

A large unilateral persistent sciatic vein: a case report

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Abstract

Persistent sciatic vein is considered a relatively rare anatomical finding, commonly associated with the Klippel-Trenaunay-Weber syndrome. We report a case of a large unilateral persistent sciatic vein in the right lower limb of an adult male cadaver, identified during routine dissection. The size of the vein was comparable to the sciatic nerve and it was originated from the union of posterior tibial veins at the distal end of the popliteal fossa. It was ascending in the posterior part of the thigh, medial to the sciatic nerve, before coursing through the infrapiriform foramen of the greater sciatic foramen and terminating by draining into the internal iliac vein. Further dissection revealed conventional anatomy of the femoral venous system. The epidemiology, anatomy, diagnosis and management a persistent sciatic vein are also discussed.

Keywords: lower limb venous variation; persistent sciatic vein

Anatomy 2022;16(2):127–130 ©2022 Turkish Society of Anatomy and Clinical Anatomy (TSACA)

Introduction

The sciatic vein is an embryological vessel that forms the main stem of the primordium of the deep venous system of the lower limb. It is usually located on the dorsal aspect, following the course of the sciatic nerve.^[1,2] With the establishment of the definitive deep venous system, the vein usually involutes, with its remnants forming the inferior gluteal vein, satellite vein of the sciatic nerve, and perforating veins of the lower limb.^[3,4] It may however fail to degenerate, and remains as the persistent sciatic vein (PSV) (*vena comitans nervi ischiadici persistens*).^[2]

First described by Servell in 1978, PSV is a rare anatomical finding that may occur as an isolated entity, or in association with the Klippel-Trenaunay-Weber syndrome (KTWS).^[5] KTWS is a rare congenital vascular anomaly characterized by a triad of capillary malformation, varicose veins and soft tissue/ bone hypertrophy.^[2,5,6] When present, the PSV can assume any of the three forms as described by Cherry et al.^[5] as; complete type (arises from the popliteal vein or its tributaries, ascends along the sciatic nerve, and terminates in the internal iliac vein), upper type (arises from the muscular veins of the upper thigh, runs along the sciatic nerve and terminates in the internal iliac vein) or the lower type

(limited to the distal thigh, arises from the popliteal fossa, and terminates in the deep femoral vein).^[5,7,8]

We present here a case of a unilateral large complete PSV and discuss the epidemiology, anatomy, diagnosis and management of PSV.

Case Report

During routine cadaveric dissection, we observed a case of a large PSV in the right lower limb of an adult male cadaver. The PSV, comparable in size to the sciatic nerve, originated from the posterior tibial veins at the distal region of the popliteal fossa, without connection to the popliteal vein. Instead, anterior tibial veins joined to form the popliteal vein, which received all the genicular veins (**Figure 1**). From the popliteal fossa, the PSV ascended in the posterior part of the thigh, medial the sciatic nerve (**Figure 2a**). Within the proximal thigh and gluteal region, it was located between the sciatic nerve and the posterior femoral cutaneous nerve of the thigh (**Figure 2b**). It then passed through the infrapiriform foramen to enter the pelvis, where it terminated by draining into the internal iliac vein (**Figure 2c**). Further investigation revealed conventional anatomy of the femoral venous system (**Figure 2d**).

Discussion

PSV is a relatively rare congenital vascular variation caused by failure of degeneration of the principal trunk of the primitive deep venous system of the lower limb.^[2] It was classified by the International Society of the Study of Vascular Anomalies (ISSVA) in 2014 as a “channel-type” or “truncal” vascular malformation.^[9] In 1978, Servell hypothesized that the vessel developed as a collateral channel for lower limb venous return in cases where the femoral vein was obstructed.^[5] Cherry et al.,^[5] and Baskerville et al.,^[10] in their large case series of patients with PSV reported that the FV is almost always patent in these individuals, disproving this hypothesis. Nonetheless, there are several cases of hypoplastic femoral vein in patients with PSV.^[4,6]

The prevalence of PSV in the general population is unknown. Literature suggests that the PSV may be more common in certain individuals, such as those with recurrent varicose veins of the lower limb. In a retrospective analysis of ascending phlebographies and varicographies of 1200 patients with varicose veins, Trigaux et al.,^[4] identified a PSV in 7 (0.5%) patients. The prevalence of PSV is even higher in individuals with the KTWS.^[4,11,12] For instance, Cherry et al.,^[5] found a PSV in 20 (48%) out of 41 KTWS patients who were diagnosed through magnetic resonance imaging (MRI). A similar study on KTWS by Noel et al.,^[12] found a PSV prevalence of 20%. It is noteworthy that in both studies, MRI was performed only on a subgroup of KTWS patients with symptomatic presentation (41 out of 279 in the study by Cherry et al.,^[5] and 20 out of 290 in the study by Noel et al.^[12] As such, the prevalence reported in these studies should be interpreted with caution due to possible selection bias.

PSV can be present unilaterally^[5,13–15] or bilaterally,^[5,7,11,12] and can occur as a single large vein^[4,12] or a network of veins.^[4,5] It can also present concurrently with a persistent sciatic artery.^[12,15] When present, the PSV can assume any of the three forms as described by Cherry et al.^[5] The PSV displays typical features of a medium-size vein, with a thin tunica intima, thin muscular tunica media, and a thick well-developed tunica adventitia.^[11] There are conflicting reports on the presence of valves within the PSV. Koç et al.,^[11] in their case report of bilateral PSV found 3 valves in each of the veins. However, 2 large studies on KTWS patients failed to demonstrate any valves within the PSV.^[5,12]

PSV is asymptomatic in the majority of individuals and is diagnosed incidentally during routine investigations. It may be symptomatic in a small subset of individuals and

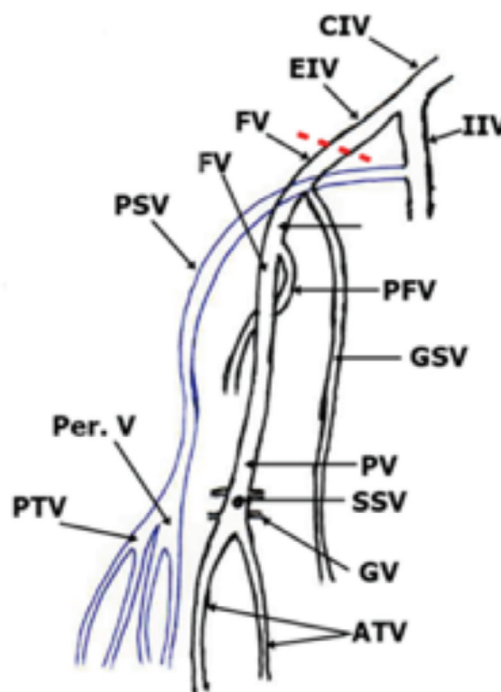


Figure 1. Illustration showing the origin, course and tributaries of the persistent sciatic vein drawn in blue. ATV: anterior tibial veins; CIV: common iliac vein; EIV: external iliac vein; FV: femoral vein; GSV: great saphenous vein; GV: genicular veins; IIV: internal iliac vein; Per. V: persistent vein; PFV: deep femoral vein; PSV: persistent sciatic vein; PTV: posterior tibial veins; PV: popliteal vein; SSV: small saphenous vein.

has been cited in the literature as an unusual cause of recurrent lower limb varicose veins and chronic venous reflux.^[4,5,12,13,15] For instance, Trigaux et al.^[4] reported that posterior leg varices in 6 out of 7 patients were drained by a PSV and not the short saphenous vein, suggesting a possible causal role. PSV should therefore be ruled out in all patients with recurrent varicose veins of the calf or posterior thigh. The PSV has also been reported as a site of deep venous thrombosis and subsequent pulmonary thromboembolism.^[4,5,16]

Definitive diagnosis of PSV is usually made through imaging studies. Initial studies mainly relied on varicography and ascending phlebography.^[4,5,10] These modalities are however invasive and have a low sensitivity,^[5,13] and have therefore been largely replaced by newer imaging modalities such as Doppler ultrasonography and MRI. Doppler sonography is non-invasive, fast, and relatively cheap, but is limited as its diagnostic accuracy is operator-dependent. Magnetic resonance imaging venography is considered a reliable modality in the assessment of the anatomy of the deep venous system of the limb and the



Figure 2. Dissection of (a) posterior thigh; (b) gluteal region; (c) hemi-pelvis displaying the sciatic vein (yellow stars) and its relations, and (d) anterior thigh displaying the conventional anatomy of the femoral triangle. Note the sciatic vein coursing through the posterior thigh with the tibial nerve and common peroneal nerve forming its most immediate and distal lateral relations respectively in (a). The sciatic vein crossing inferior to the piriformis muscle with the sciatic nerve and the posterior femoral cutaneous nerve of the thigh forming its lateral and medial relations respectively in (b). The sciatic vein coursing through the infrapiriform compartment to drain into the internal iliac vein in (c). The great saphenous vein draining into the femoral vein in (d). AL: adductor longus; CPN: common peroneal nerve; FA: femoral artery; FN: femoral nerve; GM: gluteus minimus; GSV: great saphenous vein; IIV: internal iliac vein; L5: fifth lumbar vertebra; LBF: long head of biceps femoris; SBF: short head of biceps femoris; PFCN: posterior femoral cutaneous nerve of the thigh; PM: piriformis; SM: semimembranosus; SN: sciatic nerve; ST: semitendinosus; SV: sciatic vein; TN: tibial nerve.

pelvic area,^[16] and is therefore appropriate modality for investigating presence of a PSV.

Due to the rarity of the PSV, its management has yet to be standardized. The majority of the PSV are asymptomatic, and may not require any treatment. Treatment is however indicated in patients with recurrent varicose veins within the PSV territory.^[13] Patients with mild symptoms may require simple stab avulsion, stripping, or excision of the varicosities.^[5,13] Severe cases of claudication may require surgical excision of the PSV.^[6,12] This however requires the presence of a patent superficial and deep femoral venous system. In patients with hypoplasia of the femoral venous system, the great saphenous vein from the

unaffected side may be used to reconstruct the continuity of the deep venous system of the lower limb via a popliteal vein-great saphenous vein anastomosis.^[12] The role of endovascular therapies for a PSV is still not yet established.

Conclusion

Although relatively rare in the general population, PSV is more common in individuals with varicose veins and KTWS syndrome. It should be considered as a differential in cases of recurrent varicose veins and/or chronic venous insufficiency of the lower limb.

Acknowledgement

We appreciate the role that the donors of the cadaver used herein in contributing to the furtherment of the study of Anatomy both as a science and as a field of medicine.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Author Contributions

VK: protocol/project development; manuscript writing/editing, review and approval of the manuscript; DO: data collection and analysis, review and approval of the manuscript; FN: data collection and analysis, review and approval of the manuscript; IC: protocol/project development; manuscript writing/editing, review and approval of the manuscript; WN: data collection and analysis, review and approval of the manuscript; MM: data collection and analysis, review and approval of the manuscript; JM: protocol/project development; manuscript writing/editing, review and approval of the manuscript; BO: protocol/project development; manuscript writing/editing, review and approval of the manuscript.

Ethics Approval

This study was conducted in accordance with the ethical guidelines of the Helsinki Declaration and its later amendments. Ethical provision for this cadaveric study is as provided in the constitution under CAP 249 of the Human Anatomy act.

Funding

None.

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Conflict of interest statement: No conflicts declared.

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