SHORT REPORT

Cystic Adventitial Disease of the Popliteal Artery: A Case Report

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Introduction

Cystic adventitial disease of the popliteal artery is a rare disease. The aetiology remains uncertain. Different diagnostic investigations are discussed. Treatment depends on the diagnostic findings and varies from conservative to surgical management.

Case Report

A 46-year-old male patient presented with progressively worsening calf pain in the left leg while walking. He had no known risk factors for vascular disease apart from smoking 20 cigarettes a day and some degree of hypercholesterolaemia.

Clinical examination revealed bilateral palpable femoral pulses. The right popliteal and ankle pulses were also palpable. On the left side no pulses were felt at the popliteal and ankle level. Doppler flow measurements and pulse-volume registration showed a distinct pressure gradient over the left popliteal vessel with a reduced ABPI.

Digital subtraction angiography was performed. This showed the presence of a high grade stenosis in the popliteal artery with radiological appearances suggestive of cystic adventitial degeneration.

A puncture of the cyst with aspiration of its contents was attempted, but the liquid was too viscous and evacuation could not be performed. Treatment was tried using percutaneous dilation with stenting of the popliteal artery, but 1 month after stenting the patient presented again with the same claudication pain. The stenosis was still present, confirmed by Doppler flow measurements.

Surgical treatment followed with a posterior approach through an incision in the popliteal fossa. The contents of the cyst were removed and an endarterectomy was performed, removing the stent at the same time. Salicylates were started.

Eighteen months later the patient presented again with claudication in the left leg. Pulses were still palpable at the popliteal and ankle level, but there was a pressure gradient on Doppler flow measurements.

CT showed a bilocular adventitial cyst measuring 4×1 cm². A moderate stenosis of 50% could be seen. Magnetic resonance imaging showed the same pathology. An angiogram showed a stenosis of 75%.

A femoropopliteal bypass with reversed vein was performed. Warfarin was started. The patient remained asymptomatic 1 year after his operation.

Discussion

The aetiology of adventitial cystic disease of the popliteal artery remains uncertain. It could be the result of repetitive microtrauma due to overuse of the lower limb.¹ The most popular belief is that the popliteal cysts are ganglia.²,³ In some cases, a communication with the knee joint⁴ or a Baker’s cyst⁵ is detected, what suggests that the cyst originates from synovial cells. Finally, cystic mucous degeneration is described as a generalized disorder of the connective tissue. Levien et al. developed the theory that the cause is an incorporation of mesenchymal...
cells, destined to form joint tissue, into the developing non-axial vessels.

Cystic adventitial disease has an incidence of 1:1200 in patients with claudication and is present in 1:1000 femoral arteriograms. The male/female ratio is 15:1. Symptoms occur in the fourth and fifth decade, with a range from 10 to 77 years. Typically, there is a sudden onset of unilateral claudication in a young, usually non-smoking patient. The progression of the claudication is quick. Occasionally, temporary reduction of symptoms can occur, something which does not usually happen with atherosclerotic disease.

Cystic adventitial disease typically occurs at the level of the femoral condyles. Locations other than the popliteal artery have been described, such as the radial and brachial artery, the common femoral artery, the external and common iliac artery and even veins.

Swift diagnosis is imperative, since delay can result in arterial occlusion that would complicate surgical management. Duplex ultrasonography is a safe and non-invasive method, which can reveal flow turbulence and detect a cyst. The differential diagnosis includes aneurysm formation or a synovial cyst. Duplex ultrasound is highly operator dependent.

CT provides additional information (Fig. 1). Stress manoeuvres such as foot extension can make lesions more obvious. Magnetic resonance angiography (MRA) is a newer technique which reveals other details of the artery (Fig. 2). MRA gives a good evaluation of the inflow and outflow vessels and closely correlates with the measurements of conventional angiography. It is an expensive technique which is not always available. The characteristic defect seen on angiography is the ‘scimitar sign’ (Fig. 3). Today, with the use of CT and MRI, the importance of conventional angiography is that it provides a clear image of the inflow and outflow vessels in case a bypass graft is needed. Spontaneous rupture of the cyst can occur, but this is extremely rare.

When the artery is not occluded, percutaneous aspiration under CT-guidance can be used. A unilocular cyst and a safe access track are needed. If the cyst contents are too viscous, surgery will be needed. After puncture, a repeat CT will detect delayed emptying of the punctured cyst. Recurrence
is common after puncture. This will happen in about 10% of the cases. If puncture is not indicated, a cyst incision can be tried with the same results. With arterial occlusion or with failure of local management, excision of the segment and interposition grafting or bypass grafting ignoring the cyst is indicated. Urokinase thrombolysis has been described. Opening the arterial lumen converts surgical treatment to non-resectional treatment.

Percutaneous transluminal angioplasty and stenting has the advantage that it preserves the intima. It can be performed as a day case procedure. Unfortunately the results in the literature are rather poor. The cyst is not evacuated and symptoms can return early when the pressure on the vessel becomes too high, which is what happened in our case. It is important to inform the patient about the high recurrence rates after this procedure. The different possible interventional procedures were explained to the patient in our case report. After discussing the revalidation time and complications related to each procedure, we chose to start with a percutaneous treatment.

Surgical cyst excision and surgical resection of the compressed artery with interposition grafting are efficient but much more invasive methods. In our case report, we decided to perform cyst excision with endarterectomy. This decision was based on the patency of the popliteal artery. As the artery was still open, resection could be delayed and treatment by cyst excision could be attempted. The endarterectomy was performed to remove the stent from the vessel. If the integrity of the vessel wall is compromised, a partial resection with patch can be performed. Resection of the artery with interposition grafting should only be performed in case of arterial occlusion.

Surgical bypass is the last and most invasive alternative with good results. In our case, we preferred this method to interposition grafting to avoid an intervention where previous surgery had been carried out, which could lead to difficult cyst resection and vessel damage. Because of the rarity of the disease there is no consensus on the surgical treatment. Depending on the surgeon, an evacuation, surgical resection or bypass will be done.

Conclusions

Cystic adventitial disease of the popliteal artery is a rare disease of uncertain etiology. Magnetic resonance imaging and CT are clearly superior diagnostic techniques. The treatment depends on whether occlusion of the popliteal artery has occurred. When this is still patent, non-surgical treatment can be performed. In case of an occluded artery or when non-surgical treatment has failed (as in this case), surgical treatment is indicated.

References


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