Case report

SPONTANEOUS RUPTURE OF SPLENIC ARTERY ANEURYSM: A CASE REPORT

ABSTRACT

Introduction:
Splenic artery aneurysm is a rare condition but the true incidence is unknown as the majority of the cases are asymptomatic. The major complication of Splenic artery aneurysm is spontaneous rupture and carries a mortality rate of 25%. Young women, usually during the third trimester of pregnancy, are at an increased risk of Splenic artery aneurysm rupture, with pregnancy accounting for 20% to 50% of all ruptures.

Presentation of Case:
A 25-year-old female patient presented to the emergency department with a story of a nonspecific abdominal pain in the left flank. The case evolves with syncope and hemorrhagic shock. The radiology findings documented a massive hemoperitoneum caused by the rupture of a splenic artery branch aneurysm at the hilum. The patient was submitted to emergency laparotomy and splenectomy. Immediate post-operative care and followings days were uneventful.

Discussion:
The majority of splenic artery aneurysms are incidentally discovered on CT scans and, when symptoms do occur, they are typically nonspecific. Current guidelines suggest that asymptomatic true splenic artery aneurysms less than 3 cm in diameter and showing little or no growth can be safely managed through observation. When rupture of splenic artery aneurysms occur this demands an intensive and immediate resuscitation and surgical intervention for patient survival.

Conclusion:
Although splenic artery aneurysm rupture is a rare cause of hypovolemic shock in the emergency department, it should be considered in patients presenting with abdominal pain and hypovolemia. High degree of suspicion and prompt diagnosis is crucial for life saving intervention.

Keywords: splenic, artery, aneurysm, rupture, splenectomy, hemorrhagic, shock

1. INTRODUCTION

Splenic artery aneurysm (SAA) is a rare condition with a reported incidence of 0.1%–0.2% and a prevalence of 1% in the general population. However, the true incidence is likely underreported, as most cases are asymptomatic (1,2). SAA is the third most common type of arterial aneurysm, following abdominal aortic and iliac artery aneurysms, and it is the most frequent visceral aneurysm, accounting for up to 60% of all splanchnic artery aneurysms. Reported diameters of SAAs range from 0.6 to 30 cm (1,3,4)

The etiology of SAA is diverse, with the most common causes being pancreas-related pathologies (52%), thoraco-abdominal trauma (29%), post-surgical complications (3%), and peptic ulcer disease (2%). (5,6)

Based on the structural integrity, SAA can be divided into three categories: true aneurysms, dissecting aneurysms and pseudoaneurysms. They can also be classified by their location: proximal, middle or distal/hilar splenic aneurysms. Most of the true aneurysms develop in the distal third of the splenic artery (75%), while 20% develop in the middle third. (7)

The major complication of SAA is spontaneous rupture, which occurs in 2% to 10% of cases and carries a mortality rate of 25%. Pseudoaneurysms, in particular, present the highest risk of rupture (37%–47%) and are associated with a 90% mortality rate.(1, 4) Young women, usually during the third trimester of pregnancy, are at an increased risk of SAA rupture, with pregnancy accounting for 20% to 50% of all ruptures. The rupture of an SAA during pregnancy has devastating consequences, with maternal and fetal mortality rates of 80% and 90%, respectively. (8)

Most patients with SAA are asymptomatic. When symptoms do occur, they typically present in the sixth or seventh decade of life as nonspecific abdominal pain. If rupture occurs, patients can present with intra-abdominal hemorrhage, syncope, hemorrhagic shock, and death. (2)

2. PRESENTATION OF CASE

A 25-year-old female patient presented to the emergency department of a medium-sized rural hospital in Portugal with a story of a nonspecific abdominal pain in the left flank. There was no history of nausea, vomiting, fever or trauma. While in the emergency department, the patient had a syncope episode and was admitted to the emergency room.

At evaluation, she regained consciousness but was lethargic (Glasgow coma scale of 14). She was also tachypneic, although with good peripheric oxygen saturation (SpO2 99%) in air room, hypotense (mean arterial pressure of 45mmHg) and tachycardic (heart rate of 130bpm).

Abdominal examination showed abdominal pain in the left flank and hypochondrium, but no signs of peritoneal irritation. E-fast was performed and was positive for free intra-abdominal fluid. Arterial blood gas evaluation demonstrated metabolic acidemia with hyperlacticaemia.

We assumed hemorrhagic shock and we began hemodynamic resuscitation in the emergency room. Stabilization was achieved after blood products transfusion (1 unit of red blood cells (RBC), 1 unit of frozen fresh plasma(FFP) and 1 pool of platelets), 1g of tranexamic acid administration and vasopressor support with norepinephrine (maximum dose of 0,3 mcg/Kg/min).

Laboratory analysis, showed an hemoglobin of 11.1 g/dL, a fall of 4g/dL comparing to baseline values {reference: 12.0-16.0 g/dL}, leukocytosis (14.65 × 103/uL {reference: 4.0-11.0 x 103/uL}), and an elevated reactive C-protein (6.00 mg/dL {reference: 0-0.5 mg/dL}).

After stabilization, a CT scan was performed. It documented a massive hemoperitoneum caused by the rupture of a splenic artery branch aneurysm at the hilum.

The patient was then transported into the operative room and an emergency laparotomy was performed. Intraoperative findings confirmed a massive hemoperitoneum and a splenic artery branch ruptured aneurysm of 13 mm at the hilum. Due to hemodynamic instability during the surgery we decided to proceed with splenectomy.

During the procedure, there was an estimated blood loss of 2 liters, with worsening of the hypovolemic shock. Massive transfusion protocol was activated with administration of four units of FFP, one CUP of platelets, and four unis of RBC.

Immediate post-operative care was provided in the intensive care unit, where she remained for four days. On the 5th day, she was transferred to the general surgery ward being discharged home at the 12th post-operative day. The post-operative recovery period was uneventful and the post-splenectomy vaccination protocol was performed at time of discharge.

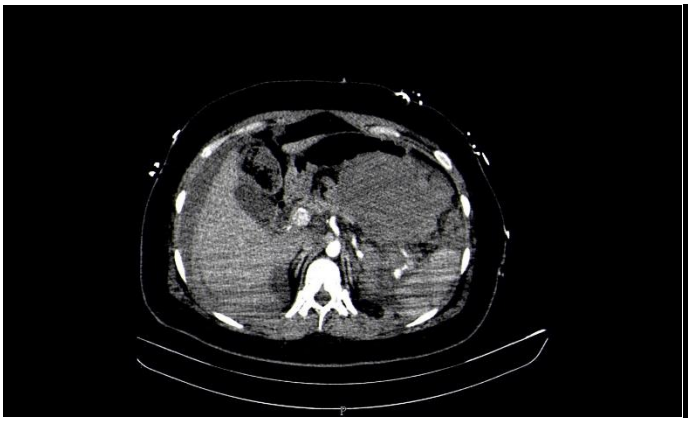

Figure 1 CT Scan - splenic artery rupture + hemoperitoneum

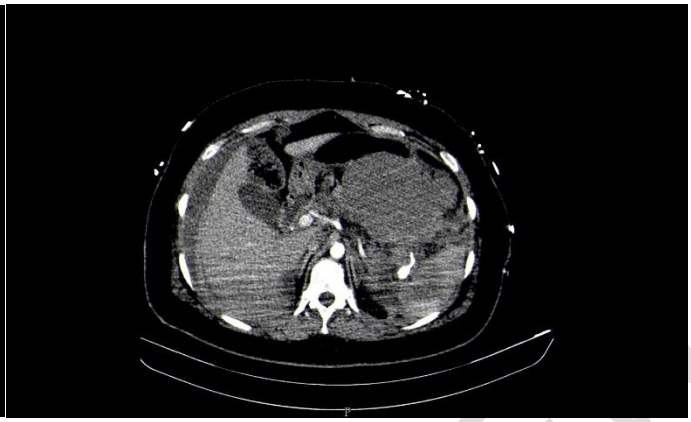

Figure 2 CT Scan - splenic artery rupture + hemoperitoneum

3. DISCUSSION

The majority of splenic artery aneurysms (SAAs) are incidentally discovered on CT scans. When symptoms do occur, they are typically nonspecific and variable. Although the exact cause of SAA remains unclear, the most common pathological finding is a defect in the tunica media, characterized by the loss of elastic fibers and smooth muscle, often associated with atherosclerosis. (9)

Due to the rarity of visceral aneurysms, including SAAs, the natural history and risk of rupture or other complications are not well understood. SAAs can be classified as true aneurysms or pseudoaneurysms, depending on the degree of vessel wall involvement, with pseudoaneurysms carrying a significantly higher risk of rupture. Some evidence suggests that pseudoaneurysms may also exhibit relatively rapid growth, emphasizing the need for early intervention regardless of their size. (8-10)

Current guidelines suggest that asymptomatic true SAAs less than 3 cm in diameter and showing little or no growth can be safely managed through observation and monitored with serial imaging. However, splenic artery pseudoaneurysms and SAAs in pregnant women or women of childbearing age should be treated regardless of size, due to the elevated risk of rupture. Observation of small (<3 cm) true aneurysms may be appropriate, except in women of childbearing age. Other indications for intervention include: presence of portal hypertension, potential need for liver transplantation, nonatherosclerotic or nondegenerative aneurysms, aneurysms that demonstrate growth of more than 0.5 cm or presence of symptoms. (1, 7, 8).

The major complication of SAA is spontaneous rupture, which occurs in 2% to 10% of cases and carries a high mortality. SAAs The rupture may occur freely into the peritoneal cavity, into the gastrointestinal tract, resulting in GI hemorrhage, or it may erode into surrounding structures such as the splenic vein, forming a splenic arteriovenous fistula. Rarely, the high blood flow through a splenic arteriovenous fistula can cause mesenteric steal syndrome, potentially resulting in non-transmural small bowel ischemia.

Treatment of SAA can generally be achieved through either open surgical or endovascular approaches. Endovascular procedures are preferred in elective cases, while open surgery is reserved for unstable patients or when endovascular options are unavailable. Ruptured SAAs are particularly challenging and represent a surgical emergency due to the risk of hemodynamic collapse. In such cases, ligation of the splenic artery, both proximally and distally, is required. Most patients with ruptured SAA undergo concomitant splenectomy without vascular reconstruction. (7, 8)

Patients who undergo urgent splenic artery ligation or splenectomy should be vaccinated on or after post-operative day 14 to reduce the risk of overwhelming post splenectomy sepsis (OPSS), particularly against pathogens such as *Streptococcus pneumoniae*, *Haemophilus influenzae* type B, and *Neisseria meningitidis*. (8)

This case illustrates a rare condition requiring immediate resuscitation and surgical intervention for patient survival. As with many cases described in the literature, our patient had no known risk factors or history of trauma. The absence of identifiable risk factors in some cases underscores the complexity of this condition and highlights the need for further research to better understand the pathophysiology of the underlying disease and the risk factors contributing to spontaneous rupture.

4. CONCLUSION

We presented a case of splenic artery aneurysm rupture in a young woman without known risk factors. Although splenic artery aneurysm rupture is a rare cause of hypovolemic shock in the emergency department, it should be considered in patients presenting with abdominal pain and signs of hypovolemia. Prompt diagnosis is crucial for timely and appropriate life saving intervention, which often requires an aggressive surgical approach. Therefore, a high degree of suspicion is essential for ensuring rapid intervention.

CONSENT (WHERE EVER APPLICABLE)

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

Disclaimer (Artificial intelligence)

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc have been used during writing or editing of manuscripts.Details of the AI usage are given below:

1. ChatGPT 3.5, chatbot provided by OpenAI, utilized for grammar verification and general text organization

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