Splenic artery aneurysm treated by coil embolization

Aneurisma de artéria esplênica corrigido por embolização com molas

Introduction

Splenic artery aneurysms are rare even though they are the most common visceral aneurysm. Its prevalence in the general population is about 0.8%. Its formation mechanism is still unknown. The diagnosis is often incidental, in the process of imaging investigation of other diseases or when there are fatal complications such as rupture. The possibility of rupture of splenic artery aneurysms with a diameter less than 2 cm is low; however, those with a diameter equal to or greater than 3 cm are usually referred for surgical treatment due to the high risk of rupture. The elective treatment is indicated for non complicated cases, and the coil embolization is an interesting method, since it avoids conventional surgical treatment.

Keywords: Splenic artery; vascular diseases; embolization, therapeutic.

Case report

A 70-year-old female patient with arterial hypertension was admitted to the Nephrology service complaining of recurrent urinary infection. Abdominal computed tomography (CT scan) showed three aneurysmal dilations in the superior mesenteric artery, right renal artery and splenic artery. The patient was referred to the Angiology service. Abdominal CT angiography showed the same aneurysmal dilations shown at the CT scan (Figures 1 to 3). Preoperative angiography by retrograde femoral catheterization was performed and showed: patent superior mesenteric artery filling the gastroduodenal and hepatic arteries through the pancreatic arcade, where a small saccular partially calcified aneurysm with approximately 0.4 cm in diameter was observed (Figure 4); patent right renal artery with large-neck saccular aneurysm at the bifurcation, measuring about 1 cm; normal patent left renal artery; patent splenic artery with a large-neck partially calcified aneurysm in its distal third (extraparenchymatous),...
measuring about 2 cm in diameter. Surgical treatment was performed three weeks after angiography. Right femoral puncture was made with selective catheterization of the celiac trunk with a Simmons 2 catheter and selective catheterization of the splenic artery aneurysm was made with microcatheter Excelsior SL 1018 (Boston Scientific, Natick, MA, USA). Coil embolization was performed with 12 Guglielmi detachable coils (GDC). Follow-up images showed exclusion of the aneurysm and patency of the other branches. The other aneurysms received expectant treatment and were followed up for six months so that surgical treatment would be performed only if necessary. The patient was discharged three days after the operation and has been asymptomatic since.

Discussion

Splenic artery aneurysm is an infrequent clinical condition, but still the third most common abdominal aneurysm and the most frequent visceral one, accounting for 60% of all cases. It is the most frequent splanchnic aneurysm, with a prevalence of 0.8% in the general population. It presents high risk of rupture in pregnant patients (due to the increase in splenic blood flow and changes in blood vessel elastin) and in patients with portal hypertension.
The precise mechanism of aneurysmal dilatation of the splenic artery is unknown. Trimble and Hill’s statement that relates aneurysm formation with arterial wall fragility and increased blood pressure is still current.

There are several disease processes related to the development of splenic artery aneurysms, including: arteriosclerosis, multiparity, portal hypertension, intra-abdominal inflammatory diseases, abdominal trauma, connective tissue diseases, congenital aneurysms or mycotic emboli.

This type of aneurysm is more common in women, in a proportion of 4:1. Most are located on the distal third of the splenic artery and may be associated with other aneurysms in the same artery or in other vessels. Most saccular aneurysms are splenic and located near the arterial bifurcations. Parietal calcification may also be present.

The first reports suggested a 10% risk of rupture. More recent studies suggest that the risk has been overestimated and that actual rupture rates are around 2 to 3%. Anyway, rupture does occur and it is more common in certain risk groups. About 50% of rupture cases occur during pregnancy and 20% in patients with portal hypertension.

Splenic artery aneurysm seldom produces clinical signs and symptoms, especially when its diameter does not exceed 2 cm. Abdominal pain on the superior left quadrant or the epigastric region is uncommon. However, some patients complain of chronic non-specific epigastric pain or pain on the left hypochondrium. Acute pain on the left upper quadrant of the abdomen indicates possible aneurysm rupture, especially if there are signs of hypovolemia.

Figure 3 – CT angiography of the abdominal aorta showing aneurysmal dilatation in the splenic artery, superior mesenteric artery and right renal artery

Figure 4 – Preoperative angiography showing aneurysmal dilatation in the splenic artery
This type of aneurysm has no typical clinical signs. It can present clinical signs that can be ascribed to other diseases - as, for example, a murmur that, when present, can be related to aorta turbulent flow. The same can occur when there is a palpable mass in the left superior quadrant – which can be caused by splenic aneurysm – but it is more commonly related to splenomegaly.

Because of that, most cases go unnoticed until the onset of complications, which in case of rupture, may be fatal. The diagnosis is also made unintentionally by exams indicated for other diseases. Simple abdominal radiography may reveal calcification referred to as “signet-ring”. Other imaging exams may make the diagnosis, such as ultrasonography, CT scan or magnetic resonance imaging.

Although duplex mapping is a non-invasive exam with minimal risk to the patients, it is known to be examiner-dependent when the objective is to find a splenic artery aneurysm and contrast radiologic exam is usually necessary to confirm the diagnosis. CT scan may confirm the diagnosis, especially when using intravenous iodinated contrast. However, angiography remains the most used diagnostic and evaluation method when it comes to splenic aneurysms, besides assessing possible aneurysms in other visceral arteries. Recent advances in magnetic resonance angiography and helical CT scan will provide more precise clinical diagnosis of splenic aneurysms.

Readily access to minimally invasive methods such as ultrasonography, MRI and tomography has increased the rate of elective and incidental diagnosis of splenic aneurysms. With the increasing use of visceral arteriography, duplex scan and CT scan, such lesions have been detected more frequently.

The possibility of rupture is very low in aneurysms smaller than 2 or 3 cm, except when the patient is pregnant, has portal hypertension or has been subjected to surgical procedures, such as liver shunts or transplantation.

The treatment for splenic artery aneurysm must be carried out when there is a high risk of rupture (diameter larger than 2 cm), when the patient is asymptomatic, in transplant patients, when there are associated inflammatory processes, and when the patient is a fertile or pregnant woman. Patients with splenic aneurysm greater than 3 cm in diameter are usually referred to surgical treatment due to the risk of rupture.

There are several surgical approaches for splenic artery aneurysms: resection with or without vascular repair, simple open or laparoscopic splenic artery ligation and endovascular procedures, such as embolization. The classic approach – open or via laparotomy – is an effective method. Laparoscopy is an excellent and less aggressive alternative; however, it requires a surgeon skilled in laparoscopic surgery. The difficulty of endovascular treatment is stent placement, because the splenic artery is tortuous.

Recent advances in imaging diagnosis have been providing fundamental aid to the anatomical criteria in choosing the surgical technique to be used, which depends on the aneurysm location and on vascular anatomy. When it is located on the distal portion of the artery, repair can be done by open surgery with ligation, and splenectomy may be needed.

Coil embolization is not recommended in giant aneurysms because its inefficient in occluding the aneurysm due to the intense inflammatory reaction and the possibility of embolization. Despite that, percutaneous embolization with Gianturco coils and gelfoam (Pfizer, Inc.) has had favorable results reported. The method may make surgical intervention unnecessary or be associated with surgical treatment, which enables temporary control of the lesions – especially pseudoaneurysms – while trying to improve the patient’s clinical status before a planned operation. Embolization may be especially beneficial to patients with visceral bleeding after surgical drainage of pancreatic pseudocyst and those with high surgical risk due to associated comorbidities. Thus, selective embolization – as the first choice of treatment for saccular splenic aneurysm – has been shown to be a feasible option due to the high possibility of splenic parenchyma preservation with minimal morbidity and short hospital stay. This technique has a success rate of 85%.

Like every invasive procedure, embolization is not complication-free. This technique is associated with a risk of splenic artery occlusion with splenic infarction and aneurysm recanalization, reported in 4% of cases. Up to 25% of the patients subjected to the procedure may present splenic infarction, this risk increasing in distal embolization.

Elective treatment of splenic artery aneurysm is recommended in cases without rupture. Exeresis surgical risk must be considered and be lower than 0.5%. If surgical risk is high, one may consider percutaneous embolization or even laparoscopic ligation as alternatives. Although some authors recommend correction only for low-risk patients, recent studies pointed out the choice of treatment to be determined by the dimensions of the aneurysm, anatomical features, rupture risk and the patient’s clinical picture.

The natural history of splenic artery aneurysms is unknown because they are often asymptomatic and diagnosed during investigation of other diseases or at the time of rupture, with high perioperative mortality rate. For these reasons, despite being infrequent, splenic aneurysms must be treated at the time of diagnosis, once they
present a diameter superior to 2 cm or are associated with aggravating conditions: women in fertile age, pregnancy before the third trimester, patients with systemic arterial hypertension or expanding aneurysms.

References


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