Physical Signs Unusual causes of calf swelling – 1

Unusual presentation of a tibial artery false aneurysm

Paul Rowe, Peter Taylor, Alfred Franklin, Ian McColl, Anthony Missen and John Spencer

Guy's Hospital, London SE1 9RT, UK.

Summary: Peripheral aneurysms of the leg are rare, and nearly always involve the popliteal artery. We describe the unusual presentation of a swollen leg caused by a large false aneurysm of a branch of the posterior tibial artery. This developed in the absence of either a history of trauma, local infection or infective endocarditis.

Introduction

Swelling in the calf with no history of trauma is usually secondary to deep vein thrombosis, ruptured Baker's cyst, tumours of the bone or soft tissue. We report the case of a patient with a swollen calf due to a large false aneurysm of a branch of the posterior tibial artery.

Case report

A 67 year old man presented with a two year history of a progressively enlarging painless swelling of the right calf. There was no history of rheumatic heart disease, infective endocarditis, intermittent claudication, local infection, trauma or previous surgery. On examination there was a firm, non-pulsatile swelling involving the whole of the right calf, sparing the popliteal fossa. All peripheral pulses were present and equal. He was hypertensive (blood pressure 160/100 mm Hg), but there were no cardiac murmurs or audible peripheral bruits. No abnormality of cardiac valves was revealed by echocardiography.

Radiographs showed some expansion and bowing of the shaft of the right fibula with periosteal elevation and bony erosion (Figure 1a, 1b). A bone scan (Figure 2) revealed increased uptake of technetium methylene diphosphonate ($^{99}\text{TcMDP}$) in the shaft of the fibula and in soft tissues posterolateral to it. In addition the dynamic phase of the scan demonstrated increased blood flow in this region. Contrast enhanced computerized axial tomography (Figure 3) showed a large,

well demarcated soft tissue mass involving the soleus muscle. There was increased vascularity in the inferior portion of this mass which also contained fat and soft tissue. On the basis of these radiological features the lesion was thought to be a benign tumour. However, at exploration of the right calf a large aneurysm, probably originating from a branch of the posterior tibial artery was found. This was excised (Figure 4).

It measured $130 \times 90 \times 66$ mm. No obvious artery of origin was seen with the naked eye. Bisection showed it to have a leathery wall, 3 mm thick. While the greater part of its lumen was filled with woody-hard laminated thrombus, there was a residual lumen at one end, close to which the wall showed a constriction. Microscopy showed the wall to be densely fibrous and devoid of arterial elements. There was negligible organization of the thrombus confined to its periphery. No inflammation was present. The appearances were those of a false aneurysm of long standing.

There were no post-operative complications and the pedal pulses remained unchanged. Post-operative angiography revealed no abnormality in the arterial vasculature of the right leg. A post-operative bone scan, in essence an isotope arteriogram, showed the *absence* of the 'accumulation' of radionuclide seen in the pre-operative scan (Figure 2), which was, in retrospect, in the lumen of the false aneurysm.

Discussion

Painless progressive swelling of the calf of 2 years duration would exclude deep vein thrombosis or a

Correspondence: P.H. Rowe, M.A., F.R.C.S., Department of Surgery, Guy's Hospital, London SE1 9RT, UK.
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Figure 1 (a and b) Straight and lateral radiographs showing an abnormal bowed right fibula with marked periosteal elevation and bony erosion.

ruptured Baker's cyst as causes, since both have an acute painful onset. The physical signs, length of history and investigations indicated that this was a benign lesion originating in either the bone or soft tissues of the calf; by contrast the vascularity of the lesion suggested sarcomatous changes.

The final diagnosis was unsuspected. The absence of palpable pulsation was most likely attributable to thrombotic occlusion of most of the lumen of the aneurysm, while the constrictive effect of the fascial compartment below the knee may have been a contributing factor.^{1,2} Computerized tomography failed to reveal any connection to an artery but did, in retrospect, show contrast present in the small residual lumen of the aneurysm. Angiography often fails to demonstrate peripheral aneurysms,¹ and while this procedure might have been helpful in making a diagnosis, it was declined by the patient.

The most commonly encountered peripheral aneurysms occur in the popliteal artery.^{3,4} Aneurysms of the leg may be secondary to atherosclerosis,⁵ penetrating or other traumatic injury,⁶ or infective in origin, either from local sepsis or septic embolism. Despite the absence of any focus of infection, history of trauma, and the normality of the heart valves, the size of the aneurysm, its fibrous wall, and the normal post-operative arteriogram were in keeping with a false aneurysm. Although no history of trauma was obtained, the patient was a poor historian: consequently this possibility cannot be eliminated as false aneurysms can certainly develop in the absence of penetrating injury.⁸

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Figure 2 The dynamic phase of the bone scan showing abnormal tracer accumulation in the shaft of the fibula and in soft tissues postero-lateral to it (arrowed), interpreted as the residual lumen of the false aneurysm.

Figure 3 Contrast-enhanced computerized tomogram of both calves demonstrating the abnormal, flattened, deformed fibula and large well defined soft tissue mass involving the soleus muscle on the right. Contrast is present in the small residual lumen of the aneurysm whose sac is delineated by arrow.

Figure 4 The bisected aneurysm showing obliteration of the lumen (except at one end) by hard laminated thrombus of long standing. Both above and below the constriction, the wall proved wholly fibrous.

References

1. Downing, R., Grimley, R.P., Ashton, F. & Slaney, G. Problems in diagnosis of popliteal aneurysm. *J R Soc Med* 1985, **78**: 440–444.
2. Takolander, R.J., Bergquist, D., Bergentz, S.E., Ericson, B.F. & Sigurjonsson, S. Aneurysms of the popliteal artery. *Acta Chir Scand* 1984, **150**: 135–140.
3. Chitwood, W.R., Stocks, L.H. & Wolfe, W.G. Popliteal artery aneurysm: past and present. *Arch Surg* 1978, **113**: 1078–1082.
4. Linton, R.R. The arteriosclerotic popliteal artery. *Surgery* 1949, **26**: 41–58.
5. Bouhoutsos, J. & Martin, P. Popliteal aneurysm. A review of 116 cases. *Br J Surg* 1974, **61**: 469–475.
6. Rich, N., Baugh, J. & Hughes, C. Acute arterial injuries in Vietnam, 1000 cases. *J Trauma* 1979, **10**: 359–369.
7. Bonds, J.W. & Fabian, T.C. Surgical treatment of mycotic popliteal artery aneurysm: A case report and review of the literature. *Surgery* 1985, **98**: 979–982.
8. Lloyd, T.V. Pseudoaneurysm of the dorsalis pedis artery secondary to non-penetrating injury. *Am J Sports Med* 1979, **7**: 133–135.