

**TEACHING POINT**

# Popliteal aneurysm: the need for vigilance

## Epidemiology

Aneurysms of the popliteal artery are rare, the incidence varying between 0.1 and 3%. Half the patients are over 65 years of age. There is a male predominance (95%) and about 45% have hypertension. Fifty percent of patients have bilateral popliteal artery aneurysms (Figure 1). One in 10 patients with an abdominal aortic aneurysm have a popliteal aneurysm [1]. Previous surgery for an abdominal aortic aneurysm or popliteal aneurysm should alert the physician to the possibility of generalised aneurysmal disease, as one in 10 patients develop further aneurysmal disease over 10 years, some developing a contra-lateral popliteal aneurysm [1]. Popliteal aneurysms are of two types, saccular (which give rise to compressive symptoms and may rupture) and fusiform (which present with thrombo-embolic disease).

## Presentation

Symptomatic patients may present with acute or chronic limb ischaemia, peroneal nerve or venous compressive disorders. A common presentation of peripheral ischaemia due to distal embolisation from a thrombosed aneurysm may give rise to a 'white limb' or a 'trash foot' appearance. 'Trash foot' describes the appearance of the feet after multiple distal embolisation from a proximal thrombus. Occlusion of the small blood vessels leads to multiple petechiae (Figure 2). Venous compression occurs in aneurysms greater than 2 cm in size; collateral channels ensure normal venous drainage in most cases. Rupture is rare. One-third of patients are asymptomatic at diagnosis.

## Diagnosis

Many popliteal aneurysms are detected by palpation alone. Diagnosis requires a high degree of clinical suspicion. In one series, only 26% of symptomatic popliteal aneurysm were diagnosed by general practitioners, although 94% were readily palpable [2]. Duplex ultrasonography is very reliable and remains the standard investigation. Better delineation is gained with computerised tomography or magnetic resonance imaging.

A third of asymptomatic patients will develop complications at some time [1], and many will require

amputation. Advancing age, systolic hypertension and triglyceride concentration are associated with popliteal aneurysm dilatation [3]. Aneurysmal dilatation of more than 2 cm, the presence of thrombus and poor distal run-off predict the development of symptoms [4].

## Management

Patients with symptomatic popliteal aneurysms should undergo operative repair because the incidence of limb loss increases with the onset of symptomatic disease. In contrast, the management of asymptomatic disease remains controversial.

### Symptomatic popliteal aneurysm

Surgical treatment of popliteal aneurysm involves exclusion of the aneurysm by proximal and distal ligation of the aneurysmal sac and maintaining the continuity of the circulation with a bypass graft, preferably using the long saphenous vein as it has a higher patency rate. The role of thrombolysis—using streptokinase or tissue plasminogen activator—is to clear the distal run-off before surgical by-pass in order to increase graft patency [5].

There are two ways of administering thrombolysis in symptomatic popliteal aneurysms: (i) pre-operatively, into the distal popliteal or tibio-peroneal tract, below the aneurysmal sac, to clear the run-offs prior to bypass grafting; and (ii) intra-operatively, as an adjuvant to surgical bypass. The thrombolytic agent is infused directly into the distal vessel after exploration of the artery distal to the aneurysm. Reported rates of stroke and major haemorrhage are 1 and 5% respectively [6], and acute deterioration of the limb during intra-arterial thrombolysis—possibly secondary to thrombus destabilisation—may also occur.

Close co-operation between radiologists, surgeons and nursing staff allows effective monitoring of patient progress.

### Asymptomatic popliteal aneurysm

The management of asymptomatic popliteal aneurysm remains controversial. Some surgeons would intervene in aneurysms larger than 2 cm, others in those larger than 3 cm and others would not intervene at all. Advocates of conservative management point to the increased morbidity and mortality as a consequence of



Figure 1. Trans-femoral digital subtraction arteriography showing bilateral popliteal aneurysms in a patient presenting with claudication in the right leg.

surgery, the value of intra-arterial thrombolysis and the inconclusive correlation between the small aneurysmal changes observed with duplex ultrasonography and clinical aneurysmal disease [7]. In addition, the 5-year life expectancy among this group of patients is reported to be half that of a matched population, with more than half dying within 5 years of diagnosis and only 35% surviving for a decade [8]. Conversely, aggressive surgical intervention is associated with a decreased complication rate and increased limb salvage.

Up to one-third of asymptomatic patients will develop complications over 5 years, and one-third of patients with acute pre-operative ischaemia will require amputation in spite of emergency surgical intervention [5]. Surgery in asymptomatic patients is less complicated and produces better primary graft patency and limb salvage rates than in symptomatic patients. Following reconstruction, amputation rates vary from 2% in patients with asymptomatic aneurysms to 7% in patients with chronic ischaemia caused by distal occlusion and up to 34% in patients with acute thrombosis or embolisation [6].

In the absence of surgical contra-indications and provided that the patient is fit for surgery, asymptomatic aneurysms greater than 3 cm in size with distorted anatomy and presence of thrombus, should, in our opinion, be operated upon.



Figure 2. 'Trash foot' due to distal embolism from popliteal aneurysm.

## Conclusion

All patients with lower limb ischaemia, oedema or pain should have a thorough examination of the popliteal fossae. In patients with a prominent popliteal pulse and in pulseless popliteal swellings, an ultrasound study of both popliteal fossae will help determine the presence of an aneurysm, its maximum diameter and also to determine whether there is intra-luminal thrombus. Asymptomatic aneurysm of the popliteal artery is a potentially dangerous lesion that may justify elective surgery.

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Received 27 July 1998; accepted 6 August 1998



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