

Spontaneous rupture of a splenic artery aneurysm with hemoperitoneum; case presentation

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ABSTRACT



Aneurysms of the splenic artery are relatively rare, being found in patients with portal hypertension, multiparous, atherosclerosis, or in young people with various genetic diseases. In the uncomplicated forms, splenic artery aneurysms are often difficult to diagnose either because of the asymptomatic evolution, or because of the non-specific symptoms. In cases of trauma or large sizes, aneurysms can be complicated by rupture, which can cause hemoperitoneum with the risk of death if specific treatment is not initiated as soon as possible. Depending on the location of the splenic aneurysm, comorbidities, the patient's general condition or life-threatening complications, laparotomy, laparoscopy, endovascular techniques or combined procedures can be performed. The case of a 33-year-old female patient who presented to the emergency room with abdominal pain, nausea, vomiting and later syncope is presented. The patient was referred to the radiology department, and computed tomography revealed a ruptured splenic artery aneurysm with hemoperitoneum. The splenic artery aneurysm and the spleen were excised by emergency surgery, with a favorable postoperative outcome. The young age of diagnosis and treatment probably implies a genetic component, so that she was referred for additional investigations after discharge.

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Introduction

The splenic artery is the third most common in terms of the presence of an aneurysm on an intra-abdominal visceral vessel. Rupture of such an aneurysm can lead to retroperitoneal hematoma, massive hemorrhage with hemorrhagic shock in the case of hemoperitoneum, but also to possible fistulas with the pancreas due to the adjacent anatomical relationship [1,2]. If the dimensions do not exceed 2 cm, most aneurysms are asymptomatic and are diagnosed incidentally, by performing a computed tomography for another pathology. Such aneurysms are associated with various conditions such as pregnancy, liver cirrhosis, atherosclerosis, or in young people in case of malformations and/or genetic predispositions [3,4]. The risk of rupture and possible complications occurs with aneurysms over 5 cm in diameter, when it is necessary to implement minimally invasive measures to reduce the risk of such events. In case of rupture of the aneurysm (large sizes, trauma, etc.), it is necessary to stop the bleeding by embolization, the application of different coagulant agents

or emergency surgical treatment, with the aim of saving the patient's life [5-7].

In this article, we will present the case of a 33-year-old female patient who presented anamnesticly as acute appendicitis at the onset, with epigastric pain that later extended to the lower abdominal floor. Through paraclinical and imaging investigations, it was later diagnosed that the patient has a ruptured splenic artery aneurysm with retroperitoneal hematoma and hemoperitoneum. This paper also presents a brief review of the main etiological factors of aneurysms, the most frequent forms of clinical presentation, and the therapeutic attitude depending on the patient's condition and anatomical peculiarities.

Case Presentation

A 33-year-old female patient, known to have polycystic ovary syndrome, obese with a BMI of 33.1 kg/m², without previous surgical interventions, presented to the emergency department 8 hours after the onset of sudden epigastric pain, later associated with sensation of nausea, general abdominal pain, and followed by an episode of lipothymia.

The initial clinical examination showed a hemodynamically stable patient (with a blood pressure of 125/56 mmHg, heart rate of 96 beats/minute), warm, dry, normally colored integuments, dry mucous membranes, and enlarged abdomen due to the presence of a well-represented adipose tissue. The patient had spontaneous pain and on palpation at the level of the epigastrium and at the level of the right iliac fossa, rebound tenderness at the level of the right inguinal region, without presenting menorrhagia or externalization of blood from the level of the digestive tube.

Paraclinical investigations performed in the emergency room show mild normochromic normocytic anemic syndrome, HGB: 11.10 g/dL, HCT: 34.80%, MCV: 86.80 fL, MCH: 27.70 pg, and inflammatory syndrome with WBC: 18.36 *1000/uL, NEU: 90.00%, C- reactive protein: 7.90 mg/L. The differential diagnosis indicates the suspicion of acute appendicitis or ovarian cyst rupture, so the patient was referred to the radiology department. A contrast-enhanced CT scan is performed, which reveals a ruptured splenic artery aneurysm approximately 6 cm from the origin of the artery (Figure 1).



Figure 1. Computed tomography appearance of the splenic artery aneurysm

Later, the patient presents another lipothymic episode with a sudden drop in blood pressure, and it is decided to transfer the patient to the central operating room. Under general anesthesia, the peritoneal cavity is explored, revealing about 500 ml of blood in the pelvic region, blood clots and fresh free blood in the abdominal cavity. Penetration into the omentum bursa is decided and a pulsatile hematoma was found in zone I of the retroperitoneum, with continuity solution in the peritoneal cavity. The splenic artery is identified and anchored at the emergence from the celiac troch, it is dissected distally along a winding path, and an aneurysm of the splenic artery of approximately 6/4 cm is identified, with active bleeding at the time of exploration. Splenic artery aneurysm dissection, splenectomy, abundant lavage of the omental bursa and peritoneal cavity are performed, followed by the placement of drain tubes at the level of the omental bursa, in the splenic lodge and Douglas space (Figure 2).

Postoperatively, the patient is transferred to the intensive care unit where it is decided to administer two units of erythrocyte mass to correct the severe anemic syndrome (HGB: 7.20 g/dL, HCT: 22.60 %), with dynamic follow-up by determinations of multiple serum values, including the evaluation of renal, hepatic and pancreatic functions.

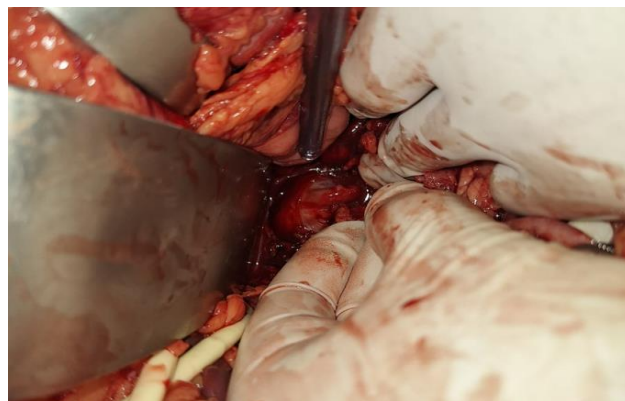


Figure 2. Intraoperative appearance of the aneurysm

After the surgery, the excised pieces were sent to the pathological anatomy department for macroscopic and histopathological examination (Figure 3).

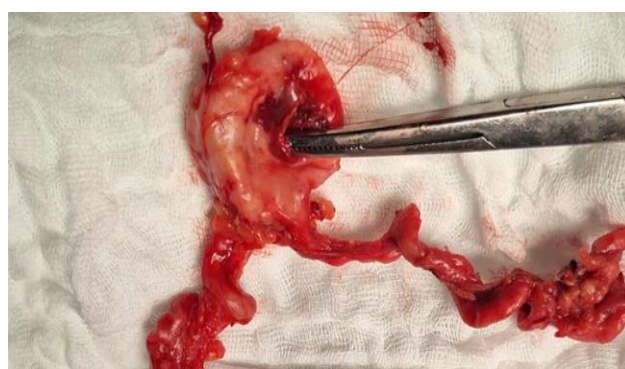


Figure 3. The macroscopic appearance of the aneurysm and the splenic artery

Treatment with broad-spectrum antibiotics (ceftriaxone 2g/day), analgesic and anticoagulant is initiated. On the 2nd postoperative day, the patient is transferred to the general surgery department, where the treatment started in the intensive care unit continues. After 2 days, the drain tubes are removed from the omental bursa and the splenic area, as the amount evacuated does not exceed 50 ml of serous fluid. In the following 24 hours, the constant maintenance of HGB: 8.70 g/dL and HCT: 26.50% values were noted. Pancreatic, liver and kidney tests were normal and the systemic inflammatory syndrome was remitted, but with an increase in thrombocytosis indicators, so that the antiplatelet treatment with aspirin is supported.

On the 7th postoperative day, despite preventive measures (mobilization, mattress), the patient develops a decubitus ulcer located in the sacrum area, which is treated with topical treatment. Discharge is carried out on the 9th postoperative day, with the recommendation of vaccination

against encapsulated germs, monitoring of the number of platelets and continuation of antiplatelet treatment. 16 days after the intervention, the skin sutures are removed and it is decided to continue the aggregative treatment with aspirin, since thrombocytosis is maintained at high values (PLT: 887.00 *1000/uL).

Discussions

Aneurysms of the intra-abdominal arteries are rare vascular pathologies, with an incidence between 0.015 and 0.2%, the most affected being the renal, hepatic and splenic arteries [5]. The most frequent etiology is represented by the atherosclerotic one, followed by various connective diseases such as Marfan syndrome, Ehler-Danlos or fibromuscular dysplasia [8,9].

Patients with a ruptured splenic artery aneurysm may experience abdominal pain localized to the left hypochondrium and/or epigastrium (depending on its location). The symptomatology can be non-specific with vague abdominal pain, or on the contrary with a clinical picture of hemorrhagic shock with severe arterial hypotension, profuse sweating, muscle weakness, skin pallor and feeling of thirst [10]. An important clinical element that can raise the suspicion of a marked loss of blood volume is the history of syncope in the recent antecedents, most often correlated with the onset of intra or retroperitoneal hemorrhage [11-14].

Treatment of splenic artery aneurysms may consist of hydro-electrolyte and hemodynamic rebalancing in the case of patients with hemodynamic instability and signs of shock. The surgical or minimally invasive approach is indicated both in such patients and cases whose aneurysm size exceeds 25 mm [9,15], or there are associated inflammatory or infectious factors, vasculitis, connective tissue diseases or congenital diseases such as Ehler-Danlos syndrome type IV, Marfan or von Recklinghausen conditions [10,16].

Thus, endovascular treatment can be useful in the case of these patients through embolization of the splenic artery with coils, placement of covered stents, intraluminal injection of thrombin, alcohol or polystyrene [11,17]. The minimally invasive approach is preferable for aneurysms placed proximally, difficult to access surgically. When possible, it should be avoided in the case of anatomical peculiarities involving the vascularization of the small intestine, pancreas or other adjacent organs, as well as in the case of mycotic pseudoaneurysms, the splenic artery with a small lumen or tortuous path, making access with the catheter difficult and with high risks of complications during the intervention [18-20]. The post-interventional complications are represented by stent migration with subsequent perforation and severe recurrent hemorrhage [21], splenic or intestinal infarction, bacterial colonization of the stent with formation of splenic abscesses and fever [22].

Surgical treatment of splenic artery aneurysms is still considered the gold standard, being indicated in patients with hemodynamic instability, aneurysms with a diameter of approximately 2.5 cm, placed in the distal portion of the artery, or which for anatomical reasons (tortuous artery, variants) the anatomical vasculature adjacent to the viscera) cannot be treated minimally invasively [23]. The surgical approach in this case may require resection of the aneurysm, with subsequent interposition of a vein graft and eventual resection of the spleen or the tail of the pancreas depending on the size of the aneurysm. The presence of liver cirrhosis and portal hypertension, episodes of pancreatitis, the presence of spleen infarction, but also the experience of the surgical team can limit/customize such an intervention [23,24]. The laparoscopic approach can be used in the case of small lesions, located distally, in pregnant women and in those patients in whom the intraperitoneal adhesion syndrome is low, so that the resection of the aneurysm and the spleen can be performed [25,26].

In the presented case, considering the condition of the patient who presented in an emergency (initially with hemodynamic stability but later with sudden hypotension secondary to the wide rupture of the aneurysm, as well as of the splenic artery which had a winding path), the classic surgical intervention was decided to save the patient's life. In elective conditions, the minimally invasive approach with selective embolization of the artery could help to stabilize the patient, and in a secondary time to practice either the reconstruction of the splenic artery (to maintain the function of the spleen) or its resection with the risk of further development of thrombocytosis. In the case of the presented patient, given the location of the aneurysm in the distal part of the splenic artery and a satisfactory vascularization of the pancreas (through a large pancreatic artery that forms an arch with the inferior pancreatic artery), ischemia of the tail of the pancreas did not occur. This fact was confirmed by low levels of amylase and lipase throughout the hospital stay, thus not requiring a resection of the distal segment during surgery [27].

The patient's symptomatology in the present case mimicked in the initial stage an acute appendicitis at the onset, the pain initially starting at the level of the epigastrium and later migrating to the level of the right iliac fossa and with slight swelling at this level. However, the lipothymic episode occurring simultaneously with the pain at the epigastric level raised suspicions about this diagnosis, requesting a differential emergency diagnosis by performing a tomographic imaging investigation that managed to detect the presence of the splenic artery aneurysm. Furthermore, the migration of pain from the epigastrium to the right iliac fossa may be based on the distribution of blood, which may be irritating to the peritoneum given the time between onset of symptoms and presentation to the hospital [28].

In this patient, the cause of the splenic artery aneurysm may be suggested to be genetic, given the young age at which it was diagnosed, the thin appearance of the skin, and its fragility. Thus, the patient developed a decubitus ulcer after about 7 days of hospitalization, despite the prophylactic methods imposed from the first postoperative day, many of these elements described being characteristic of Ehlers Danlos syndrome type IV [29-31].

Conclusions

Although splenic artery aneurysm is a rare disease in the general population, it can lead to severe intraperitoneal bleeding that can sometimes be difficult to manage. Clinical evaluation and history may often show pain located at the level of the epigastrium or the base of the chest associated with phenomena of loss of consciousness or syncope, which may raise the suspicion of vascular disease. This pathology can be confirmed by imaging methods, and minimally invasive and surgical treatment can be used both separately and simultaneously, in cases where they are available in emergency situations.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript. Informed consent was obtained from all subjects involved in the study.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

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