



# Popliteal Revascularization in Bilateral Persistent Sciatic Artery: Case Report

## Revascularización de arteria poplítea con arteria ciática persistente bilateral: revisión de la literatura

Fernando José Meléndez Negrette<sup>1</sup>

José Miguel Hidalgo<sup>2</sup>

Sergio Álvarez<sup>2</sup>

Emilio Sanín<sup>2</sup>

Santiago Echeverri<sup>2</sup>



### Key words (MeSH)

Sciatic  
Iliac artery  
Extremities  
Ischemia

### Palabras clave (DeCS)

Ciática  
Arteria ilaca  
Extremidades  
Isquemia

### Summary

The persistent sciatic artery is a rare congenital vascular anomaly secondary to an alteration in embryological development. Most cases are asymptomatic and they are detected when they are associated with the presence of aneurysms or embolisms. We present the case of an 81-year-old woman with cardiovascular risk factors who consulted for ischemia of the lower limb.

### Resumen

La arteria ciática persistente (ACP) es una anomalía vascular congénita, poco frecuente, secundaria a una alteración en el desarrollo embriológico. La mayoría de los casos son asintomáticos y se detectan cuando se asocian con aneurismas o embolias. Se presenta el caso de una mujer de 81 años con factores de riesgo cardiovascular quien consulta por isquemia del miembro inferior.

### Case report

An 81-year-old woman with a history of dyslipidemia, hypertension, coronary disease and smoking, with clinical picture of 15 days of evolution consisting of pain in the right lower limb. To the physical examination there was a delay in capillary filling of more than 2 seconds and necrosis of the first finger. A plethysmography that showed infra-popliteal involvement vascular surgery requested arteriography and intervention according to findings, because of their comorbidities, the patient was not a candidate for surgical management.

She was given a descending puncture arteriogram from the right common femoral artery; since the superficial femoral artery could not be cannulated with a short vascular introducer 5 Fr, it was decided to inject for arteriography (Figure 1a), which showed marked hypoplasia of the superficial femoral artery without connection to the popliteal artery in the adductor channel (Figure 1b). Therefore, it was decided to perform an ascending puncture with a 21G needle from the posterior tibial artery and a 5 Fr dilator was positioned from which a 0.018" guide was advanced, which ascended to the popliteal area and, after multiple attempts, was directed to a lateral path (Figure 2). Then, it was decided to perform an aortogram and pelvic arteriography, examination that showed persistent sciatic arteries bilaterally (figure 3), without aneurysms and occlusion of the

right popliteal artery (figure 4). Angioplasty was performed by contralateral approach with balloon on guide, with satisfactory recanalization of the popliteal artery, descending by the persistent sciatic artery (PSA) (Figure 5a), and with improvement of distal foot perfusion (Figure 5b).

### Discussion

The persistent sciatic artery (PSA) is an anomaly very rare vascular, resulting from the persistence of an artery that normally returns in the first 3 months of the gestation. During the first weeks this artery provides the irrigation of the lower limbs and then, when the embryo is 12 mm long, the Superficial femoral artery increases in size, becomes anastomosis with the external iliac artery and then the sciatic artery atrophies to become the distal branches of the lower gluteal artery, upper and the sciatic nerve. Its incidence is 0.025 % at 0.04 % and the bilateral rate is only in the 12-30 % of cases (1). It is right in 50 % of the cases, left in 20 % and bilateral in less than 30 %. It occurs in both sexes equally. The great most cases are asymptomatic and the symptoms usually occur at the age of 40-50, with claudication, aneurysm and rarely with sciatica (2,3). This anomaly has been associated with mullerian disorders, fistulas arteriovenous, limb and artery hypertrophy right retroesophageal subclavian (4).

<sup>1</sup>Radiologist, fellow of Interventional Radiology, Universidad de Antioquia, Medellín, Colombia.

<sup>2</sup>Radiologist, specialist in Interventional Radiology, Department of Interventionism, Hospital Pablo Tobon Uribe, Medellín, Colombia.

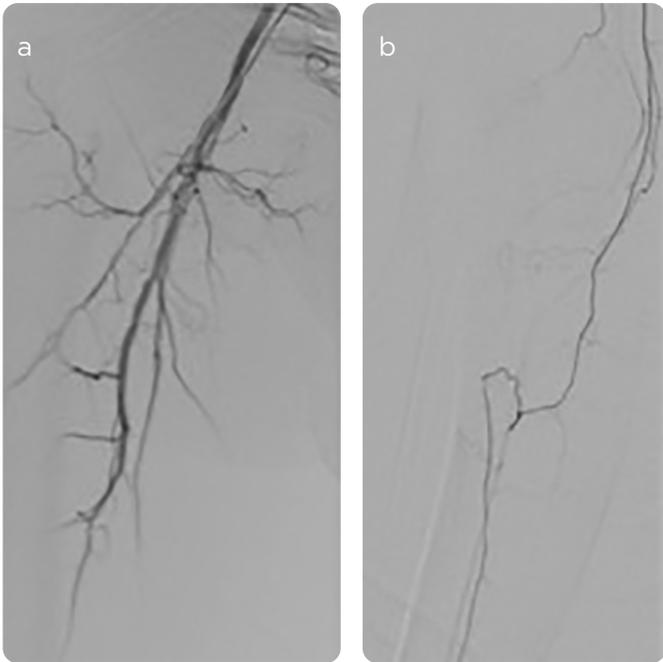


Figure 1. Arteriography. a) hypoplasia of the superficial femoral artery. b) medial collateral of superficial femoral artery that is anastomose with posterior tibial artery.

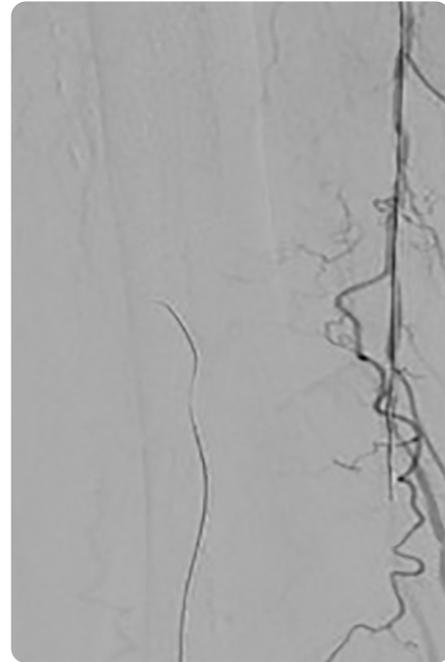


Figure 2. Ascending puncture guidance from the posterior tibial artery has a lateral path in contrast to the medial border of the artery hypoplastic superficial femoral.

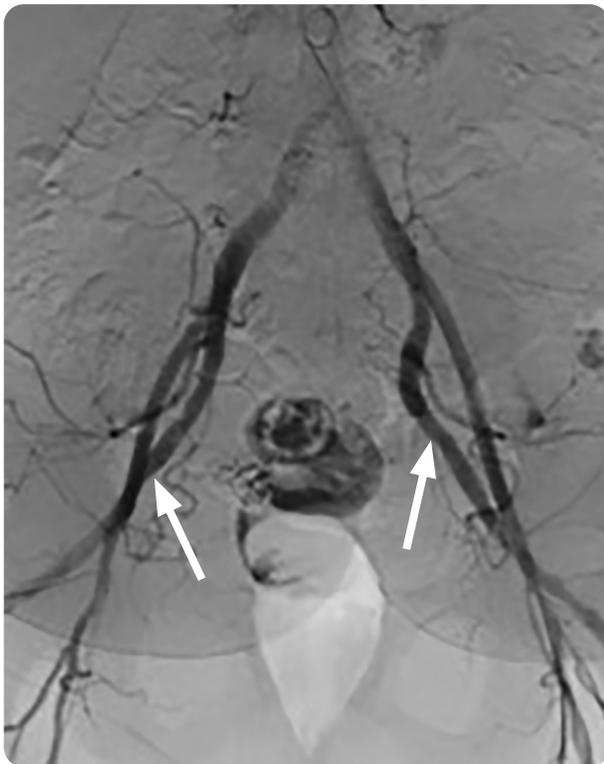


Figure 3. Pelvic arteriography: bilateral persistent sciatic artery as a continuity of the internal iliac arteries (arrows).

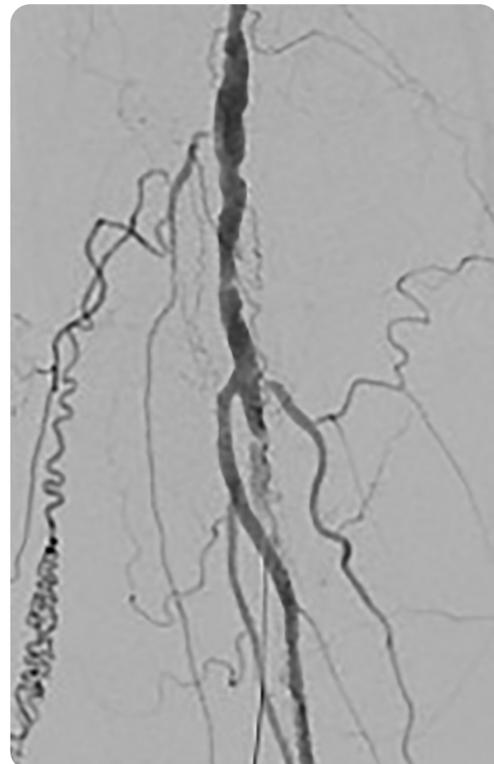


Figure 4. Atheromatous artery disease with occlusion of the popliteal artery with collaterals.



Figure 5. a) Conventional balloon angioplasty of the occluded segment. b) Repermeability of the popliteal artery in a satisfactory manner.

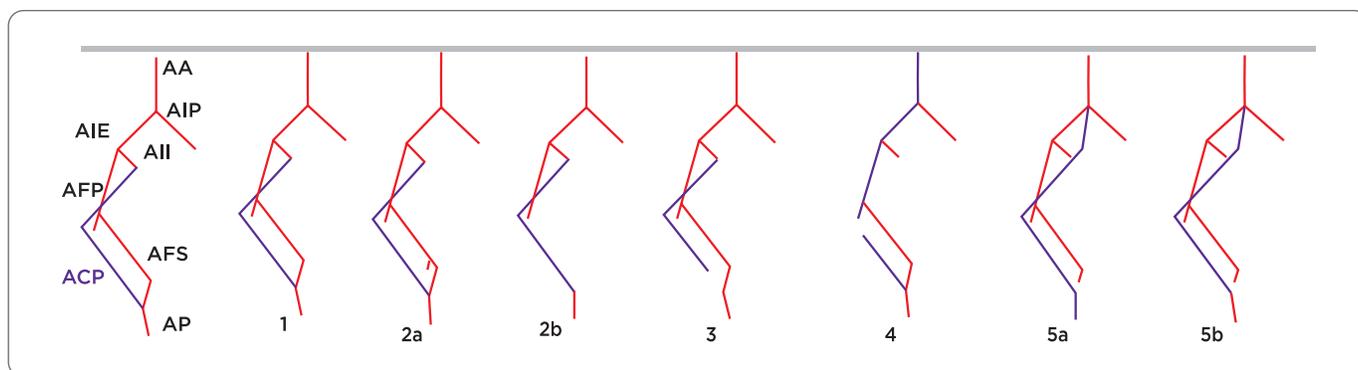


Figure 6. Classification diagram of the persistent sciatic artery according to persistence, hypoplasia or agenesis.

Some authors suggest that if the femoral artery is hypoplastic, the persistence of the sciatic artery is favored (4).

Anatomically, the artery is an extension of the internal iliac artery and continues through the sciatic foramen through the piriform muscle accompanying the sciatic nerve, and then descends through the lower medial limb to the nerve and continues on to the popliteal artery (5).

Green described this anomaly in 1832, in cadaveric studies, and a classification was made depending on the persistence, hypoplasia or agenesis of the sciatic and superficial femoral artery: Type 1: a complete PSA, together with a normal femoral artery; type 2: a complete PSA with incomplete femoral development; in type 2a, the femoral artery is present but narrows and does not reach the popliteal artery, as in the case described here; in type 2b, the femoral artery is completely absent, in type 3: an incomplete PSA in which only the proximal segment of the sciatic artery persists and the femoral arteries are fully developed. Type 4: an incomplete PSA, in which only the distal segment of the artery persists and the femoral arteries are fully developed. Type 5 -- PSA originates in the middle sacral artery; type 5a has a fully de-

veloped femoral artery and type 5b has a poorly developed femoral artery (Figure 6) (4).

Physical examination can identify Cowie's sign, the absence femoral pulse, but with a pathognomonic popliteal pulse, although its absence does not rule out the PSA (6). The aneurysm is the most frequent occurrence of PSA, described as up to 42% of cases, is detected as a pulsating mass in the buttocks resulting from the shearing of the passage of the artery by the piriform muscle and the sacrospinous ligament. Occasionally it grows and produces compressive symptoms (7). The authors are in favour of treating it, as it is associated with rupture and embolism (8). The second most frequent symptom is embolism (9). PSA can be diagnosed by Doppler, angiotomography or MRI angiography. It is important to recognize this variant, as in some cases a femoropopliteal bridge should be avoided considering that the femoral artery is occluded (10).

Some authors are in favor of non-invasive studies in first instance, which allow you to visualize the anatomical relationships with the sciatic foramen and assess the existence of aneurysms or thrombosis,

since in arteriography the diagnosis can be confused with arterial occlusions (5).

Treatment is not indicated in asymptomatic patients, but annual follow-up with Doppler is recommended to monitor aneurysm formation (3). Treatment depends on the symptoms and classification. In patients with embolism, the use of oral anticoagulation and prostaglandin analogues improve the symptoms of claudication (11). If medical treatment is chosen, follow-up with Doppler and ankle/brachial index is necessary every 3-6 months.

For aneurysms, endovascular treatment by embolization or coated stents, or surgery is indicated by bypass or aneurysmectomy with venous flap interposition or prosthesis, depending on whether the PSA is complete or incomplete, since a complete form contraindicates the occlusion of this vessel (8).

In this case it was relevant to recognize this anomaly with in order to find the access that would allow vascular recanalization in a satisfactory manner. It is striking that no aneurysm is found and the atherosclerotic cause of popliteal occlusion..

## References

1. Mazet N, Soulier-Guerin K, Ruivard M, Garcier JM, Boyer L. Bilateral persistent sciatic artery aneurysm discovered by atypical sciatica: a case report. *Cardiovasc Intervent Radiol*. 2006;29(6):1107-10.
2. Wang B, Liu Z, Shen L. Bilateral persistent sciatic arteries complicated with chronic lower limb ischemia. *Int J Surg Case Rep*. 2011;2(8):309-12. doi: 10.1016/j.ijscr.2011.07.010.
3. Patel MV, Patel NH, Schneider JR, Kim S, Verta MJ. Persistent sciatic artery presenting with limb ischemia. *J Vasc Surg*. 2013;57(1):225-9. doi: 10.1016/j.jvs.2012.06.108.
4. Van Hooft IM, Zeebregts CJ, van Sterkenburg SM, de Vries WR, Reijnen MM. The persistent sciatic artery. *Eur J Vasc Endovasc Surg*. 2009;37(5):585-91. doi: 10.1016/j.ejvs.2009.01.014.
5. Jung AY, Lee W, Chung JW, et al. Role of computed tomographic angiography in the detection and comprehensive evaluation of persistent sciatic artery. *J Vasc Surg*. 2005;42(4):678-83.
6. Knight BC, Tait WF. Massive aneurysm in a persistent sciatic artery. *Ann Vasc Surg*. 2010;24(8):1135.e13-1135.e18. doi: 10.1016/j.avsg.2010.05.017.
7. Wijeyaratne SM, Wijewardene N. Endovascular stenting of a persistent sciatic artery aneurysm via retrograde popliteal approach: a durable option. *Eur J Vasc Endovasc Surg*. 2009;38(1):91-2. doi: 10.1016/j.ejvs.2009.03.007.
8. Mascarenhas de Oliveira F, de Souza Mourão G. Endovascular repair of symptomatic sciatic artery aneurysm. *Vasc Endovascular Surg*. 2011;45(2):165-9. doi: 10.1177/1538574410389340
9. Yamamoto H, Yamamoto F, Ishibashi K, et al. Intermediate and long-term outcomes after treating symptomatic persistent sciatic artery using different techniques. *Ann Vasc Surg*. 2011;25(6):837.e9-837.e15. doi: 10.1016/j.avsg.2011.02.017.
10. Brantley SK, Rigdon EE, Raju S. Persistent sciatic artery: embryology, pathology, and treatment. *J Vasc Surg*. 1993;18(2):242-8.
11. Kritsch D, Hutter HP, Hirschl M, Katzenschlager R. Persistent sciatic artery: an uncommon cause of intermittent claudication. *Int Angiol*. 2006;25(3):327-9.

## Correspondence

Fernando José Meléndez Negrette  
 Departamento de Radiología  
 Universidad de Antioquia  
 Medellín, Colombia  
 fernandomelendezun@gmail.com

Received for evaluation: April 11, 2019

Accepted for publication: December 1, 2019