

# Bilateral Mycotic Popliteal Aneurysms Associated with Infective Endocarditis

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## ABSTRACT

Mycotic aneurysms are a rare complication of infective endocarditis in the post-antibiotic era. The involvement of the popliteal artery is an exception and is more common in men. When the clinical suspicion is high, early diagnosis using imaging tests has prognostic implications. The aneurysm size, the presence of thrombosis and the patient's general condition are important factors to decide the adequate treatment.

We describe the case of a 48-year old male patient with bilateral aneurysms of the popliteal arteries originating from endocarditis of the mitral and aortic valves caused by methicillin-resistant *Staphylococcus aureus*, with multiple septic emboli.

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## Key words

> Popliteal mycotic aneurysms - Endocarditis - Methicillin-resistant *Staphylococcus aureus*

## Abbreviations

> MA	Mycotic aneurysm	LE	Lower extremity
IE	Infective endocarditis	MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
BC	Blood culture		

## INTRODUCTION

True aneurysms of the popliteal arteries are not uncommon when they are associated with an abdominal aortic aneurysm. The development of pulsating masses in such region is generally due to trauma, constituting pseudoaneurysms. (1) The presence of mycotic aneurysms (MAs) in this region is rare. (2, 3) We describe the case of a male patient with bilateral aneurysms of the popliteal arteries originating from endocarditis of the mitral and aortic valves caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

## CLINICAL REPORT

A 48-year old man with a history of type 2 diabetes and hypertension, who was a former smoker, presented with constitutional symptoms associated with fever, pain, swelling and functional deficit of the right lower extremity. He denied abuse of intravenous drugs.

He had subfebrile temperature and was hemodynamically stable. A holosystolic murmur was heard over the mitral area. Painful and pulsating swelling was present behind both knees, predominantly in the right popliteal fossa. The skin was tense with edema in both lower extremities (LEs). The patient presented alternating periods of consciousness deterioration.

Laboratory tests: hematocrit 24%, white blood cells 18 900 U/L, platelets 283 000/mm<sup>3</sup>, blood glucose levels 1.09 g/L, BUN 0.39 g/L, creatinine 0.68 mg/dl, and prothrombin time 68%.

The transthoracic echocardiogram (Figure 1)

showed left chamber enlargement, mild left ventricular dysfunction and two vegetations, one over the ventricular surface of the anterior mitral leaflet measuring 19 × 19 mm and another 10 × 11 mm-vegetation over the bicuspid aortic valve.

Doppler ultrasound of the LEs: right LE: a 9.6 × 6.9 cm-popliteal artery aneurysm, with wall thrombosis measuring 6 cm in diameter and an adjacent fluid collection measuring 14 cm in linear diameter × 3 cm in anteriorposterior diameter. Left LE: aneurysm of 6 cm without thrombus.

Computed tomography scan: central nervous system: diffuse serpiginous hyperdense images. Spleen: hypodense image measuring 4 × 3.6 cm. Popliteal region (Figure 2): aneurysm with wall thrombosis, signs of dissection and peripheral enhancement.

Angiography of the LEs: bilateral aneurysm below the knees with distal flow impairment (Figure 3).

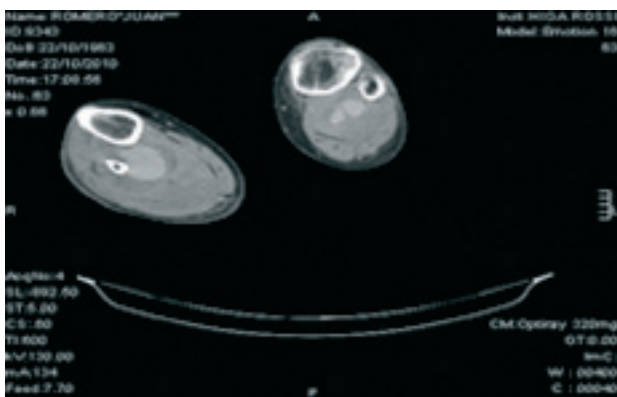
Three blood culture (BC) samples were obtained. Empiric antibiotic therapy for native valve infective endocarditis (IE) was initiated.

The patient evolved with alternating periods of consciousness deterioration and subfebrile temperature. The three blood cultures were positive for MRSA.

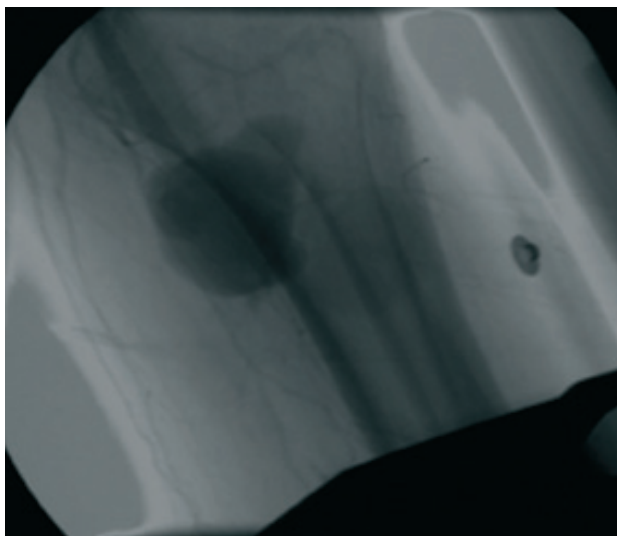
The patient was transferred to a surgical center and underwent mitral and aortic valve replacement with bioprostheses 29 and 21, respectively, bilateral supracondylar amputation due to complicated aneurysm, splenectomy due to septic embolism with splenic abscess and endovascular coil embolization of hepatic



**Fig. 1.** Two dimensional echocardiography. Vegetations in the mitral and aortic valves.



**Fig. 2.** Computed tomography scan. Aneurysmal images with wall thrombosis.



**Fig. 3.** Angiography of the lower extremities. Image of mycotic aneurysms below the knee.

artery pseudoaneurysm.

The histopathologic examination of the surgical specimen demonstrated a mycotic aneurysm due to

gram positive cocci with extensive necrosis and inflammation of muscles and soft tissues.

The patient had a favorable outcome with consciousness recovery. He was discharged.

## DISCUSSION

Mycotic aneurysms are defined as “infected aneurysms developing in a previously normal artery secondary to septic embolization due to bacterial endocarditis”. (4)

Septic emboli are lodged in the lumen or vasa vasorum of normal or abnormal peripheral arteries. This leads to vessel wall infection and ischemia resulting in medial destruction and aneurysm formation. (2, 4, 5) From a histopathologic point of view, they constitute pseudoaneurysms due to perforation of the arterial wall.

In the post-antibiotic era, peripheral mycotic aneurysms caused by septic embolism are extremely rare (2) and represent 2-10% of all the cases of IE. (6) Multivisceral involvement is uncommon. (6)

The aorta, peripheral arteries, cerebral arteries, and visceral arteries are involved in descending order of frequency. (5) The most frequently affected artery is the femoral artery. (2, 3, 5)

Popliteal artery involvement is rare (2, 3) (< 1%) and is more frequent in men. (4)

Despite antibiotic therapy has resulted in a marked decrease in the incidence of IE in developed countries, the disease persists as a consequence of prosthetic heart valves, intravenous drug abuse and degenerative valve disease. Most MAs develop from left chamber endocarditis. (2)

Staphylococcus and Streptococcus species are the most common infecting organisms. (2, 5) Staphylococcus aureus is more prevalent in intravenous drug users. (2, 5) In 18%-50% of cases the infecting organism cannot be isolated. (2, 4, 5)

The mortality of MAs ranges from 0% to 15%. (5) They can be clinically silent or manifest as pain, (7) a pulsating mass, a palpable thrill, local inflammatory changes (cellulitis or abscess), vascular compromise (distal embolization, thrombophlebitis, or arteriovenous fistula), or compressive neuropathy. (5, 7, 8) Complications are more frequent when the aneurysm diameter is > 2 cm (8, 9) and may result in limb loss. (7)

Thromboembolism with acute ischemia of the extremity is the most threatening complication with an amputation rate of 30% according to some series. (4, 10)

Doppler ultrasound is an excellent screening method (10) to confirm the presence of wall thrombus and for follow-up. Angiography is frequently used and computed tomography scan is useful to define blood flow and the presence of concomitant aneurysms. (4, 5, 10)

Early diagnosis can modify the outcome (5) and improve the survival of the affected extremity. (7, 8)

The presence of an inflammatory mass, particularly in any anatomic arterial region should alert physicians about the presence of this complication. Late detection reduces the possibility of an adequate solution.

Open surgery is the only approach with chances of success: exclusion of the aneurysm with saphenous vein bypass and extra-anatomical reconstruction avoiding the septic focus. Endovascular repair has limited chances in this anatomical region with the disadvantage of introducing a stent graft in an infected area and the possibility of stent flexion and thrombosis. The results of embolization are not adequate. (5)

In all the cases, the source of embolism should be treated with antibiotic therapy, either empiric or guided by blood cultures for at least 6 weeks (2, 5) and heart valve replacement, if required. (3)

The management should be individualized. (5) Symptoms, aneurysm size, the presence of thrombosis and the concomitant risk of acute ischemia should be considered. In the absence of risk of acute ischemia, the patient's general condition should be considered, together with the presence of associated diseases, signs of sepsis and its complications, and the experience and availability of endovascular or surgical repair. (5, 10)

## CONCLUSIONS

Mycotic aneurysms of the popliteal arteries are a rare complication of IE, (2, 3) with potentially devastating consequences. Patients with symptoms, aneurysm size > 2 cm and thrombosis have worse outcome. (10) However, management should be individualized considering patient's general condition, the presence of concomitant diseases and associated septic complications.

## RESUMEN

### Aneurismas micóticos bilaterales asociados con endocarditis bacteriana

En la era posantibiótica, los aneurismas micóticos en arterias periféricas son una complicación poco frecuente de endocarditis infecciosa. El compromiso de la arteria poplítea es excepcional y más frecuente en hombres. El diagnóstico

temprano, utilizando los métodos de imágenes ante una elevada sospecha clínica, tiene implicaciones pronósticas. El tamaño del aneurisma, la presencia de trombosis y el estado general del paciente son factores importantes para decidir un tratamiento oportuno.

En esta presentación se describe el caso de un paciente de 48 años con aneurismas poplíteos bilaterales con punto de partida en una endocarditis mitroaórtica por *Staphylococcus aureus* meticilinoresistente, con embolias sépticas múltiples.

**Palabras clave** > Aneurismas micóticos poplíteos  
Endocarditis infecciosa - *Staphylococcus aureus* meticilinoresistente

### Conflicts of interest:

None declared.

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