CASE REPORT

Continued Growth of a Popliteal Aneurysm Following Surgery

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Case Report

A 77-year-old male presented with sudden onset of ischaemic pain in his right foot. He had no past history of intermittent claudication, ischaemic heart disease or atrial fibrillation. His vascular risk factors included a recent diagnosis of type 2 diabetes mellitus and he had stopped smoking 26 years previously.

On examination his right forefoot was dusky and cold to palpation but all the pulses in that leg were palpable. The clinical diagnosis of popliteal aneurysm was confirmed by ultrasound. The diagnosis was trash foot due to emboli from a popliteal aneurysm and intravenous heparin started.

The right-sided aneurysm was ligated proximally and distally and circulation restored using reversed saphenous vein. The patient recovered well from surgery. Ultrasound also demonstrated a 2.8 cm left popliteal aneurysm containing thrombus but the abdominal aorta was normal calibre.

In 1993 the left-sided aneurysm was operated on after a brief history of ischaemic symptoms. The aneurysm ligated proximally at the distal superficial femoral artery and distally at the below knee popliteal artery. A left-sided femoro to below knee popliteal artery bypass was performed using autologous saphenous vein. Again the patient made an uneventful postoperative recovery.

Six years later the patient was admitted with a 3 week history of swelling of the left calf and thigh. A deep vein thrombosis was diagnosed on venography with thrombus extending from the calf veins into the popliteal vein. Despite anticoagulation and support hoisery his symptoms did not resolve over a 2-month period. Duplex scan of the popliteal fossa demonstrated that despite surgery the popliteal aneurysm had continued to expand and now measured 11 cm in maximum diameter. No flow was seen within the aneurysm and appearances suggested popliteal vein compression which was confirmed with computerized tomography. The left popliteal aneurysm was decompressed surgically by incision and evacuation of thrombus. Inspection of the lining of the aneurysm showed non-pulsatile backbleeding from the luminal aspect of the proximal popliteal artery. The aneurysm was fed via collaterals around the knee that were controlled by underrunning sutures. Exploration of the proximal anastomosis revealed that there was no pulse or Doppler shift signal in the superficial femoral artery immediately distal to the intact ligature.

The patient made good postoperative progress an on follow-up the lower limb swelling had improved at 1 month. Duplex follow-up confirms a functioning graft with no flow in the aneurysm and no increase in size.

Discussion

Popliteal artery diameter increases with age, sex and body size and is considered aneurysmal if it measures 1.5 times the size of normal proximal artery or if its external diameter exceeds 2.0 cm. Aneurysms of the popliteal artery account for 70% of peripheral aneurysms and only aneurysmal dilatation of the abdominal aorta is more common. In Western nations the conditions is being recognized more frequently but it has been estimated that only four or five cases a year will present to any major vascular centre.

Aneurysm formation in the popliteal artery may be...
a manifestation of a systemic abnormality or dilating diathesis\textsuperscript{10} or result from regression of atherosclerotic plaques.\textsuperscript{11} There is some evidence of an imbalance in enzymatic activity in aneurysm walls,\textsuperscript{12,13} while mechanical factors may also result in abnormal dilatation of arteries. Reflected pressure waves above a bifurcation may weaken a vessel wall\textsuperscript{14} as may the stress on the arterial wall caused by knee movement.\textsuperscript{15}

Acute thrombosis with distal ischaemia is the most common presentation and usually requires urgent revascularization for limb salvage. Progressive occlusion of the infrapopliteal arteries can result from chronic thrombosis or embolization and may lead to intermittent claudication, rest pain, blue toe syndrome or gangrene. The most serious complication is rupture which, without immediate surgical intervention, can be limb or life threatening.\textsuperscript{16} Compression of adjacent structures can result in chronic venous stasis or acute venous thrombosis.\textsuperscript{17}

Studies of the natural history of popliteal aneurysms suggest conservative management carries a poor prognosis with high rates of thromboembolic complications,\textsuperscript{9} but the treatment of asymptomatic aneurysms is controversial.\textsuperscript{18,19} A medial approach to the popliteal artery with proximal and distal ligation and bypass using autologous saphenous vein is the usual surgical intervention,\textsuperscript{3,20,21} however, operative technique will depend on the configuration of the aneurysm, the vessels available for inflow and outflow, and the isolation of an embolic source.\textsuperscript{22}

Endovascular stenting of popliteal aneurysms is becoming more widely reported, but the durability of this technique remains to be tested scientifically. In theory, both stenting and open ligation\textsuperscript{25} may leave patent collateral genicular vessels allowing endoleaks. The term ‘endoleak’ was introduced in 1996 to describe a complication of endovascular repair of abdominal aortic aneurysms\textsuperscript{23} where there is persistent flow outside the graft but within the aneurysm sac. Type II endoleak has also been termed collateral perfusion\textsuperscript{24–27} and retroleak.\textsuperscript{28} This backflow from patent aortic branches can be subdivided into those with and without outflow and may lead to continued aneurysm growth and rupture.\textsuperscript{29} Although flow was not around an intraluminal graft in the case presented the continued expansion of the aneurysm sac and subsequent venous compression was consequent on patent collateral circulation with retrograde branch filling of the excluded aneurysm. Medline literature search revealed only one published case report of continued popliteal aneurysm growth following ligation.\textsuperscript{30} The length of the inflow vessel between the point of ligation and the aneurysm is possibly more important than the technique of exclusion. The longer this distance the more likely the presence of collateral vessels and subsequent collateral perfusion of the aneurysm.

We were surprised that it was not possible to detect flow in the aneurysm using duplex or CT. It is debatable whether angiography would provide better anatomical detail of persistent feeding vessels. Lifelong screening for other aneurysms has been suggested in patients with known popliteal aneurysms,\textsuperscript{3} but the cost effectiveness of this policy has not been properly evaluated. This case suggests that limited duplex follow-up of the ligated aneurysm may fail to diagnose continued flow within the aneurysm sac thereby falsely reassuring the surgeon and patient. Serial measurement of postoperative aneurysm size may have a role in screening for the rare occasions where endoleaks occur in popliteal aneurysms.

References


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