Mycotic Aneurysm of the Popliteal Artery Due to Infective Endocarditis


Abstract
Mycotic aneurysm (MA) is an infrequent complication of infective endocarditis (IE), reported in 3 to 15% of the patients with IE. The commonest site for such aneurysm is intracranial vessels (65%) followed by abdominal and then the peripheral vessels.

We describe a case of 32 year old man with recently diagnosed rheumatic heart disease and mitral regurgitation. He had infective endocarditis (IE) and developed a large mycotic popliteal artery aneurysm (MPAA) and a small profunda femoris arterial aneurysm (PFAA) while he was on antibiotic therapy. The patient was successfully treated with prolonged antibiotic therapy and embolisation of the MPAA while PFAA was managed conservatively.

Introduction
Popliteal artery is the commonest site for peripheral arterial aneurysms and the commonest aetiology is atherosclerotic. But it is infrequently involved in MAs. There are only few cases of such MPAAs associated with IE. Presentation of MPAA is quite variable and diagnosis can be established with invasive and non-invasive investigations. Definitive treatment is surgical intervention with excision and reconstruction using autologous venous graft. Prolonged targeted antibiotic therapy is an important adjuvant. Mycotic PFAAs are extremely rare. Their occurrence is almost never isolated and are usually seen along with other MAs at commoner sites.

Case Report
A 32-year-old male with no previous illnesses presented with symptoms of low grade fever for one month for which he was taking treatment at a private hospital without much relief. He had received antibiotics for 2 weeks details of which were not known. His fever persisted and he developed sudden onset right hemiparesis and was referred to our hospital for further management.

On presentation to our hospital, patient was febrile, conscious, oriented and was stable hemodynamically. He had right hemiplegia with a power of grade 0 in the right upper limb and lower limb. Auscultation revealed a pan systolic murmur in the mitral area of grade IV/VL. Routine investigations were normal and CT (computed tomography) scan of the brain revealed a non haemorrhagic infarct in the left frontal lobe, basal ganglia, internal capsule, parietal lobe and anterior temporal lobe. Two dimensional echocardiography revealed severe mitral regurgitation with a 1X1.5 cm vegetation on anterior mitral leaflet prolapsing into the left atrium. Blood cultures (bacterial and fungal) did not grow any organisms. Patient was started on intravenous crystalline penicillin 20 mU every 6 hourly and gentamycin 60 mg every 8 hourly for IE.

On the 18th day of his stay in ward, we noticed a swelling in the upper part of right calf for which patient was totally asymptomatic. A clinical examination revealed a localised, pulsatile and tender swelling of about 5 cm in diameter with palpable distal pedal pulses.

A colour-duplex ultrasonography (USG) of the calf showed an 5.7X4.3 cm aneurysm in the distal part of popliteal artery and 1.1X1.2 cm aneurysm arising from profunda femoris artery. There was no evidence of deep venous thrombosis.

A digital subtraction angiography (DSA) (Fig. 1) was done which revealed a large partially thrombosed aneurysm arising from distal popliteal artery with three vessels (common peroneal, anterior and posterior tibial artery) distal run off from mid calf. Selective popliteal artery angiogram (Fig. 2) showed large partially thrombosed aneurysm in its distal part. A small aneurysm was also seen in the right profunda femoris artery (Fig. 3).

There was no evidence of distal embolic pathology. An aortogram was done to look for asymptomatic aneurysms elsewhere, which was normal.

Opinion of cardiovascular surgeons was taken but due to high intraoperative risk, surgery was deferred. The size of the popliteal artery aneurysm increased to 11X6.1X5.6 cm over next 3 days and the patient started complaining of pain. He was taken up for embolization of the popliteal artery in view of risk of impending rupture of aneurysm. Popliteal artery aneurysm was successfully embolised with 35-2-3 coil (Cook) by vascular and interventional radiologist following which, there was complete exclusion of the aneurysm from the circulation (Fig. 4). Post embolization angiogram revealed good distal three vessels run off by collaterals. The size of the calf mass reduced and the patient was symptomatically better (Fig. 5).

The patient was totally asymptomatic for the profunda femoris artery aneurysm and its size was small and was not increasing, so it was left untouched. The antibiotics (penicillin and gentamycin) were continued in the same doses for 6 weeks and the patient was afebrile and the calf swelling had reduced considerably at the time of discharge.
An aneurysm is a localised permanent dilatation of an artery greater than 50% of its expected normal diameter. MA was first described by Osler in 1885. The classical description was that of infective aneurysms secondary to rheumatic endocarditis and did not imply a fungal etiology; hence the term ‘mycotic’ is a misnomer. Instead the term infective aneurysm has been recommended.4

There are very few cases of MPAAs reported in the literature. The estimated male-to-female ratio is 11:3 with an age range of 2 to 81 years, the mean age of occurrence being 41 years.2

The pathogenesis of MA includes 4 different mechanisms: septic embolisation to the vasa vasorum, extension from the contiguous infective process, direct bacterial inoculation during arterial trauma, bacterial infection of arterial injury or atherosclerotic plaque.5

In IE, MPAA is a consequence of septic embolisation, whereby emboli are lodged in the lumen or vaso vasorum of normal or abnormal peripheral arteries. This leads to vessel wall infection and ischemia resulting in medial destruction and aneurysm formation.2

The rate of septic embolism falls after the first 3 weeks of antimicrobial therapy, although it can still occur after therapy is completed.2

### Discussion

An aneurysm is a localised permanent dilatation of an artery...
The causative organism may not be identified from operative specimens as a result of pre-operative antibiotic therapy. Staphylococcus aureus (~30%), Salmonella species (~15%), and less commonly viridans group streptococci are some of the causative organisms of mycotic aneurysms in the postantibiotic era. Recent reports suggest Streptococcus pneumoniae, including penicillin-resistant strains, are re-emerging as a cause of mycotic aneurysms. MPAA presents as a painful, tender, pulsatile leg swelling in febrile patients with a definitive or unsuspected infective focus. Symptoms and signs of ischemia are often evident, secondary to thrombosis or rupture of the aneurysms. Rarely, neurological symptoms and signs may be present possibly due to direct compression or occlusion of the vasa nervosa arising from the popliteal artery. Laboratory studies in a patient of MPAA show a leukocytosis and increased acute phase reactants like erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). Blood cultures are positive in only 50% of reported cases and negative blood cultures and gram stains do not rule out a mycotic aneurysm. Non-invasive procedures such as colour-duplex USG, CT and magnetic resonance imaging (MRI) or angiogram can establish a diagnosis and provide information regarding the size, diameter, morphology (saccular morphology being suggestive of an infective aetiology) and its relationship to surrounding structures. Conventional or digital subtraction angiography is important to demonstrate the status of the inflow and outflow vessels, and guides about the operative approach.

Broad-spectrum antibiotics should be commenced pre-operatively and continued in postoperative period for about 6 weeks. If no causative pathogen is identified, at least two synergistic agents should be employed. Mycotic aneurysms greater than 0.5 to 2.0 cm are likely to enlarge and progress, thus warranting surgical intervention. MPAA generally mandates resection and revascularisation. The techniques and anatomic approaches in treating MPAA are different from those employed for their non-mycotic counterparts. Sepsis and the susceptibility of prosthetic grafts to infection, limits the reconstruction to autologous venous grafts. Autologous grafts like long saphenous vein grafts or superficial vein from the ipsilateral or contralateral lower (or upper) limb or deep leg veins may be used. Infection related graft failure remains to be a significant complication. Extra anatomical bypass through uninfected tissue planes may avoid this. If the revascularisation fails, ligation of the artery may be necessary which predisposes to the risk of ischemia and amputation.

In a patient with MPAA after intervention, total limb salvage rate, a 5-year patency rate and a primary and/or secondary amputation rate are 60-72%, 50-86%, and 18-27.5% and/or 28-40%, respectively. These rates are comparable with those of non-mycotic popliteal aneurysms. PFAAs are rare and often occur with synchronous aneurysms, most commonly of the popliteal artery, as in our patient. The most common complications are limb ischemia and rupture. Good-risk patients with a PFAA >2 cm should undergo elective repair. Aneurysmectomy with femoral interposition graft is a durable repair.

Summarising, IE associated MAs are rare in popliteal artery and profunda femoris artery and if diagnosed and treated in early course, the outcome is favourable.

References