Rare disease

An unusual combination of sciatic and popliteal artery aneurysms

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Summary

A 68-year-old male presented with an asymptomatic pulsatile swelling on the back of his left thigh. Angiography revealed this to be aneurysmal degeneration of a persistent sciatic artery (PSA), an embryological variant whereby the primitive vascular tree persists as the main blood supply to the lower limb. Initial treatment was with an inlay graft to exclude the aneurysm from the circulation. The patient was re-referred 12 years later with a pulsatile swelling distal to the old scar. Angiography showed a popliteal artery aneurysm separate to both the sciatic artery and the anastomosis. The second procedure fashioned an inlay graft from the original graft down to the distal popliteal artery. The patient remains under follow-up. Patients with a PSA are prone to aneurysmal degeneration, which may also occur in adjacent vessels. For this reason, the authors recommend these individuals are kept under lifelong follow-up.

BACKGROUND

Persistent sciatic artery (PSA) is an embryological variant, whereby the primitive vascular tree persists as the main axial blood supply to the lower limb. It is an uncommon condition, which was first described in the literature in 1832.¹

A PSA is susceptible to aneurysmal degeneration, which was initially reported in 1864.² In common with all aneurysms, the potential complications include thrombosis, rupture and distal ischaemia, all of which represent significant clinical problems. Due to the obscurity of this condition, there is also clearly a risk of misdiagnosis.

This case highlights the need for timely clinical assessment, investigation and surgical management of this uncommon condition. Moreover, it emphasises the susceptibility of these individuals to further aneurysmal degeneration in adjacent vessels and therefore the need for lifelong follow-up.

CASE PRESENTATION

A 66-year-old male presented initially in 1996, with an asymptomatic 3 cm subcutaneous pulsatile swelling on the back of his left thigh. There was no history of trauma or symptoms of distal ischaemia. His medical history consisted only of hypertension controlled with enalapril and microscopic haematuria for which followed routine investigation but no cause was found.

There was no family history of any form of aneurysm. He was a smoker of between 10 and 12 cigarettes daily, lived with his wife and was employed as a factory worker.

In 1996, clinical examination revealed a 3 cm pulsatile swelling on the back of the left thigh with no palpable thrill. Femoral pulses were palpable bilaterally, and although no pulses were palpable below this the feet were warm and well perfused with no evidence of tissue loss. There was no clinically-apparent aneurysm elsewhere.

INVESTIGATIONS

Angiography and duplex examination revealed a large blood vessel running down through the sciatic notch and along the back of the thigh, later forming the popliteal artery. This vessel was closely associated with the sciatic nerve and was tortuous with a small distal fusiform aneurysm. The superficial femoral artery offered little in the way of distal perfusion. The findings were consistent with a persistent left sciatic artery with distal aneurysmal degeneration.

TREATMENT

In 1997, the patient underwent a procedure to exclude the sciatic artery aneurysm.³ A vertical incision was made over the aneurysm, which was repaired with an 8 mm diameter polyester graft. Histology of the aneurysmal segment showed fibrolipid atheromatous debris including blood clot. Immediate recovery from the procedure was uneventful.

OUTCOME AND FOLLOW-UP

Initially following his procedure, the patient reported some slight hyperaesthesia extending to the upper part of the back of the left thigh. The abnormal sciatic artery could be palpated up to the gluteal region, but this remained unchanged. There was no alteration in limb function or evidence of peripheral vascular disease.

In light of the unusual nature of the aneurysm, the patient remained under vascular surveillance with duplex imaging. This was initially becoming increasingly less frequent annually, as the graft remained patent and no further problems were detected. The patient was discharged from surveillance in 2004.

In 2008, the patient, now 78, was re-referred by his general practitioner with a swelling in the left popliteal fossa. On clinical examination, this was distal to the old incision.

Angiography showed that this was not an extension of the previous aneurysm, nor an anastomotic false aneurysm, but a new 4 cm popliteal aneurysm at the level of the knee joint.

Because of the risks of thrombosis, embolism and rupture operative repair were planned. The distal aspect of the previous incision was opened and extended down to the popliteal fossa. The aneurysm commenced 3 cm distal to the previous graft extending to just above the knee crease, after which the vessel was merely ectatic. An inlay 8 mm diameter polyester graft was extended from the original graft at mid-thigh level to the distal popliteal artery.

Recovery from this second procedure was also unremarkable with the patient maintaining a good level of function. A Duplex scan performed at 12 months confirmed patency of and good flow within the grafts and no further evidence of aneurysmal arterial degeneration. The patient remains under follow-up.

DISCUSSION

The main arterial supply to the lower limb in the developing embryo is from the sciatic artery, which in normal development undergoes involution to remain as remnants of the inferior gluteal, popliteal and peroneal arteries in the developed fetus. Concurrently, the superficial femoral artery develops to form the main arterial supply to the lower limb. Disorders of involution can lead to the persistence of the sciatic artery. The degree of impaired involution gives rise to two subsets of PSA, complete and incomplete forms.⁴ Complete forms occur when the superficial femoral artery is hypoplastic and the PSA provides the arterial supply down to the popliteal artery. The incomplete form occurs when the superficial femoral artery provides the main supply to the popliteal artery and the sciatic artery is hypoplastic. The incidence of PSA is approximately 0.03–0.06% with no gender preponderance and a mean age at diagnosis of 51 years. Approximately, 12% of cases occur bilaterally.⁵

Reported presentations of PSA are those of complications of aneurysmal degeneration including gluteal swellings, distal embolisation, ischaemia and sciatic neuropathy.^{2–4}

⁶ Up to 44% of cases of PSA are complicated by aneurysmal degeneration, which almost always occurs at the level of the sciatic notch. The high risk has been attributed to repeated trauma to the area in addition to the known risk factors of hypertension and smoking.^{7–8} The present case was the first recorded one, where aneurysmal degeneration of the PSA has occurred distal to the sciatic notch.³

Diagnosis can be achieved with both clinical suspicion and angiography, which will demonstrate the aberrant vascular anatomy and surrounding structures in order to plan

intervention. CT or MR angiography is therefore the investigation of choice, highlighted by a case of PSA aneurysm being mistaken for a common femoral aneurysm on plain angiography.⁹

Published treatments of this rare condition include endovascular embolisation or surgical revascularisation. Options for the latter include femoropopliteal bypass, ilioPSA bypass, transobturator iliopopliteal bypass or fashioning of an interposition graft (as described in our case).^{3–5}

This is to our knowledge, the only report of a second distal aneurysm along a PSA following initial repair of a proximal aneurysm with interposition grafting. The risk of further aneurysm formation should be considered in planning surgical revascularisation when these rare cases present and patients should be kept under lifelong follow-up.

Learning points

- ▶ Prominent arteries on the posterior thigh may represent the phenomenon of a PSA, which is prone to aneurysmal degeneration.
- ▶ Patients with this embryological abnormality may be dependent on the vessel for lower limb perfusion.
- ▶ Following surgery, this group is at risk of subsequent aneurysmal degeneration in the same or adjacent vessel and should therefore be kept under lifelong follow-up.

Competing interests None.

Patient consent Obtained.

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