CASE REPORT

Endovascular treatment for superior mesenteric artery pseudoaneurysm: case report

Tratamento endovascular de pseudoaneurisma de artéria mesentérica superior: relato de caso

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Abstract

Pseudoaneurysm of the superior mesenteric artery is a rare disease, however it is associated with a high incidence of rupture and mortality. The etiology is usually infectious and diagnosis is commonly made by means of occasional imaging. Historically, the treatment of choice has been open surgical repair; however it is associated with numerous complications and technical difficulties. We reported a case of a pseudoaneurysm of superior mesenteric artery in a patient with liver abscess who, after resolution of infection, underwent successfull a minimally invasive endovascular approach, with deployment of microcoils and bare stent.

Keywords: Mesenteric artery, superior, aneurysm, false, embolization, therapeutic.

Resumo

O pseudoaneurisma de artéria mesentérica superior é uma doença rara, porém com alta taxa de ruptura e mortalidade. Sua etiologia geralmente é infecciosa e comumente o diagnóstico é feito por meio de achado nos exames de imagem. Historicamente, seu tratamento de eleição tem sido o reparo cirúrgico aberto; entretanto, é associado a inúmeras complicações e dificuldades técnicas. Relatamos um caso de pseudoaneurisma de artéria mesentérica superior em um paciente portador de abscesso hepático no qual, após resolução do processo infeccioso, foi empregado, com sucesso, um tratamento minimamente invasivo endovascular, com implante de micromolas e *stent* não-recoberto.

Palavras-chave: Artéria mesentérica superior, falso aneurisma, embolização terapêutica.

Introduction

Aneurysms and pseudoaneurysms of the visceral arteries are rare entities that present a prevalence range of 0.1 to 2% in the general population[1]. Although true superior mesenteric artery aneurysm (SMA) is rarely described in the literature, pseudoaneurysm, which is a contained rupture on the arterial wall, is the fourth most common visceral aneurysm, with a 4% prevalence. SMA pseudoaneurysms present high rupture (20 to 30%) and mortality rates (30 to 50%). Some recent reports recommend endovascular treatment as an effective minimally invasive option for these patients[1,2]. In this paper, we describe a case of SMA pseudoaneurysm treated via endovascular approach at the Department of Interventional Radiology of *Hospital Israelita Albert Einstein* (HIAE).

Case description

A 53-year-old male patient was admitted with a septic abdomen and ultrasound image suggestive of right hepatic lobe abscess, between the VI and VII segments, and measuring 5.9 x 5.8 x 4.6 cm. After percutaneous drainage, a sample of the purulent secretion was sent to culture, but

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bacterial growth was not observed. After empiric antibiotic therapy, computed tomography scan of the abdomen showed a small residual collection measuring 1.8 x 1.4 cm on the VII segment. Simultaneously, an aneurysmal dilatation was detected on the proximal SMA with luminal thrombi, determining moderate stenosis (Figure 1). After clinical improvement of the patient, angiographic examination was scheduled, along with endovascular treatment of the aneurysm.

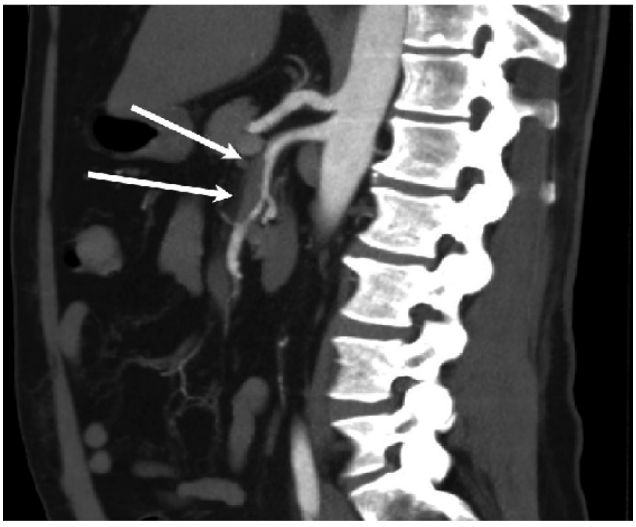

Figure 1 – CT angiography imaging showing superior mesenteric artery pseudoaneurysm with lumen compression by intramural thrombus

Figure 2 – Superior mesenteric CT angiography showing saccular dilatation on a proximal segment (arrow) and lumen compression next to the emergence of jejunal branches (arrowhead)

The procedure was performed under general anesthesia and clopidogrel 300 mg, an antiplatelet-aggregation agent. After femoral artery puncture and SMA catheterization, angiography showed saccular aneurysmal dilatation in its proximal third, followed by severe and extensive stenosis on the emergence of the jejunal branches, and slowing of the contrast flow to jejunoileal and colic branches, which characterize pseudoaneurysm with extrinsic compression of the arterial lumen (Figure 2). A 6-F guiding catheter was then introduced into the SMA ostium, followed by superselective catheterization of the pseudoaneurysm with microcatheter, and embolization with platinum controlled-release microcoils. The stenosis was treated by implantation of a self-expanding nitinol stent (7 mm caliber). Control angiography showed adequate stent implantation, preservation of the trunk and branches of SMA, and improvement of blood flow to the bowel (Figure 3). One month later, CT angiography showed patency of the superior mesenteric artery and exclusion of the pseudoaneurysmal sac (Figure 4).

Discussion

The SMA aneurysm was first described by Koch in 1951. DeBakey and Cooley described, in 1953, the first successful treatment of SMA aneurysm by resection without arterial reconstruction. Its incidence is underestimated due to its location, which makes the diagnosis

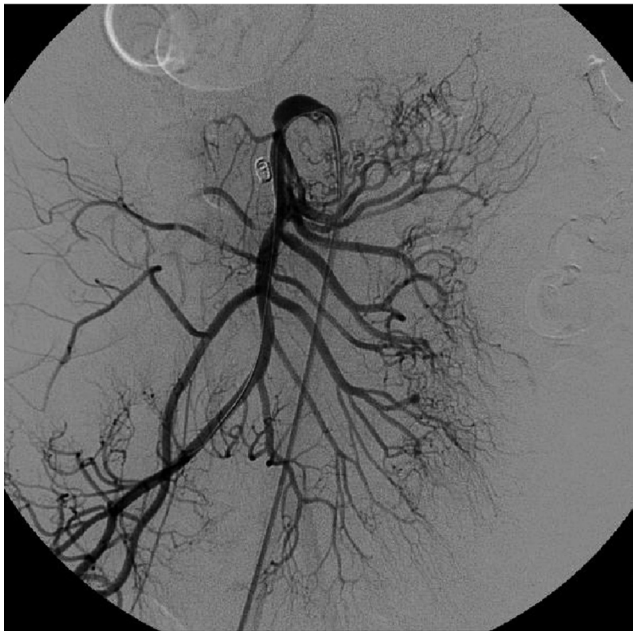

Figure 3 – Post-treatment angiography showing exclusion of pseudoaneurysm, presence of coils and improvement of intestinal branches' perfusion

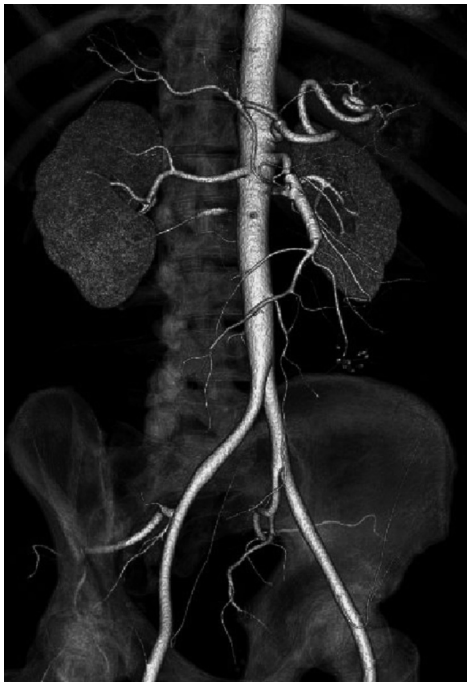

Figure 4 – CT Angiography imaging one month after embolization showing patent superior mesenteric artery

difficult. The age group most frequently affected is from 45 to 55 years old, with similar distribution between genders. About 58 to 63% of the SMA pseudoaneurysms are infectious, and the main etiologic agents are *Streptococcus ssp.* and *Staphylococcus ssp*, generally associated with endocarditis and bacteremia[3]. Atherosclerosis, vasculitis, fibrodysplasia, pancreatitis and even renal lithotripsy[4] are other etiologic factors. Mitchell et al. described deficiency in the elastase/alpha-antitrypsin complex as an etiologic factor, and Tupler et al. described its association with ergotism[5].

The SMA pseudoaneurysms are mostly asymptomatic. About 40 to 80% of the cases evolve to rupture without prodromal signs and symptoms, but 70 to 80% of the patients presenting with rupture are symptomatic, and the mortality rate is high. Pseudoaneurysm rupture causes intense acute pain with signs and symptoms of hemorrhagic shock. Physical examination may be inconclusive due to the pseudoaneurysm's location and size, but a painful and movable abdominal mass may be observed in cases of rupture[6]. Multislice CT angiography has been widely used in diagnosis because it is a non-invasive exam that assesses the aneurysm dimension, its relation to adjacent organs and the presence of intraluminal thrombi. Arteriography should be restricted to endovascular treatment.

While the repair of a true visceral aneurysm is indicated when its diameter is larger than 1.5 to 2 cm – or when symptoms are present, like in cases of ruptured aneurysms and female patients in their fertile age, all cases of pseudoaneurysm must be treated regardless of size[1,7].

Conventional surgical treatment is still accepted as the treatment of choice in low-risk patients. Proximal and distal ligatures of the aneurysm are often performed, followed by aortomesenteric bypass with prosthetic graft[8]. This approach has the advantage of being a definitive repair with low risk of reestenosis when performed by experienced surgeons. On the other hand, its disadvantages are: higher surgical-anesthetic, hemorrhagic and infectious risks, longer learning curve, difficult surgical access and graft kinking and occlusion.

As endovascular techniques and devices have improved, the method has become the treatment of choice, especially in high-risk patients. The main advantages are the possibility of performing the procedure under local anesthesia, immediate post-procedure angiographic control, low risk of paralytic ileus, abscesses, hemorrhages, and fast patients' recovery[9]. The modalities of endovascular treatment are: coil or cyanoacrylate embolization (fibrous or platinum), utilization of stents (either covered or bare)[10,11], and, in some cases, their association[7,12]. The first two modalities are mainly used in proximal and saccular aneurysms and pseudoaneurysms. Covered or bare stents may be used in most cases, particularly when the patency of the artery must be maintained and when favorable anatomical features are required[13]. There are also reports of transluminal thrombin injection by means of a distal embolic protection device used in carotid interventions[14]. Coils are metallic devices designed to cause permanent vessel thrombosis that may have controlled release, thus allowing a more precise placement. Vascular stents made of nickel-titanium alloy (nitinol) assume a malleable configuration that is more suitable to handling, which allows a better delivery into the target-artery[15,16]. The treatment with stent demands favorable anatomical conditions such as: distal and proximal necks, adequate vessel caliber and little tortuosity. Patients who do not match these criteria are considered anatomically complex, and conventional surgical treatment is the option available. Nevertheless, with the experience acquired by the interventional radiologists and the improvement in the materials, many patients with complex anatomy have been adequately treated by minimally invasive method.

Conclusion

Endovascular approach is a current option for treating visceral aneurysms such as SMA pseudoaneurysms. The constant improvement of endovascular devices will probably allow the treatment of most patients, including those with complex anatomy. Long-term follow-up of patency is necessary for the assessment of method efficacy.

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Writing of the paper: SGJS
Critical analysis: FN
Final text approval*: BBA, BEFN, RCA, MSDA, RTAJ, JCC, SGJS and FN
Statistical analysis: N/I
Overall responsibility: BBA
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