

Popliteal Artery Aneurysm: Two Case Reports of Acute Lower Limb Ischaemia

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Abstract

Two cases of thrombosed popliteal artery aneurysm causing acute ischaemia were described. This report emphasises the importance of early diagnosis and surgical intervention of this condition. We then present a brief review of clinical presentation and current management of popliteal artery aneurysm. Popliteal artery aneurysm commonly first present as acute lower limb ischaemia secondary to thromboembolism. Failure to recognise this limb-threatening condition can lead to delay in treatment and even limb loss. It is therefore important to increase awareness of this condition. Popliteal artery aneurysm warrants early surgical intervention, even in an asymptomatic stage because of its potential for serious complications.

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Case Reports

Case 1

A 78-year-old man with good past health presented with acute ischaemia of the left lower limb. A provisional diagnosis of acute embolism was made and intravenous heparinization was started. Emergency exploration was undertaken using a medial popliteal approach and a thrombosed left popliteal artery aneurysm was found during the operation (Fig. 1). Direct repair of the aneurysm with Gore-tex interposition graft, distal embolectomy and open fasciotomy of the left calf were performed. Histopathological examination of the aneurysmal wall demonstrated the presence of atheroma. Despite successful revascularization with postoperative ankle-brachial indices of 1.22 (right) and 1.15 (left), the patient developed gangrenous changes of the lateral 4 toes of the left foot, which required digital amputations on the 12th postoperative day. The patient recovered uneventfully afterwards. Ultrasonography revealed a contralateral popliteal artery aneurysm of 3.2 cm diameter but the patient refused surgical intervention. The patient remained well until he developed right foot cellulitis in January 1996. A duplex scan showed an enlargement of the right popliteal artery aneurysm to 3.5 cm in diameter. He underwent ligation of the right popliteal artery aneurysm with Gore-tex bypass graft. His postoperative course was uneventful, but eight

months later it was complicated by thrombosis of the right Gore-tex bypass graft. Re-do right superficial femoral to infra-genicular popliteal artery bypass with 8 mm ringed Gore-tex graft was performed on 12 September 1996. Graft failure was due to inflow occlusion from progressive thrombosis. During follow up, the patient was asymptomatic and fully ambulant.

Case 2

An 83-year-old man presented to a district hospital in August 1996 with a sudden onset of right calf pain with coldness and weakness. There was no previous history of intermittent claudication or rest pain. His past health was good and he had no history of trauma. A clinical diagnosis of acute ischaemia was made. As the ischaemic condition improved with rapid return of warmth and relief of pain soon after commencement of heparinization, the patient was treated conservatively without operation at the district hospital. Arteriogram revealed complete obstruction at the distal part of the right superficial femoral artery. The right popliteal artery and its trifurcation could not be opacified but the calcific wall of a right popliteal artery aneurysm was evident (Fig. 2). The patient was then discharged and referred to us. At presentation, he complained of right calf claudication and rest pain with progressive deterioration. Physical examination showed absence of right popliteal and distal

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Fig. 1. Intraoperative finding of a thrombosed left popliteal artery aneurysm.



Fig. 2. Arteriogram of the lower limbs showing complete obstruction at the distal part of the right superficial femoral artery and the calcific wall of the right popliteal artery aneurysm (arrow).

pulses. The right foot was cold with superficial ischaemic ulceration over the second and third toes. Ankle-brachial indices were 0.26 (right) and 0.59 (left). Duplex scan verified occlusion of the right distal superficial femoral artery and thrombosed popliteal artery aneurysm of 4 cm in diameter with ulcerated atherosclerotic plaques. Ligation of the right popliteal artery aneurysm, aneurysmorrhaphy and right femoro-popliteal bypass with 8 mm Gore-tex graft were performed on 29 August 1996. Intraoperative arteriogram showed poor distal run-off. The postoperative right ankle-brachial index improved to 0.82. His early postoperative course was uneventful and he was discharged. However, it was later complicated by graft thrombosis as a result of inadequate outflow. With the development of right foot gangrene, the patient underwent below-knee amputation of the right leg on 13 December 1997. The amputation stump healed well and the patient was able to walk with a below-knee prosthesis independently during follow up.

Discussion

Popliteal artery aneurysm is the commonest peripheral aneurysm but seldom reported in Asians. The most common aetiology of popliteal artery aneurysm is atherosclerosis. Other causes include trauma, infection, popliteal artery entrapment and post-stenotic dilatation. It predominantly affects elderly men. It is frequently bilateral and often associated with aneurysms elsewhere in the body.^{1,2} Up to 49% of patients will develop new aneurysm at other locations in 10 years.³ Regular surveillance is therefore essential even after operative repair.

In this case report, both patients suffered from acute ischaemia secondary to the thrombosis of the popliteal artery aneurysm. The diagnosis of the first case was not made until intraoperative finding of the aneurysm. Underdiagnosis might account for the low prevalence of this condition. In the second case, there was also a delay in diagnosis until arteriography was performed. Above all, surgical intervention was not instituted at the early stage. The second patient had significant deterioration during the interval between initial presentation and operation. This indicated either progression of thrombosis or recurrent embolisation, which had significantly compromised the distal run-off vessels. Unsatisfactory result is often related to delay in diagnosis and treatment.

Presentation

Up to 75% of patients with popliteal artery aneurysm were symptomatic on presentation. Acute ischaemia secondary to thrombo-embolism was the most common presentation. Other manifestations included chronic ischaemia, rupture, extrinsic compression of surrounding structures and incidental detection of an expansile pulsatile mass.⁴

Diagnosis

A wrong diagnosis can sometimes lead to a disastrous consequence. Performance of a tru-cut biopsy for an erroneous diagnosis of sarcoma has been reported. A correct diagnosis depends on a careful physical examination. A prominent palpable popliteal artery should raise the suspicion of popliteal artery aneurysm. Ultrasonography and computed tomographic scan are accurate in assessing the morphologic features of the aneurysm, including its size, patency, intraluminal thrombus and its relation to surrounding structures. Arteriography may underestimate the size of an aneurysm because of the presence of mural thrombus, but it should still be performed to assess the distal run-off before bypass surgery.

Operative Treatment

An amputation rate of about 25% has been reported in patients with symptomatic popliteal artery aneurysm.⁵

It is generally agreed that all symptomatic aneurysms require surgical intervention whereas the indication of operation for asymptomatic one remains controversial. Most series reported a complication rate of more than 50% in patients with asymptomatic popliteal artery aneurysm if left untreated.⁶ Asymptomatic aneurysms greater than 2 cm in diameter, especially with the presence of mural thrombus, warrant elective repair because of the increased risk of complications.^{3,7-9}

Adequate exposure of the popliteal artery can usually be achieved through a medial approach. The preferred operative technique is ligation of the aneurysm with bypass grafting. Excision of the aneurysm is only necessary if it causes extrinsic compression. Autologous saphenous vein should be the choice of conduit as it gives the best long-term patency.¹⁰ Unfortunately, no suitable vein was available in both cases because of significant size mismatch, hence, the Gore-tex graft was employed. Endoluminal stented graft repair of popliteal artery aneurysm has recently been reported but its safety and value need to be proven.”

Preoperative Thrombolysis

Preoperative intra-arterial thrombolysis is increasingly adopted as the initial procedure in management of patients with acute ischaemia of short duration. It is often successful in clearing the thrombus and restoring the patency of thrombosed arteries.¹² It also led to increased identification of thrombosed popliteal artery aneurysm as the cause of acute ischaemia. In one series with 5 patients who had thrombosed popliteal artery aneurysm, only one patient was correctly diagnosed before thrombolysis.¹³ However, extension of thrombus, embolism, major haemorrhage, such as haemorrhagic stroke, and even mortality have been reported.” This method should only be applied in specialised vascular centres where expertise is available.¹⁵

Conclusion

Popliteal artery aneurysm is an important cause of lower extremity ischaemia. Diagnosis involves careful physical examination and confirmation by ultrasonography. Prompt surgical intervention is essential in symp-

tomatic patients. With increased awareness of this condition, recognition of popliteal artery aneurysm during the asymptomatic stage with elective reconstructive surgery can avoid limb-threatening complications.

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