in the left upper quadrant and left flank. Laboratory findings indicated an elevated white blood cell count, predominantly polymorphonuclear leukocytes. Contrast-enhanced CT scan showed substantial free fluid in the acute abdomen, with high density observed around the liver and spleen. Exploratory laparotomy confirmed hemoperitoneum and spontaneous splenic rupture. This case report highlights the rarity of primary spontaneous splenic rupture and emphasises the significance of early detection and intervention. Through examination and advanced imaging techniques, clinicians can accurately diagnose and promptly manage this life-threatening condition.

INTRODUCTION

Primary spontaneous splenic rupture, an infrequently encountered but exceptionally critical medical phenomenon, signifies the abrupt and atraumatic rupture of a previously unremarkable spleen (Borio *et al.*, 2022). Atraumatic splenic rupture, though rare, poses a potentially life-threatening situation. Unlike traumatic cases, this occurrence involves splenic rupture in the absence of any external force or injury (Bona, 2020). Unlike secondary ruptures, which are often precipitated by trauma or underlying pathologies, this condition manifests without any apparent antecedent cause, presenting a diagnostic problem for healthcare providers (Wu *et al.*, 2022). This enigmatic presentation can encompass a spectrum of symptoms, often bereft of overt clinical indicators, further complicating the diagnostic process (Bain, 2023). The potential for severe bleeding and its associated complications confers a pressing need for a swift and precise diagnosis, underscoring the urgency of timely intervention (Saceleanu *et al.*, 2023).

A comprehensive review of 845 cases from the available literature revealed the primary factors leading to hypersplenism, which include neoplastic conditions such as leukaemia and lymphoma, accounting for 30 per cent, infections like infectious mononucleosis, cytomegalovirus (CMV), HIV, endocarditis, and malaria contributing to 27 per cent, and inflammatory diseases or non-infectious disorders like acute and chronic pancreatitis making up 20 per cent, additionally, drug and treatment-related causes, such as anticoagulation, granulocyte colony-stimulating factor (G-CSF), thrombolytic therapy, and dialysis, were identified in 9 per cent of cases (Onyango *et al.*, 2023). Mechanical factors, including pregnancy-related conditions and congestive splenomegaly, constituted 7 per cent, while idiopathic cases with a normal spleen accounted for the same percentage; the overall mortality rate was 12 per cent, with risk factors for mortality encompassing splenomegaly, age over 40 years, and the presence of a neoplastic disorder, of the cases, 84 per cent underwent splenectomy. At the same time, conservative measures were adopted for the remaining cases (Renzulli *et al.*, 2009).

This intriguing case report serves as a stark reminder of the critical need to consider spontaneous splenic rupture in patients experiencing acute abdominal pain, especially in the absence of any traumatic events. The enigmatic nature of this condition, devoid of apparent antecedent causes, presents a diagnostic puzzle for healthcare providers. Timely recognition and intervention are paramount in navigating this complex medical scenario, ultimately holding the key to favorable outcomes for those grappling with this rare and potentially life-threatening ailment.

Case Presentation

The patient, a 26-year-old male, arrived at the Al-Noor hospital's emergency room on June 1st, 2011, seeking urgent medical attention for acute and distressing abdominal pain. The patient was having discomfort, which had emerged abruptly the previous night and had since evolved into a progressively diffuse sensation, significantly causing pain by even the slightest movement; lying down provided relief to the patient. Notably, he also experienced an episode of emesis, which was described as non-coffee ground in nature, and had one loose bowel movement. Encouragingly, there was no indication of fresh blood in either the emesis or the stool, alleviating concerns of gastrointestinal bleeding. The patient denied any history of fever or chills, pointing towards an afebrile state.

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In addition to the abdominal discomfort, the patient explained the alarming circumstances of symptoms and reported feelings of giddiness accompanied by a pronounced sense of weakness. These sensations were coupled with palpitations, indicating potential cardiac involvement. The patient noted sweating, which further highlighted the severity and distressing nature of his condition. Moreover, He reported no known allergies, was a non-smoker and non-alcoholic, and worked as a policeman. He was married and had one healthy child.

This study indicated mild erosive esophagitis and gastroduodenitis, both of which had shown improvement with esomeprazole therapy. The patient's medical history revealed epigastric pain and dyspepsia, which had been thoroughly evaluated through endoscopy in September 2008. Remarkably, the patient had been asymptomatic for the past two years and denied any significant recent or past traumas.

On initial examination, the patient appeared pale, apprehensive and had a dry mouth. Notably, there were no signs of jaundice, clubbing, or palmar erythema. Palpable lymph nodes were absent. Vital signs recorded a blood pressure of 120/70mmHg in the supine position, which dropped to 80/40 upon standing, associated with pre-syncope. The heart rate was 103 beats per minute, regular, with a respiratory rate of 19 breaths per minute. Oxygen saturation was 99%, and temperature was within normal range at 37°C.

CNS examination revealed intact function, while abdominal examination indicated diffuse tenderness with guarding, more pronounced in the left upper quadrant and left flank. Organomegaly was difficult to check due to the tenderness. There were no abnormal masses or bruising observed, and the hernial orifice was free.

Later, Laboratory investigations provided crucial insights into the patient's haematological and biochemical profile. Haemoglobin level was measured at 12.3g/dl, indicating a normal range, which is (12.1 to 15.1 g/dL) but slightly lowered haemoglobin concentration. Hematocrit registered at 36%, demonstrating a balanced proportion of red blood cells in the blood volume. The red blood cell count was 4.4 million/ml, aligning with standard physiological ranges. White blood cell count, however, presented as elevated at 14,500 cells/ml.

Further differentiation revealed a predominance of polymorphonuclear leukocytes, accounting for 63% of the total count. Lymphocytes constituted 30%, monocytes were present at 5%, while basophils and eosinophils made up trace amounts. These findings indicated a heightened inflammatory response, potentially suggestive of an acute pathological process.

Additionally, biochemical analyses showed no significant abnormalities; results were in the normal range. Notably, liver function tests, including SGOT, SGPT, and alkaline phosphatase, were within normal limits. Serum amylase was also normal. Electrolytes, including potassium, sodium, and chloride, were within physiological ranges. Laboratory examination results are presented in Table 1.

Table 1: Laboratory Examination Results

Laboratory Examination	Results	Normal Range
Hb	12.3 g/dl	12.1 to 15.1 g/dL
Ht	36%	41% to 50%
Red Blood Cell Count	4.4mill/ml	4.7 mill/ml to 6.1 mill/ml
WBC	14500	4500 to 11,000
PMN	63%	40% to 65%
LYMPH	30%	20% to 40%
MONO	5%	2% to 8%
BASO, EOSINO	1%	Baso: 0.5% to 1%, Eosino: 1% to 4%
MCV	82.4	80–100
MCH	27.1	27 to 31
MCHC	33.8%	32–36%
PLT	455,000	150,000 to 450,000
B. Urea	29 mg/dl	5 to 20 mg/dl
Creatinine	0.6 mg/dl	0.74 to 1.35 mg/dL
SGOT	17	8 to 45
SGPT	20	7 to 56
ALP	74	44 to 147
Amylase	92	40 to 140
Pottasium	4.1 mmol/l	3.5 to 5.5
Sodium	142 mmol/l	135 to 145
Chloride	112	96 to 106
Bilirubin	0.42	0.1 to 1.2

As mentioned in Figure 1, a CT scan of the abdomen and pelvis was performed, which revealed significant free fluid in the abdominal cavity, with high density observed around the liver, spleen, flanks, and pelvis. There was no evidence of intra-abdominal or retroperitoneal mass lesions. Based on the imaging findings, the patient underwent an explorative laparotomy, which confirmed the diagnosis of hemoperitoneum. Intraoperatively, blood clots were predominantly found in the upper abdomen, around the omentum and spleen, with evidence of blood oozing near the splenic hilum. Consequently, a splenectomy was performed to address the spontaneous rupture of the spleen.

The histopathology report revealed that the pre-operative diagnosis of acute abdominal bleeding was confirmed through examination of the specimens. The first specimen consisted of a single piece of fatty tissue displaying severe haemorrhage throughout, measuring 6 x 4 x 0.5 cm. This sample was meticulously sectioned, and various parts were processed (Block x2). The second specimen, the spleen, was intact and measured 11 x 5.5 x 2 cm. It was appropriately sectioned and underwent partial processing (Block x4). Upon microscopic examination, the first specimen revealed matured fatty tissue with extensive, fresh haemorrhage pervading nearly the entire field. No atypia or signs of malignancy were observed. The examination of the splenic tissue in the second specimen unveiled notable infiltration of neutrophilic cells in the subcapsular region and along the tear's edges, accompanied by multiple areas of intraparenchymal haemorrhage. Additionally, moderate lymphoid hyperplastic changes were noted. As with the first specimen, no atypia or malignancy indicators were detected. These histopathological features align closely with the clinical impression of a traumatic splenic tear or rupture. There was no evidence of atypia or malignancy in either specimen. The histopathology report is shown in Figure 2.

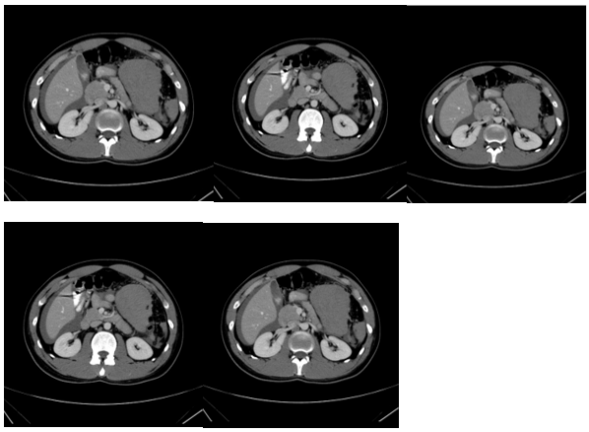

Figure 1: CT-Scan Results

Post-splenectomy was crucial to implement measures to mitigate the risks associated with functional asplenia, which included vaccination against encapsulated pathogens, prophylactic antibiotics, and vigilant monitoring for potential complications. In this case, the surgery was prescribed to treat the patient. The case emphasises the importance of heightened clinical awareness to facilitate prompt diagnosis and surgical intervention in cases of primary spontaneous splenic rupture, a rare but potentially life-threatening condition.

HISTOPATHOLOGY REPORT

Pre-operative Diagnosis	:	Acute abdominal internal bleeding
Specimen	:	Spleen + Omentum
Macroscopic	:	1.) One piece of fatty tissue with severe hemorrhage in most of the tissue. The whole piece measures 6 x 4 x 0.5cms. Sectioned and parts processed (Block x2). 2.) Spleen in one piece, measures 11 x 5.5 x 2cms. Sectioned and parts processed (Block x4).
Microscopy	:	1.) Examination revealed mature fatty tissue with massive fresh hemorrhage occupying almost all the field. No atypia and no evidence of malignancy seen. 2.) Examination revealed splenic tissue showing prominent neutrophilic cells infiltration in the subcapsular area and along the edges of the tear accompanied by multiple intraparenchymal hemorrhage. Besides there is moderate lymphoid hyperplastic changes. No atypia and no evidence of malignancy seen.
Comments	:	Features are highly in keeping with the clinical impression of Traumatic Splenic Tear (rupture). - No atypia and no evidence of malignancy seen.

Figure 2: Histopathology Report

DISCUSSION

Primary spontaneous splenic rupture is an exceedingly rare clinical entity, with only a limited number of cases reported in the literature. The condition poses a diagnostic challenge due to its elusive presentation and absence of antecedent traumatic events. Spontaneous splenic rupture, while a rare phenomenon, commands immediate attention and precise diagnosis owing to its potentially fatal consequences. This case report underscores the critical importance of recognising and promptly addressing this life-threatening condition. This classic presentation aligns with previous reports of primary spontaneous splenic rupture (Borio *et al*., 2022). The absence of fever or chills, along with the lack of a history of trauma, further supports the diagnosis of atraumatic splenic rupture.

As mentioned in Table 1, laboratory investigations revealed an elevated white blood cell count, predominantly composed of polymorphonuclear leukocytes. This finding is consistent with an acute inflammatory process, which is commonly observed in cases of splenic rupture (Borio *et al*., 2022; Wu *et al*., 2022).

As shown in Figure 1, Imaging played a pivotal role in the diagnosis of primary spontaneous splenic rupture. The contrast-enhanced CT scan revealed significant free fluid in the abdominal cavity, with high density observed around the liver, spleen, flanks, and pelvis. This imaging finding corroborated the clinical suspicion and guided subsequent surgical intervention. The role of CT scans in detecting splenic rupture has been emphasised in previous studies (Bain, 2023; Saceleanu *et al*., 2023).

In Figure 2, the histopathological examination of the spleen confirmed the diagnosis, revealing notable infiltration of neutrophilic cells along the tear's edges, along with areas of intraparenchymal haemorrhage. These findings are consistent with the clinical impression of a traumatic splenic rupture; no evidence of atypia or malignancy was detected, further supporting the diagnosis of primary spontaneous splenic rupture (Crowley *et al*., 2021).

The aetiology of spontaneous splenic rupture remains elusive, with various theories proposed yet lacking robust empirical support; these conjectures range from localised splenic pathologies obliterating evidence upon rupture to reflex splenic vein spasms causing acute congestion, Chronic portal venous congestion, recurrent torsions in mobile spleens, and potential ruptures of degenerative splenic arteries further contribute to the complexity, Notably, spontaneous splenic rupture has been documented in a spectrum of medical conditions, historical cases, from Rokitansky in 1861 to Atkinson in 1874, provide context (Dunphy *et al*., 2019).

The diagnostic landscape in cases of spontaneous splenic rupture is notoriously challenging, primarily due to its symptomatic resemblance to an array of acute abdominal conditions (Bax *et al*., 2022). The absence of a history of trauma related to the classic signs of abdominal pain and guarding raised concern for the healthcare team. Furthermore, the presence of high-density free fluid surrounding vital organs, as presented in the CT scan, strongly suggested bleeding or pus, compelling the medical team to opt for explorative laparotomy (Hoeg, 2022).

Despite advancements in medical science, the precise aetiology of spontaneous splenic rupture remains an enigma in many instances; theorised causes ranging from reflex spasm of the splenic vein to portal venous congestion and an abnormally mobile spleen only add layers to the diagnostic challenge, distinguishing spontaneous splenic rupture from other causes of acute abdominal pain, including gastrointestinal and cardiac conditions, demands a nuanced approach (YaÄŸmurkaya *et al*., 2021).

Clinicians must maintain a vigilant stance, keeping spontaneous splenic rupture on their diagnostic radar, especially when presented with classic symptoms. Surgical intervention, such as splenectomy or partial splenectomy, remains the mainstay of treatment, although non-operative management may be considered in this case. Additionally, it is important to address any underlying predisposing conditions, such as infectious mononucleosis or hematologic disorders, to prevent recurrence (Lin *et al*., 2022).

The presented case serves as a reminder of the complexities inherent in medical diagnoses and ensuring the well-being of patients facing rare and challenging conditions like spontaneous splenic rupture.

CONCLUSION

In conclusion, this case of spontaneous splenic rupture underscores the need for heightened clinical awareness and interdisciplinary collaboration in rare medical emergencies. Advanced imaging and collaboration among specialists play a transformative role in diagnosis and management. Understanding diverse etiologies and post-splenectomy complications equips clinicians to deliver timely and highly effective care. This Study ensures optimal patient outcomes and guides future research and innovation in rare medical conditions.

Strengths and Limitations

This report offers a thorough clinical presentation and supports the diagnosis with histopathological evidence. It effectively places the case in context with existing literature, emphasising the need for early intervention. However, due to the rarity of the condition, generalizability may be restricted. The study is based on a single case, and long-term follow-up is absent.

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