ELSEVIER

Case Report

Endovascular Management of a Large Persistent Sciatic Artery Aneurysm

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The persistent sciatic artery (PSA) is a remnant of the fetal circulatory system that is preserved in less than 0.1% of the population. Up to 60% of patients with this vascular anomaly will go on to development of a PSA aneurysm (PSAA), which can produce a variety of symptoms including neuropathy, claudication, and acute limb-threatening ischemia. Historical management is by open operation and interposition grafting, which can be highly morbid. We describe successful management of a large, symptomatic PSAA by endovascular stent grafting with intermediate term follow-up.

The sciatic artery is a branch of the umbilical artery and serves as the principal source of arterial inflow to the developing limb bud in early embryological development. By the time the embryo has grown to 10 mm in its normal course, the femoral artery begins to supply the vascular beds of the lower extremity. At 22 mm, the femoral artery serves as principal inflow to the limb as the sciatic artery involutes, forming the basis for the internal iliac artery proximally, and the peroneal and posterior tibial arteries distally.[1] The incidence of persistent sciatic arteries (PSAs) in the general population is difficult to determine; the estimated prevalence of 0.03−0.06% is based on angiographic and autopsy data.[2,3]

When the sciatic artery does not involute or does so only partially, the remnant PSA is particularly prone to aneurysmal degeneration in the gluteal portion of the artery. A review of the available case data and literature estimates that up to 60% of patients develop aneurysms.[4] Patients may present with a variety of symptoms including claudication or chronic ischemic symptoms, embolization, mass effect from the enlarging aneurysm, and acute limb ischemia secondary to thrombosis of a PSA aneurysm (PSAA). Although the literature reports satisfactory results with both open and endovascular management of a PSAA, questions remain as to whether endovascular exclusion can provide effective relief of symptomatic PSAAs, particularly in patients suffering from sciatic nerve compression. We present a case of a patient who was treated at our institution with an endovascular approach to exclude her PSAA and improve her symptoms of sciatic compression.

CASE REPORT

A 72-year-old African immigrant woman was presented to our clinic complaining of buttock pain and left lower extremity pain in a sciatic distribution. She was noted to have a large palpable, pulsatile mass of the left buttock. She was otherwise healthy, having been treated for tuberculosis in the past. Her physical examination was notable for an absent left femoral pulse with multiphasic distal signals. Her right femoral pulse was palpable with multiphasic signals distally. Computed tomography (CT) angiography demonstrated bilateral PSAAs with the right thrombosed and the left supplying an 8.3 × 6.3 cm aneurysm in the gluteal musculature (Fig. 1). The superficial

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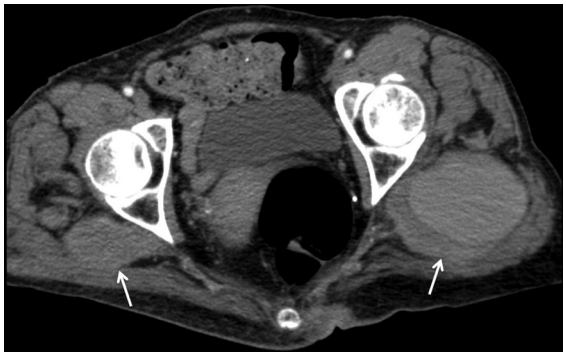

Fig. 1. CT imaging of bilateral PSAAs, *arrows* demonstrating aneurysms. Note asymmetric contrast as right side is occluded.

femoral arteries were small and terminated in the adductor hiatus. Catheter angiography further confirmed the left PSA to be the major vascular supply to the distal left leg, the aneurysm to be 83 mm in maximal diameter and without thrombus. The sciatic artery proximally measured 8 mm with an outflow of 14 mm near the aneurysm, tapering to 10 mm more distally with a tortuous course in the thigh (Fig. 2).

As the hypoplastic right external iliac artery was occlusive with a 9F sheath alone, we were unable to bring appropriately sized delivery sheaths from an ''up-and-over'' approach. Therefore, we elected to access the sciatic artery with the patient in a prone position. A cutdown was made to expose the sciatic artery alongside the sciatic nerve (Fig. 3). The patient was systemically heparinized, and a 12F sheath was used to deploy 2 overlapping Viabahn™ stent grafts (W. L Gore, Flagstaff, AZ). The first stent measured 8 × 150 mm and was deployed proximally. A secondary stent measuring 10 × 100 mm was used to obtain distal seal with 5 cm of overlap. Completion angiography demonstrated successful exclusion of the PSAA (Fig. 4). The sciatic artery was closed with interrupted Prolene sutures. The patient was subsequently seen at 1- and 6-month intervals with complete resolution of her symptoms, shrinkage of her aneurysm sac, and a patent stent graft on follow-up imaging (Fig. 5).

DISCUSSION

The PSA is a recognized vascular abnormality, first published in 1832 by Green.[5] Further attempts at classification based on autopsy data and case series have been published by Pillet et al.[6] and then modified by Gauffre.[7] Each of the anatomic classification systems address the following: (1) whether the PSA is intact to the distal runoff and (2) does it provide the dominant runoff to the limb. The clinical question is does the patient demonstrate symptoms from the presence of their PSA or PSAA and should it be treated?

A recent review of the literature by van Hooft et al.[3] recommended treatment of the symptomatic PSA and watchful waiting of the asymptomatic PSA. This opinion is shared by other pooled analyses of the available data.[2,8] These reviews of the literature also serve to demonstrate the heterogeneity of patient presentation and overall paucity of generalizable data. Certainly, most authors seem to agree that the asymptomatic patient with a PSA does not need intervention, merely a commitment to serial imaging and clinical examinations. However, the patient who with symptoms of distal ischemia or local mass effect (including sciatic distribution neuropathy) and clinically presents with Cowie's sign (absent femoral pulse with normal distal perfusion and a pulsatile gluteal mass) should undergo axial imaging (computed tomography angiogram or magnetic resonance angiogram). This allows the clinician to evaluate for aneurysmal degeneration of a PSA and additionally provides crucial information about the femoral artery and superficial femoral artery to help guide clinical decision-making.

The presence of an aneurysm in the PSA changes the risk/benefit ratio for intervention. Sixty percent of patients with a PSAA will embolize, and as many as 75% of patients with a PSAA will embolize from their aneurysm, putting their distal perfusion at risk. Patients with complete superficial femoral arteries and inline flow distally may undergo ligation or embolization of the PSAA without sequelae. However, the patient with an incomplete superficial femoral artery is dependent on the PSA for flow to the distal lower extremity. Those patients require (1) femoropopliteal or iliopopliteal bypass with ligation of the PSAA; (2) exclusion of the PSAA by open interposition grafting; or (3) stent grafting of the PSAA.

Although well described, the major disadvantage of open ligation or interposition grafting of a PSAA remains as the risk for iatrogenic sciatic injury.[9] Endovascular exclusion of a PSAA has been demonstrated as a feasible option in a handful of reports.[8,10–12] The durability of endovascular stent grafts in the region remains incompletely defined, and failure has been reported.[13] In addition, it has been suggested that patients who suffer from compression of the sciatic nerve may not benefit from endovascular exclusion of the aneurysm, as it does not decompress the aneurysm off of the nerve. This may be true in the patient with significant amounts of chronic thrombus in the aneurysm sac, and these patients may derive greatest benefit from open aneurysmectomy. However, in a patient with minimal thrombus such as ours, exclusion of the aneurysm by stent graft can produce almost immediate reduction in size of the aneurysm, with prompt resolution of symptoms.