ACTA RADIOLÓGICA PORTUGUESA
Janeiro-Abril 2014 | nº 101 Volume XXVI | 43-45

Caso Clínico / Radiological Case Report

IDIOPATHIC SPLENIC ARTERY PSEUDOANEURYSM SUCCESSFULLY TREATED WITH EMBOLIZATION

PSEUDO-ANEURISMA IDIOPÁTICO DA ARTÉRIA ESPLÉNICA TRATADO POR EMBOLIZAÇÃO

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Recebido a 10/01/2014
Aceite a 14/05/2014

Abstract

Splenic artery pseudoaneurysms are rare and typically resultant from pancreatitis, spleen trauma, and iatrogenic complications. Unlike true aneurysms, pseudoaneurysms are usually symptomatic and more prone to rupture. We report the case of an asymptomatic, idiopathic splenic artery pseudoaneurysm in a 84-year-old woman that underwent an abdominal computed tomography (CT) examination after the inaugural diagnosis of diabetes mellitus. No prior history of pancreatitis, trauma or abdominal surgery was documented. Attending to the unpredictable risk of rupture, splenic artery embolization was performed with no immediate complications. One month after the procedure, a follow-up Doppler ultrasound found no flow inside the pseudoaneurysm.

Key-words

Splenic artery pseudoaneurysm, splenic artery embolization.

Resumo

Os pseudo-aneurismas da artéria esplénica são raros e tipicamente secundários a pancreatite, trauma ou iatrogenia. Contrariamente aos aneurismas verdadeiros, os pseudo-aneurismas são geralmente sintomáticos e têm maior probabilidade de ruptura. Apresentamos o caso de um pseudoaneurisma idiopático e assintomático da artéria esplénica, numa doente de 84 anos, do sexo feminino, que efectuou uma tomografia computorizada (TC) abdominal na sequência de um diagnóstico inagural de diabetes mellitus. Não se apuraram antecedentes de pancreatite, trauma ou cirurgias abdominais. Devido ao risco imprevisível de ruptura, efectuou-se embolização da artéria esplénica, sem complicações imediatas. Um mês depois, foi efectuado um estudo Doppler de controlo, que não evidenciou fluxo no interior do pseudo-aneurisma.

Palavras-chave

Pseudo-aneurisma da artéria esplénica, embolização da artéria esplénica.

Introduction

A pseudoaneurysm is a pulsating, encapsulated hematoma, which communicates with the lumen of a ruptured artery, generally due to inflammation, trauma or iatrogenic causes. The maintained arterial pressure leads to blood dissection and formation of a perfused sac. Its external wall corresponds to outer arterial layers, perivascular tissue, blood clot, or reactive fibrosis. (1,2)

Splenic artery pseudoaneurysms (SAP) are rare, even more than true aneurysms. Due to the wider use of cross-sectional imaging, these vascular changes are being increasingly detected. (1,3)

The most typical causes of SAP are pancreatitis, spleen trauma, and iatrogenic complications (including surgery and angiography). Peptic ulcer disease constitutes a rare cause. (1,3-6)

The diameter of SAP is variable and may range from 0,3 to 17 cm, as reported by Tessier et al. (3,6) SAP are usually symptomatic, unlike true aneurysms, and patients commonly complain with abdominal pain, hematochezia, melena, and hematemesis. (2,3,6)

SAP are more prone to rupture than aneurysms and may also complicate with hemorrhage. Hemorrhage may be intra or retroperitoneal, and occasionally involves the pancreatic duct, stomach, colon or even a post-pancreatitis pseudocyst. (6) The risk of rupture may reach 37%, and mortality of untreated splenic artery pseudoaneurysms may approach 90%. (1,6) Spontaneous pseudoaneurysm regression was already documented, but is a rare event. (5)

Gray-scale ultrasound typically shows an uni or multilobulated hypoechoic cystic structure adjacent to an artery. It may also demonstrate septa or concentric echogenic layers suggesting the presence of hematoma or thrombosis. The diagnosis implies the recognition of blood flow inside the pseudoaneurysm, through Doppler ultrasound, which typically shows a swirling motion called the "yin-yang sign" and a neck that communicates the sac and the supplying artery. This communication presents with a "to-and-fro" waveform: systolic blood flow entering the pseudoaneurysm corresponds to the "to" component and diastolic exiting is related to the "fro" component. (2,6)

Ultrasound is the ideal first line examination by being inexpensive and fast. However, it is operator-dependent and may be limited by atherosclerosis, obesity, and bowel gas shadowing. (2,6)

Currently, multidetector CT scanners enable quick angiographic studies. (6) Unenhanced CT acquisitions should also be performed and usually demonstrate a low-attenuation rounded structure arising from a donor artery. Intermediate or high attenuation areas within the pseudoaneurysm may indicate hematoma and, if they are found in the surrounding tissues, rupture is suspected. (2,7) After contrast administration, the pseudoaneurysm and the donor artery show strong enhancement and a communication may be demonstrated. Thrombosis inside the pseudoaneurysm appears as non-filled, low-attenuation areas. (2,7)
CT angiography is noninvasive and nondependent on the operator. It enables the generation of post-processed three-dimensional (3D) images. Additionally, CT is helpful in the detection of associated and potentially causative diseases such as pancreatitis. (6,7)

Gadolinium-enhanced MR angiography has also been described, but it is time consuming and more frequently limited by vessel tortuosity, pulsatility, motion, breathing, and other artifacts, when compared to CT. (2,6) It also allows 3D visualization and may constitute an alternative tool in patients with impaired renal function and allergies to CT iodate contrast. (2)

The gold standard for the diagnosis of SAP remains conventional angiography, an invasive technique that allows concomitant diagnostic and therapeutic approaches. (3,6)

Due to the high risk of life-threatening rupture, it is recommended an early therapeutic intervention for both ruptured and intact pseudoaneurysms, whatever its size. (6) Therapeutic options for SAP have changed over the last years, from surgical interventions to less invasive management. (2,4) Splenectomy with or without partial pancreatectomy has been the treatment of choice; however, surgical mortality and morbidity risks of 1.3% and 9% must be considered. Endovascular procedures and percutaneous thrombin CT-guided injection have recently been reported with lower morbidity. (2,6,8,9)

Splenic artery embolization (SAE) is an accepted endovascular intervention for the treatment of pseudoaneurysms. This is a minimally invasive technique that involves transcatheter occlusion of the splenic artery. The collateral circulation supplying the spleen must be spared in order to avert splenic infarction. Success rates ranging 75–85% have been reported in the literature. (6,8-11)
Despite being uncommon, complications like postembolization syndrome, transient elevation of pancreatic enzymes, splenic infarction, infection, abscess, and pseudoaneurysm rupture may happen. (9)

Case Report

An 84 year-old woman was admitted to the emergency department due to an inaugural cetoacidotic diabetic crisis. During the hospital stay, glycemic levels were controlled and a set of diagnostic exams were performed. Blood tests did not show relevant changes besides hyperglycemia and dyslipidemia. An abdominal CT scan was performed: pancreas and other abdominal organs did not reveal significant changes but an incidental, 4,5 cm sized splenic artery pseudoaneurysm was found (Fig.1a,b). Patient history was revised and there was no evidence of pancreatitis, trauma or abdominal surgery. Imaging evaluation was complemented with a gray-scale and Doppler ultrasound examination, showing the typical yin-yang flow and a communicating neck (Fig. 2a).
Due to the unpredictable risk of rupture, a therapeutic angiography was performed after reestablishing the metabolic balance. Embolization of the splenic artery distal and proximal to the PSA was performed with 4-8 mm in diameter coils. The PSA sac was also coiled with 20mm in diameter coils. The immediate post-embolization DSA images showed no perfusion to the PSA and collateral blood-flow to the spleen. (Fig. 3a,b,c).
There were no procedure-related complications. Doppler confirmed total occlusion of the PSA at one month follow-up, with preserved blood-flow to the spleen. (Fig.2b).

Discussion

Splenic artery pseudoaneurysms are rare, but the increasing use of cross-section imaging has led to its detection even in asymptomatic patients. Despite being generally post-inflammatory, post-traumatic or iatrogenic, it may not have a recognizable cause. Even in idiopathic cases, an early treatment should be performed, due to the unpredictable, high risk of life-threatening rupture.

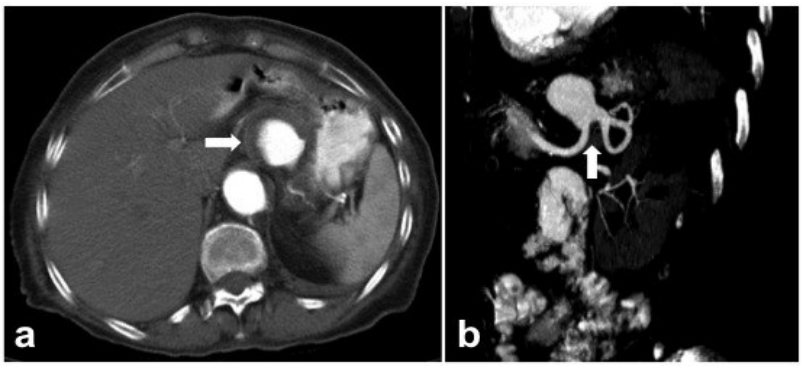

Fig.1 - (a) Axial contrast material-enhanced CT angiogram demonstrates a 4,5 cm splenic artery pseudoaneurysm, partially filled with contrast material. Peripherally, it shows intrasac thrombosis (arrow). (b) MIP postprocessed image in the coronal plane shows the communication with the donor artery (arrow).

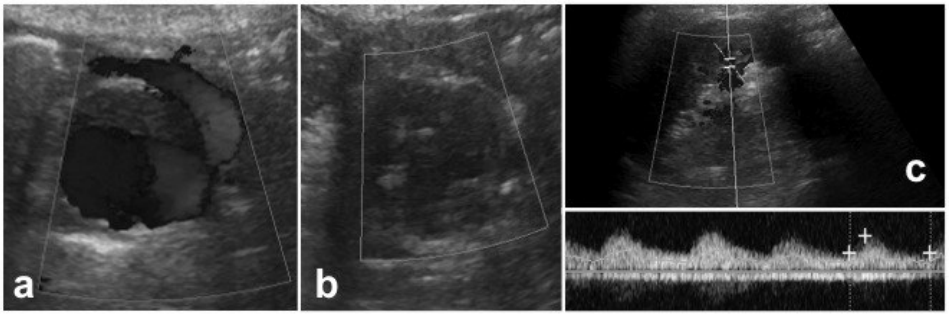

Fig. 2 - (a) Transabdominal color Doppler US shows the typical yin-yan (red-blue) flow in the pseudoaneurysmal sac, and a thick layer of mural thrombosis. (b,c) One month after the splenic artery embolization, no flow is seen in the pseudoaneurym, but the permeability of hilar splenic arteries is maintained, showing a pattern of low-resistance flow in relation to collateral circulation.

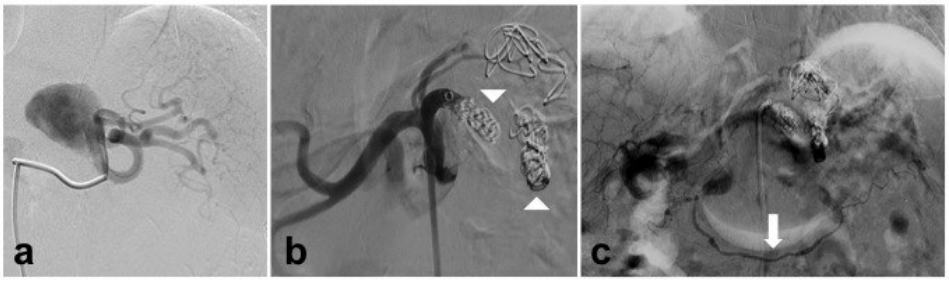

Fig. 3 - Splenic arterial embolization. (a) A splenic arteriogram was obtained prior to treatment and shows a splenic pseudoaneurysm. (b,c) Splenic arteriogram obtained after coil embolization shows complete occlusion of the splenic artery and collateral blood-flow to the spleen through the gastroepiploic arcade (arrow). The coils are deployed distal and proximal to the PSA (arrowhead) and partially fill the PSA.

Endovascular treatment options for PSA include "back-door" (artery distal to the PSA) and "front door" (artery proximal to the PSA) embolization with coils, with or without coil embolization of the pseudoaneurysm sac. Other endovascular options include covered stents or bare stents with PSA microcoil embolization through the stent mesh (8-11). These options have the advantage of leaving the main artery patent; however, they were not performed in this patient because collateral blood flow was expected to compensate for the proximal splenic artery embolization. Also, the artery had a very tortuous trajectory and a large PSA neck that would compromise the technical success of these options.

A post-embolization follow-up should be performed one and six months after, either with US or MR. CT is less preferable after coil embolization due to severe artifacts from the nitinol mesh. Doppler and MR may depict residual perfusion to the PSA and are not affected by the artifacts from the coils. Rare cases of recanalization have been reported. (6)

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