

Persistent primitive sciatic artery: a case report and review of the literature

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ABSTRACT

A persistent sciatic artery is an anatomical variation as the artery running in the posterior thigh compartment should have regressed at the embryological level. Its persistence should be looked into the window of potential complications such as aneurysms and limb ischemia. A number of cases have previously been documented in international journals, but none locally.

We present findings of a monthly resident dissection course whereby an adult male cadaver was dissected on the gluteal and posterior thigh, and we found a persistent sciatic artery arising on the lateral circumflex femoral artery, and distally, it was joining the normal popliteal artery.

Persistent sciatic artery is a variation worth knowing for surgeons and anesthesiologists approaching the posterior thigh. We should foster awareness of such variations through researches

Keywords: Persistent, Sciatic Artery, Case Report, Variation, Embryology

INTRODUCTION

The persistent sciatic artery is a rare vascular anatomical variation with an incidence of 0.03 to 0.06 %. It was first described by Green in 1832 during postmortem dissection [1,2]. During embryological development, the sciatic artery (PSA) is present but disappears after the full development of the femoral artery. The embryologically sciatic artery is a branch of the umbilical artery and provides blood supply to the lower limb around the 6 mm stage embryo. Around 12 mm, the embryo sciatic artery develops into a superficial femoral artery. At 8 months of embryonic development, the superficial femoral artery dominates the sciatic artery [3].

Persistent Sciatic Artery is prone to ischemia and aneurysms that may lead to amputation of the

affected limb. PSA is highly prone to an aneurysm probably due to the anatomical location that predisposes it to injury and potential congenital arterial elastic tissue anomaly. The diagnosis of PSA anomaly can be made by CT-angiography [3]. They are of doubtful clinical significance, especially when they are found incidentally while doing imaging [4]

Pillet et al. have classified Persistent Sciatic Artery into 5 types described below with important clinical significance because management of different medical conditions that affect PSA can be managed based on classification.

Pillet et al. classified this anatomical variation into 4 categories, and Gauffre added 5th class where the Persistent sciatic artery originates from the medial sacral artery [3].

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Complete PSA connects the internal iliac artery to the popliteal artery and the femoral artery can be normal, complete, and incomplete [4]. Bilateral PSA is rare, and it is known to account for 12 to 32 % of all known cases. It is the Right side in 50 % of known cases and the Left side in 20% [4]

Males and females are affected equally. Genetic mutation and environmental factors are attributed to be the causes of combined malformations, like in the case of Mullerian agenesis, arteriovenous fistula, hypertrophy of the lower limb, and varicose vein of atypical pattern [4]. Several authors hypothesized that the sciatic artery persists when the femoral arterial system is hypoplastic to deliver adequate blood flow to the developing limb [4]. When the PSA is occluded, it can be managed by Bypass surgery [3]. The management options, in general, are governed by the individual patient's symptoms and classification.

PSA should be included in the differential diagnosis of lower limb ischemia and aneurysm formation [4]. Given its rare presentation, it can be missed easily. Therefore, we are reporting this case to highlight the existence of persistent primitive sciatic arteries in our population for academic and clinical benefits.

CASE PRESENTATION

In the course of the usual dissection by surgical residents at the anatomy laboratory at the University of Rwanda, two surgical residents were assigned to one cadaver. This means that each resident was dissecting one body part under the direct supervision of the trainers. All ethical conduct related to the University and human remains handling were obeyed. An adult male cadaver was dissected of gluteal region and posterior thigh, and a layer-by-layer dissection was done. In the deep layer, after a section of the gluteus maximus, closer to the sciatic nerve, we found an artery running closer to it and distally following the normal course as a popliteal artery with normal branching and course. The artery was as large as the popliteal artery and accompanied by a vein. Proximally, it was arising underneath the gluteal muscles more lateral as a branch of the lateral circumflex femoral artery.

Figures 1 to 3 show the proximal part of the Persistent Sciatic Artery (PSA), where it arises underneath the gluteal muscles and its distal course.

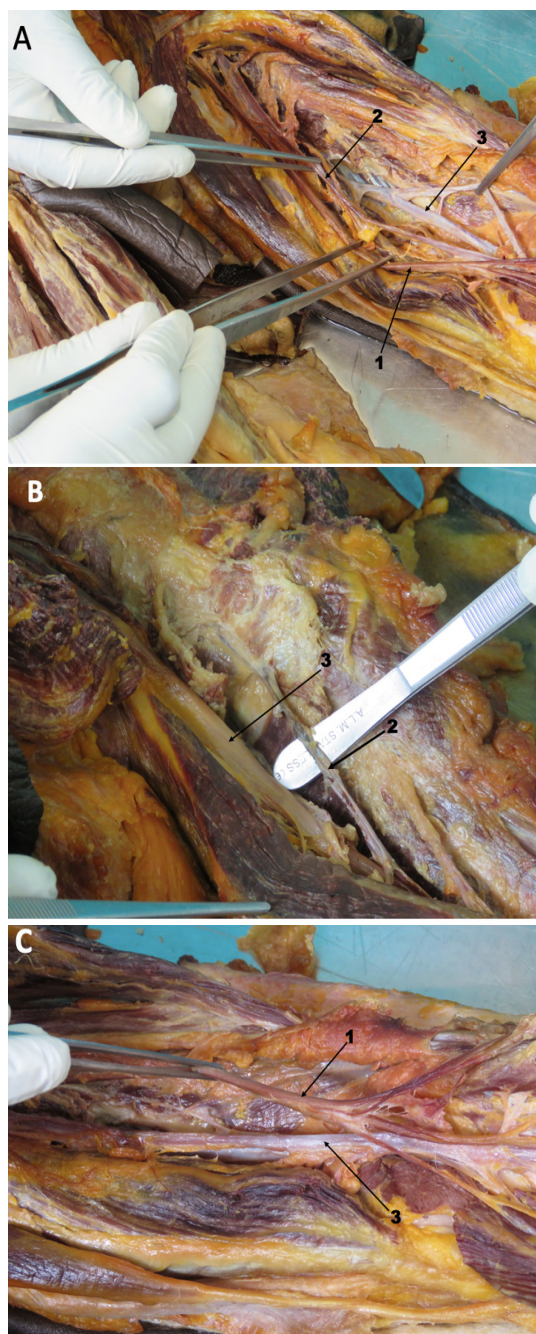


Figure 1A: (1) Popliteal Artery, (2) Persistent Sciatic Artery, (3) Sciatic Nerve

Figure 1B: (2) Persistent Sciatic Artery, (3) Sciatic Nerve

Figure 1C: (1) Popliteal Artery, (3) Sciatic Nerve

DISCUSSION

The current case report was conducted on the cause of curricula dissection in an adult

male patient. The potential findings were an unusually arterial pattern deep in the posterior compartment. Findings are in accordance with the persistent primitive sciatic artery.

The persistent primitive sciatic artery occurrence is likely to be diagnosed in adulthood in living subjects. This aberrant artery is subsequently predisposed to aneurysms [1,5].

The present dissected cadaver did not show aneurysms, even though they are prone to develop, given the course of the artery, contrary to the study by Hooft et al. [1]. The presence of a persistent primitive sciatic artery, also known as an ischiadic artery, may signify an association with a large spectrum of genetic and congenital conditions, notably arterio-venous malformations and neurofibromatosis [6]. This artery is present bilaterally, and it is known to be associated with several arterial variations in different parts of the body [7]. The clinical presentations of a subject with an ischiadic artery may be of a distal thrombo-embolic event, which can even complicate limb loss if no early intervention is undertaken. However, when the optimal diagnosis is made, bypass grafting and stent grafting remain valid therapeutic interventions [8,9]. Mandell et al. also highlighted the relevance of the persistent sciatic artery in their study, reporting potential complications related to this artery, notably the thrombo-embolic event and aneurysm, which may complicate patient outcomes [10]. In settings of trauma to the normal femoral artery, the persistent femoral artery may serve as a good alternative arterial supply to the lower extremity. This was seen in a previously published case report of femoral artery gunshot injury [4].

CONCLUSION

This is the anatomical variation representing the unilateral persistent primitive artery in an adult cadaver. Different clinicians in clinical settings do not know this. Therefore, creating awareness is paramount for medical personnel. The existence of a persistent sciatic artery represents a two-sided coin since there may be life-threatening conditions arising on it, or it may serve as the last alternative blood supply to the limb. This article, among

others, will foster this awareness among clinicians.

REFERENCES

1. van Hooft, I.M.; Zeebregts, C.J.; van Sterkenburg, S.M.M.; de Vries, W.R.; Reijnen, M.M.P.J. The Persistent Sciatic Artery. *Eur. J. Vasc. Endovasc. Surg.* 2009, 37, 585–591, doi:10.1016/j.ejvs.2009.01.014.
2. Yazama, F.; Hatori, N.; Kudoh, H.; Imamura, S.; Eda, T.; Endoh, A.; Ono, M.; Sawada, H.; Horiguchi, M. Bilateral Persistent Sciatic Arteries in a Japanese Man. *Anat. Sci. Int. Jpn. Assoc. Anat.* 2002, 77, 128–133, doi:10.1046/j.0022-7722.2002.00003.x.
3. Kim, T.I.; Satam, K.K.; Blume, P.A.; Guzman, R.J.; Ochoa Chara, C.I. Endovascular Revascularization of an Occluded Persistent Sciatic Artery for Chronic Limb-Threatening Ischemia in a Patient with Coronavirus Disease 2019. *J. Vasc. Surg. Cases Innov. Tech.* 2022, 8, 345–348, doi:10.1016/j.jvscit.2022.04.014.
4. Shaffer, W.; Maher, M.; Maristany, M.; Ustunsoz, B.; Spieler, B. Persistent Sciatic Artery: A Favorable Anatomic Variant in a Setting of Trauma. *Ochsner J.* 2017, 17, 189–194, doi:10.1043/TOJ-16-0081.
5. Ochieng, J.J. Persistent Sciatic Artery : A Cadaveric Case Study. 2022, 3, 33–37.
6. Nicholson, R.L.; Pastershank, S.P.; Bharadwaj, B.B. Persistent Primitive Sciatic Artery. *Radiology* 1977, 122, 687–689, doi:10.1148/122.3.687.
7. Sekiya, S.; Horiguchi, M.; Komatsu, H.; Kowada, S.; Yokoyama, S.; Yoshida, K.; Isogai, S.; Nakano, M.; M. Koizumi Persistent Primitive Sciatic Artery Associated with Other Various Anomalies of Vessels. *Acta Anat* 1997, 158, 143–149.
8. Patel, M. V.; Patel, N.H.; Schneider, J.R.; Kim, S.; Verta, M.J. Persistent Sciatic Artery Presenting with Limb Ischemia. *J. Vasc. Surg.* 2013, 57, 225–229, doi:10.1016/j.jvs.2012.06.108.
9. Daniel Kretzschmar , Marcus Thieme , Rene Aschenbach, P Christian Schulze, S.M.-W. A Very Rare Cause of Thrombotic Peripheral Occlusion. *Int J Angiol* 2022, 32, 75–80.
10. Mandell, V.S.; David, P.F.J.; V, J.D. Persistent Sciatic: Clinical, Embryologic, Angiographic Features. *Clin. Scenar. Vasc. Surg. Second Ed.* 1985, 245–249, doi:10.19056/ijmdsjssmes/2014/v3i1/80714.