Mycotic Pseudoaneurysm of the Tibioperoneal Trunk and Posterior Tibial Artery

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Abstract:

Mycotic aneurysms are an uncommon complication of infective endocarditis. Aneurysms located in the infrapopliteal arteries are very rare. We report a case of a 37-year-old male patient presenting cough, fever, night sweats, shortness of breath and weight loss, who acutely developed a sharp pain and edema in his right calf, firstly diagnosed as a deep venous thrombosis. Further investigation of his symptoms identified its etiology as an infective endocarditis. Antibiotic therapy was initiated. However, the patient's clinical condition deteriorated and he was submitted to an aortic valve and a mitral replacement successfully. The leg pain and edema persisted after the surgical procedure and the investigation continued. A Doppler ultrasound test and an angiography revealed a pseudoaneurysm located in the right tibioperoneal trunk and in the upper third of the posterior tibial artery. The pseudoaneurysm was treated through endovascular percutaneous embolization and with two Gugliemi detachable coils

Keywords: *Mycotic aneurysm, pseudoaneurysm, infective endocarditis, septic embolization, tibioperoneal trunk.*

INTRODUCTION

Infective endocarditis is related with a wide range of complications. Among them, the embolic events have a high incidence, occurring in 13% to 49% of the patients with the condition. A great variety of sites can be affected, including brain, spleen, lungs, kidneys, liver and main vessels [1], [2].

A mycotic aneurysm is a vascular dilation caused by the septic embolization of vegetations to the arterial vasa vasorum followed by the spread of the infection through the intima. The term was first defined by William Osler, and though it resembles fungus, most of its cases are caused by bacteria like Streptococcus spp, Enterococcus spp and Staphylococcus aureus [3]-[5].

The modified Duke criteria are accepted for the diagnosis of the infective endocarditis and include vascular phenomena as minor criteria. The mycotic aneurysm is described as part of the group of vascular phenomena [6].

The most common points of occurrence of the mycotic aneurysms are the intracranial arteries, intraabdominal arteries and arteries of the extremities. The emboli are most likely to lodge in arterial branches, like the bifurcation of the common femoral artery. Cases of infrapopliteal arteries aneurysms are very rare [3], [5].

We present a case of a mycotic pseudoaneurysm involving the right tibioperoneal trunk and the upper third of the tight posterior tibial artery.

CASE REPORT

A 37-year-old caucasian male patient started to present symptoms of fever, night sweats, shortness of breath during physical exertion, cough, and a what a patient described as a "itchy sensation inside the chest". However, no diagnosis was made at the time, and the patient was treated with symptomatic therapy only. The patient had no previous record of any past medical history. He also denied drug or alcohol abuse.

Three months after, reported to an emergency department after presenting a sudden sharp pain in his left calf not related to physical activity. In the investigation, a Doppler ultrasound test was performed and a

deep venous thrombosis of the posterior tibial artery was diagnosed. A treatment with rivaroxaban 15 mg and elastic compressions stockings was initiated at the time. In this 3 month interval, the patient lost 7 kg (15.4 pounds).

With the persistence of the symptoms, a thoracic angiotomography was performed and showed no evidence of pulmonary edema, bilateral pleural effusion, ground-glass areas and mild interlobular septum thickening, signs of cardiac chambers enlargement, and mediastinal lymphadenomegaly. He was admitted with the suspect of pleural tuberculosis. However, further investigation was not able to support this diagnosis.

A transthoracic echocardiography revealed multiple vegetations in the aortic valve, associated with moderate aortic regurgitation and preserved systolic function, and the absence of thrombus in the cardiac chambers. After that, two separate blood cultures identified the Staphylococcus aureus as the microorganism, confirming the diagnosis of infective endocarditis.

A transesophageal echocardiography showed the presence of a 7.0 x 2.0 mm mass in the left leaftlet and a 12.0 x 2.5 mm mass in the posterior leaflet of the aortic valve, preserved systolic function, mild to moderate aortic regurgitation, and the absence of thrombus in the cardiac chambers.

The patient was suitable for home therapy and was treated with daptomycin at dose of 6 mg/kg IV for every 24 h associated with gentamicin 1 mg/kg IV every 12 hours during 4 weeks.

After a medical history review, the patient revealed that he went through a root canal procedure 2 months before the start of the symptoms, something that he did not mentioned before.

After the treatment was finished, the patient continued to present the same symptoms and now his shortness of breath occurred during daily life activities. A new transesophagic echocardiography was performed and revealed the presence of a 1.29 mm perforation in the second third of the anterior leaflet of the mitral valve associated with moderate regurgitation; a leaflet deformity and a severe central mitral regurgitation due to the perforation was also identified;; there was vegetations in all three aortic leaflets and the 4.0 cm vegetation in the right leaflet had a movement towards to the left ventricle during the diastole causing severe aortic regurgitation; there was no sign of abscess in both valves; the left atrium was mild dilated and no sign of thrombus was identified; the left ventricle was dilated and the ejection fraction was measured as 57% (Simpson).

The patient underwent both aortic and mitral valve replacement surgery. Before the beginning, a chest drain was used to remove a left pleural effusion. The procedure was performed through median sternotomy. Cardiopulmonary bypass from the aorta to the right atrium was established under normothermia. Myocardial protection was held with anterograde and retrograde cardioplegia under continuous normothermic esmolol, potassium and magnesium. Both aortic and mitral valve were replaced with biological prosthetic valves. The CPB time was 76 minutes and the aorta was clamped for 53 minutes. The patient was weaned from the CPB with a low dose of intravenous dobutamine, which was maintained until closure of the incision

A new transesophageal echocardiography was performed and revealed the biological prosthetic valves with normal function and the absence of regurgitation.

A month after the surgical procedure, the patient returned to restart the investigation of his left leg pain. A magnetic resonance image with contrast of the left leg revealed an expansive heterogeneous lesion in the proximal interosseous area, associated with adjacent myofascial planes edema. The exam was repeated now using a contrast and showed a large round lesion with absence of flow void with an intense highlight by the venous contrast next to the posterior tibial artery, suggesting an 8.8 x 5.9 x 5.4 aneurysm; the lesion was also compressing the tibial posterior and the soleus muscle, and a periosteal reaction in the fibula diaphysis (figure 01).

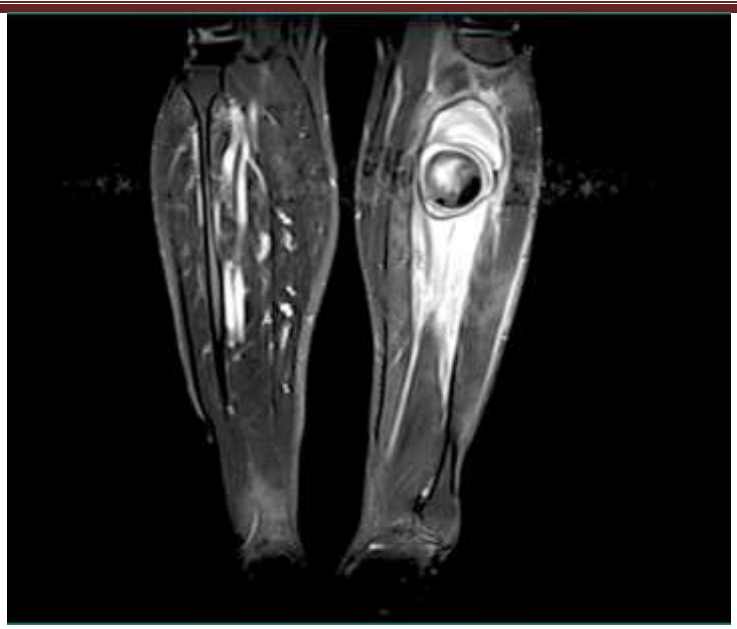

Figure 01: magnetic resonance imaging showing aneurysm compressing the tibial posterior and the soleus muscle, and a periosteal reaction in the fibula diaphysis

An arterial Doppler ultrasound test of the left lower extremity showed was also performed and showed a large hypoecogenic mass (8.9 x 6.0 x 6.8 cm) with arterial flow in proximal third of the leg, associated with the presence of mural thrombi, suggesting a pseudoaneurysm of the tibiotibular trunk.

A selective digital subtraction angiography showed an arterial permeability of the tibial anterior artery, providing perfusion through retrograde flow of its collateral circulation to the tibial posterior and peroneal arteries. Both arteries were occluded below the aneurysm (figure 2). The endovascular percutaneous embolization of the pseudoaneurysm was performed through superselective catheterization of the pre-aneurysmatic proximal third of the tibioperoneal trunk using the coaxial system with guide-catheter and micro-catheter, and liberation of two 5.0 x 40.0 mm Gugliemi detachable coils (GDC), detached from the catheters through electrolysis. The procedure was concluded without intercurrences. The post-embolization angiographic control showed full occlusion of the tibioperoneal trunk, devascularization of the pseudoaneurysm area and adequate flow of tibial posterior and peroneal arteries through the collateral circulation (figure 3).

Figure 02: Selective digital subtraction angiography showing an arterial permeability of the tibial anterior artery, providing perfusion through retrograde flow of its collateral circulation to the tibial posterior and peroneal arteries.

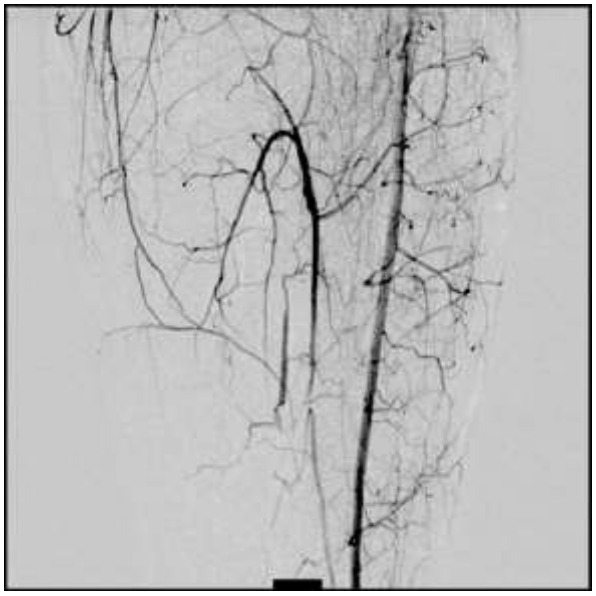

Figure 03: Post-embolization angiographic control showing full occlusion of the tibioperoneal trunk, devascularization of the pseudoaneurysm area and adequate flow of tibial posterior and peroneal arteries through the collateral circulation.

After the procedure, the patient went through physiotherapic rehabilitation for reducing leg swelling and to recover the left lower extremity strength and full movement capacity. A new magnetic resonance image was performed two months after the procedure for control (figure 4).

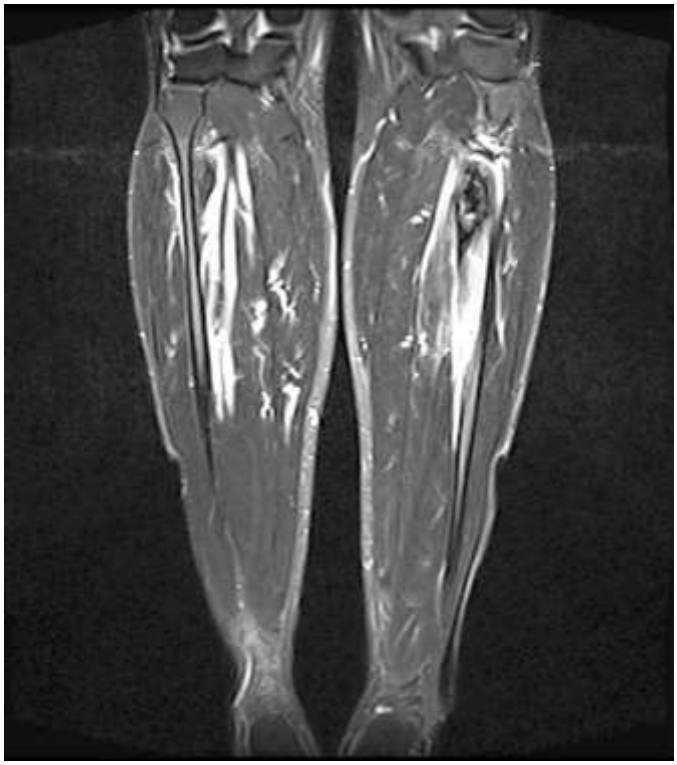

Figure 04: magnetic resonance image post-embolization showing the devascularization of the pseudoaneurysm area.

DISCUSSION

A comparative study performed by Gonzáles I et al. found that in 18 cases of symptomatic mycotic pheriperal aneurysms only 2 occurred in lower leg arteries (both popliteal). In addition, the low number of cases presented to the scientific community until the current date confirms the rarity of the infrapopliteal aneurysms [3], [5].

A review of Hoen B et al. reports that the mycotic aneurysms were present in 5% of past case series, but their frequency is now higher since the use of the imaging is broader [7].

Dental procedures that involve the manipulation of gingival or periapical region of teeth or perforation of oral mucosa are considered high risk for infective endocarditis. Patients with prosthetic valves, previous infective endocarditis or with congenital heart disease are in the highest risk group and require prophylaxis for infective endocarditis before those procedures. In the presented case, the patient did not met the criteria for prophylaxis.\ [8].

The first line therapy for native valve infective endocarditis due to methicillin-susceptible staphylococci is oxacilin solely. Previous guidelines also stated the combination with gentamicin as the main choice for the treatment. This option was abandoned because gentamicin addition failed to demonstrate clinical benefit and also increased renal toxicity. At the time of the treatment, the most recent guidelines were not yet released, then prior recommendations were followed, adding gentamicin.

Indications for surgery include heart failure, uncontrolled infection and prevention of embolism. The creation of fistulae in a valve leaflet is a sign of a locally uncontrolled infection. In the case presented, a fistula in the anterior mitral valve leaflet associated with the severe aortic regurgitation put the patient as a candidate for valve replacement [7]-[10].

Open surgery was the selected technique in most of the previous reported cases for the correction of the aneurysm. Arterial reconstruction using a saphenous vein graft and ligation or closure of the aneurysm without reconstruction were the two preferred techniques [3].

The coil embolization is a noninvasive option for the treatment of the *mycotic aneurysms*. The Gugliemi detachable coil (GDC) is a widely used method for treating ruptured cerebral aneurysms. However, since *mycotic aneurysms* located in the lower leg are rare, there are no studies with a considerable number of cases for comparison [9]**.**

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