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Case Study

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A case of bilateral persistent sciatic artery with unilateral aneurysm: An 18-year period of graft patency after excision of aneurysm

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

Włodzimierz Drożdż[1 ABCDEF], **Andrzej Urbanik**[2 ABCDEF], **Piotr Budzyński**[1 ABCDEF]

[1] 2nd Chair of General Surgery, Jagiellonian University Medical College, Faculty of Medicine, Cracow, Poland
[2] Chair of Radiology, Jagiellonian University Medical College, Faculty of Medicine, Cracow, Poland

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Summary

Background: A persistent sciatic artery (PSA) is a rare vascular anomaly with an estimated incidence of 0.02–0.04% and with a high rate of complications such as aneurysm formation, thromboembolism, and ischemia, that may lead to amputation.

Case Report: We present a case of a female patient with complete symptomatic ambilateral PSA and with unilateral aneurysm. The aneurysm was excised and the PTFE graft was interposed at the aneurismal sac (femoro-popliteal bypass could not be performed because of the high degree hypoplasia of the superficial femoral artery). The graft endured continuous compression and stretching during regular daily life of the patient. At check-up 18 years after the operation, the Doppler ultrasound showed a patent graft and no new aneurismal dilatation of the sciatic artery.

Conclusions: To our knowledge the follow-up of the presented case is the longest reported so far in the literature. The uneventful course of the patient confirms that classical aneurysmectomy still constitutes one of the treatment options of PSA aneurysm.

key words: **persistent sciatic artery • PSA aneurysm • vascular anomaly**

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Author's address: Piotr Budzyński, 2nd Chair of General Surgery, Jagiellonian University Medical College, Faculty of Medicine, Cracow, Poland, e-mail: budzynp@cm-uj.krakow.pl

Background

Persistent sciatic artery (PSA) is a rare, but potentially serious vascular anomaly [1]. In mammals, during the early fetal period, it connects the internal iliac artery with the popliteal artery and is the major blood supply to the lower limb in embryonic development. At that time the trunk runs down along with the sciatic nerve on the dorsal surface of the hip joint and the extensor muscles of the thigh. During further fetal development (after 6 weeks), due to position changes of the pelvis, which deteriorates the blood supply, the sciatic artery undergoes gradual involution. In mammals the role takes over femoral artery [2–6]. Remains of the sciatic artery take part in the formation of the inferior gluteal artery, deep femoral artery, fibular artery and the arteries of the foot. In the literature this vascular anomaly is called "persistent sciatic artery", "persistent axial artery", or "persistent ischiadico-femoral trunk" [3,7–12]. In healthy adults, remnants of the sciatic artery are represented by a descending branch of the inferior gluteal artery, which at the level between the sciatic tuberositas and major trochanter forms a long and very thin branch called the committing artery of the sciatic nerve, which accompanies the sciatic nerve down to the popliteal fossa [3,4].

In the most common ("complete") form of this vascular anomaly, the internal iliac artery and its continuity PSA leave the minor pelvis and enter the thigh through the lower portion of the greater sciatic foramen, below the pyriform muscle, running down to the posterior femoral compartment and accompanying sciatic nerve. PSA has a variable relationship to the sciatic nerve, occasionally lying within the nerve sheath [1,2,5,7,10,12,13]. At the level of the popliteal fossa it joins the popliteal artery. The profound femoral artery is usually preserved, whereas the superficial femoral artery in most cases (over 70%) is hypoplastic or even aplastic and ends in the form of several small branches at the distal part of the thigh [1–3,5,7,8,10,12,13].

The persistent sciatic artery usually runs a torturous course, is fragile and prone to vasculopathy, atherosclerosis, and aneurysm formation mostly due to hypertension and chronic trauma [1,10,12,13].

The potentially serious complications of PSA include ischemia due to occlusive thrombosis or thromboembolization, formation and rupture of an aneurysm. The amputation rate in the course of PSA is estimated at between 10–15% [1,9,14].

We present a rare case of the complete symptomatic bilateral PSA with hypoplastic femoral arteries and unilateral aneurysm, treated successfully, with an 18-year period of uneventful follow-up.

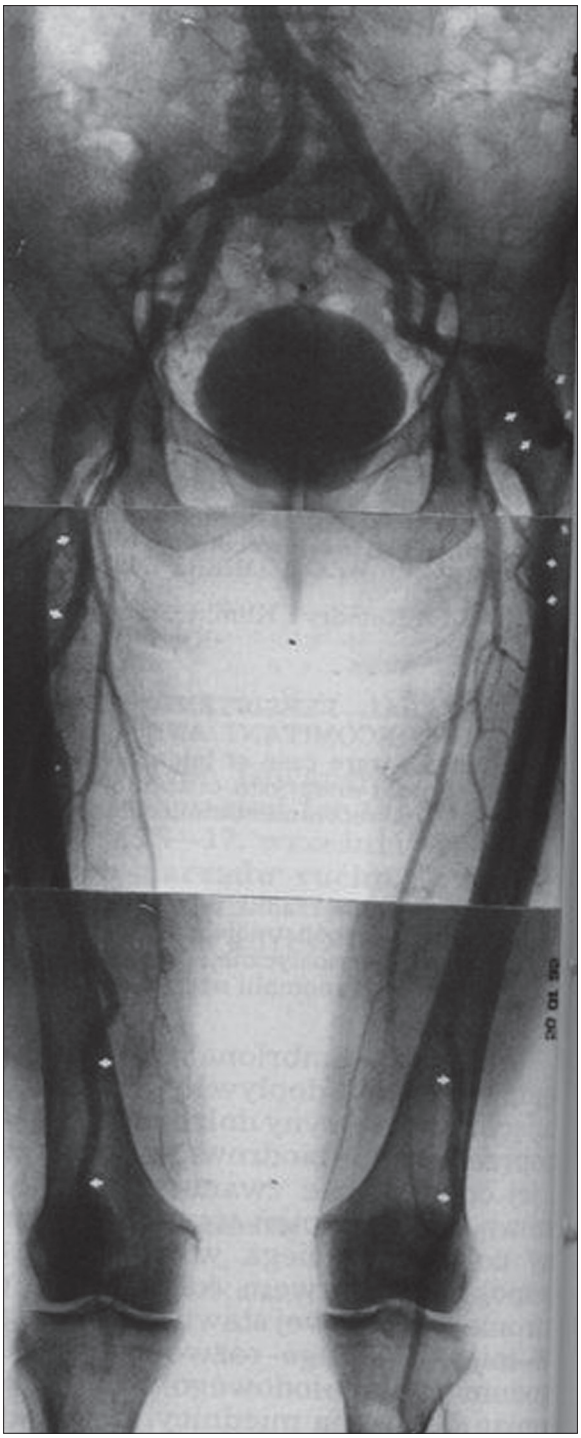

Figure 1. Angiogram showing bilateral persistent sciatic arteries Type IIa (according to Pillet) with saccular aneurysm indicated by arrows – on the left.

Case Report

In 1991 a 63-year-old non-smoking female was referred to the outpatient vascular service of our clinic, with a 2-year history of pain of varying intensity, localized in the left buttock, radiating down along the left thigh with concomitant paresthesias of the left foot. She was initially treated at a neurological unit. During the second year she experienced 2 incidents of acute pain of the left toe accompanied by the symptoms of the "blue toe" syndrome. Six months before, she began to feel discomfort, compression, and pulsatile mass in her left buttock. On admission, ankle/brachial index (AB/I) on the left was 0.67 and on the right 0.86. On physical examination, Cowie's sign was present – absent femoral pulse with palpable popliteal pulse [5,15]. In the left buttock there was a pulsatile mass of 5×10 cm with slight bruit heard over it.

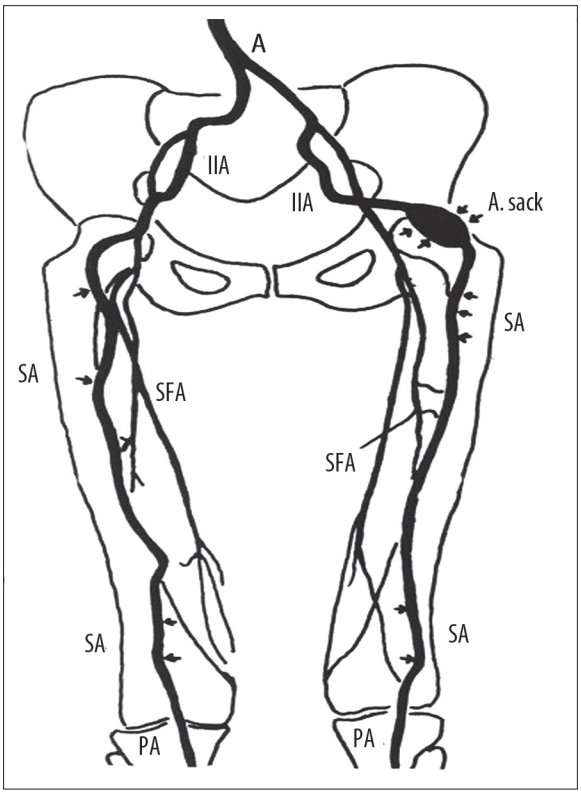

Figure 2. Schematic diagram presenting vasculature to the lower extremities: A – aorta, IIA – internal iliac artery, A.sac – aneurysmal sac, SA – sciatic artery, SFA – superficial femoral artery, PA – popliteal artery.

The initial angiograms (Figures 1, 2) revealed ambilaterally enlarged internal iliac arteries which ran down the thighs in a posterior location and joined the popliteal arteries. On the left side there was a saccular aneurysm at the level of the greater trochanter. The superficial femoral arteries were hypoplastic, and tapered gradually, ending as small branches at the distal thighs. It was diagnosed as PSA (with aneurysm), type IIa, according to Pillet [16].

The patient was operated on. At surgery the aneurysm was directly exposed and excised (Figure 3). To restore the blood flow, a PTFE graft #12 (12 cm long) was implanted in the place of the aneurismal sac in an end-to-end way (Figure 4). The postoperative course was uneventful. The AB/I of the left extremity rose from preoperative 0.67 to 0.91.The patient was discharged on the 12th postoperative day, free of symptoms and without any neurological deficit from the sciatic nerve.

The patient had been lost from follow-up since then. However, we managed to call her for check-up on June 2009, when she was 82. The general condition of the patient was fairly good. Her daily activity was adequate to her age. She did not report any complaints that could be directly attributed to the blood supply to the lower limbs. AB/I of her left foot was 0.76 and on the right AB/I was 0.81.The Doppler ultrasound showed a patent graft and no new aneurismal dilatation of the sciatic arteries.

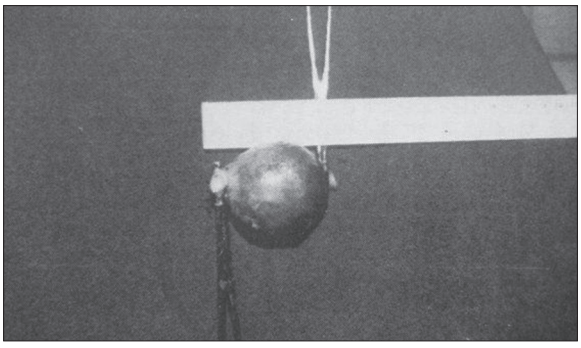

Figure 3. Excised aneurismal sac (7.5 cm in diameter).

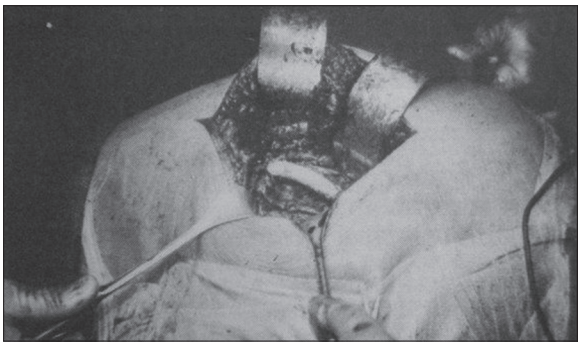

Figure 4. Intraoperative view of the interposed graft in the place of the removed aneurysmal sac.

Discussion

It has been estimated that in approximately 0.02–0.04% of adults the sciatic artery persists as the main artery supplying the lower limb [1,4,5,8,10,11–14]. One needs to be especially aware of the PSA presence in the case of hip surgery, since there may be a certain overlap of symptoms, or during renal transplantation. Division of the internal iliac artery for the graft renal artery anastomosis would result in limb ischemia if there was a PSA [8,14]. Histological study of resected sciatic artery usually demonstrates severe atherosclerotic changes, with a deficit in the collagen components of the vessel wall. PSA is a rare condition, but this artery is especially prone to develop atherosclerotic changes, embolism and aneurismal formation [10,13].

Whereas major arteries normally follow a course on the flexor aspects of articulations, the PSA courses posteriorly in the buttock and thigh and is subjected to repeated mechanical trauma (eg, compression against the edge of a chair while sitting or overstretching when walking). This may result in aneurysmal formation (unilateral aneurysm is found in over 40% of cases of PSA, while bilateral aneurysm in more than 12% of PSA cases), typically under the gluteus maximus muscle at the level of the greater trochanter [1,4,5,9–12].

Aneurysmal complications such as rupture, thrombosis or embolism constitute a high risk of acute ischemia and are still connected with a substantial rate of limb amputations [9,13,14], which is why early surgical intervention is increasingly regarded as preferable in case of the symptomatic PSA with aneurysm [3,14].

Treatment of PSA depends on the type of sciatic artery involved. In a case where the sciatic artery exists as the primary arterial supply to the extremity in the so-called "complete" form of PSA (approximately two-thirds of reported cases) revascularization of the distal extremity is necessary [2,4,7,14,15]. Multiple surgical techniques are available, including interposition grafting or femoro-popliteal bypass grafting in combination with ligation or resection of the aneurysm [2,5,12].

Recently, endovascular techniques such as percutaneous embolization with coils have been tried, providing symptomatic improvement, especially in cases of incomplete PSA where revascularization is usually unnecessary [5,11,17–19]. In cases requiring continuity of the sciatic artery, percutaneous endovascular management of the lesion with stent-graft represents a further treatment option [5,11,17–19]. However, whether or not endovascular procedures represent a reasonable alternative to classic surgical techniques is yet to be determined, because a stent graft in this location bears the potential risk for graft dislodgment or compression over the hip joint, and its durability remains an open question [11].

In our case, because of poor perfusion, and the fact that the left distal superficial femoral artery was hypoplastic and did not supply adequate flow to the lower extremity, we could not limit our procedure to the exclusion of the aneurismal sac, or perform a femoro-popliteal bypass. Additionally, endovascular procedures were not available to us at that time.

That is why we decided to interpose the graft at the place of the excised aneurismal sac. We were aware that, theoretically, placing the graft in the same position as the aneurysm was not the optimal solution, because such a graft could be exposed to incidents of repeated trauma or stretching, as it had been the sciatic artery. It could increase the risk of leaks at the anastomotic sites or cause graft thrombosis. However, in this case the graft endured continuous compression during regular daily life of the patient over a period of years.

In an extensive English language review of this subject, van Hooft et al noticed that presented follow-up was short (6–12 months) and poorly described in most articles, thus therapeutic strategies could not be deduced from the available literature [14].

Conclusions

To our knowledge the follow-up of the presented case is the longest reported so far in the literature.

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