

CASE REPORT

Beyond The Ordinary: A Case of a Unilateral Persistent Sciatic Vein

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Abstract

Uncommon anatomical variations in venous structures continue to intrigue anatomists and clinicians alike. Here, we present a rare case of a unilateral persistent sciatic vein observed in the left thigh of an adult male cadaver. Unlike the commonly associated Klippel-Trenaunay-Weber syndrome, this finding emerged as an isolated phenomenon. During routine dissection, a conspicuous enlarged sciatic vein of lower type

morphology was discovered in the left lower limb. This prominent vein, comparable in size to the sciatic nerve, originated from the confluence of posterior tibial, central soleal and peroneal veins at the distal end of the popliteal fossa. It ran a short course along the posterior thigh medial to the sciatic nerve, before terminating into the profunda femoris vein. This case underscores the importance of recognizing rare venous anatomical occurrences, such as a persistent sciatic vein, which may predispose one to deep vein thrombosis.

Key Words: *Persistent sciatic vein; Variant venous anatomy; Deep vein thrombosis; Posterior tibial vein; Peroneal vein; Central soleal vein*

Introduction

The sciatic vein drains the lower limb during embryonic life and usually regresses after development of the popliteal vein and the small saphenous vein in the 50 mm crown rump length embryo [1]. The sciatic vein, a developmental vessel integral to the formation of the deep venous system in the lower limb, typically assumes a dorsal course adjacent to the path of the sciatic nerve [2]. As the definitive deep venous system matures, the sciatic vein ordinarily undergoes involution, contributing to the formation of the inferior gluteal vein, satellite vein of the sciatic nerve, and perforating veins of the lower limb [3]. However, in some instances, this regression may not occur, leading

to the persistence of the sciatic vein in the form of the persistent sciatic vein (PSV), also known as vena comitans nervi ischiadici persistens [3].

The phenomenon of PSV represents a rare anatomical anomaly, usually found in association with other vascular anomalies, such as Klippel-Trénaunay syndrome (KTS) and Parkes Weber syndrome (PWS). However, it can also occur as an isolated anomaly. KTS, is an uncommon congenital vascular disorder, distinguished by a triad of capillary malformation, varicose veins, and hypertrophy of soft tissues and bones [4,5] PWS manifests in a similar fashion as KTS with addition on arteriovenous malformations [2]. The PSV, when present, exhibits distinct forms

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as described in previous literature [6]. It may be of the complete type, originating from the popliteal vein, ascending alongside the sciatic nerve, and culminating in the internal iliac vein. It may be of the upper type, emerging from the muscular veins of the upper thigh, coursing parallel to the sciatic nerve, and terminating in the internal iliac vein, or, it may be of the lower type, confined to the distal thigh, arising in the popliteal fossa, and terminating in the deep femoral vein.

This condition, although infrequently encountered, holds a significant clinical relevance due to its potential implications for venous return and its possible association with lower limb pathologies such as reflux in chronic venous disease [7]. In the ensuing case, we delve into the unique occurrence of a large unilateral lower type of PSV discovered during routine dissection. The aim of this report extends beyond the presentation of a singular case, as we delve into the anatomical, embryological, and clinical aspects of the persistent unilateral sciatic vein, emphasizing its significance and potential ramifications for patient care. This case underscores the importance of recognizing rare venous anatomical occurrences, elucidating their characteristics, and implications in DVT, necessitating heightened awareness among medical practitioners.

Case Report

We present a rare case of a unilateral persistent sciatic vein observed in the left thigh of a middle-aged adult male cadaver of unknown cause of death. This finding emerged as an isolated phenomenon. During routine dissection at the Department of Human Anatomy at the University of Nairobi, Kenya, a conspicuous enlarged sciatic vein was discovered in the left lower limb. This prominent vein, comparable in size to the sciatic nerve, originated from the confluence of posterior tibial, central soleal and peroneal veins at the distal end of

the popliteal fossa. It ran a short course along the posterior thigh medial to the sciatic nerve, before terminating into the profunda femoris vein. The popliteal vein was formed by the anterior tibial vein and muscular veins from the gastrocnemius. The right lower limb had normal venous anatomy and was free from any other variations.



Figure 1) Cadaveric dissection image of the left posterior distal thigh illustrating the following: N- Sciatic Nerve, V-Sciatic Vein, BF- Biceps Femoris Muscle, ST- Semitendinosus Muscle.

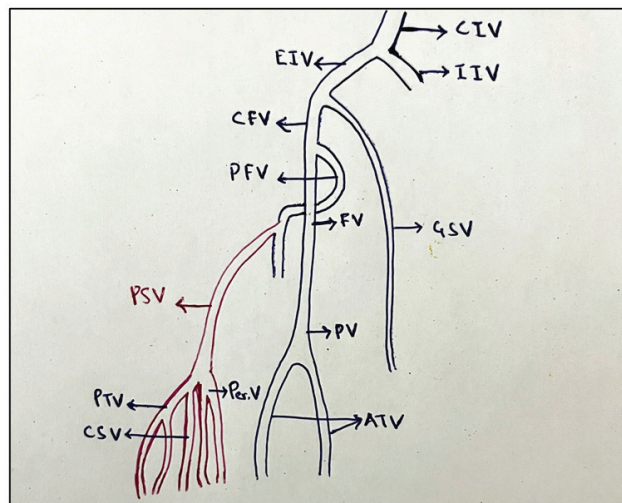


Figure 2) Sketch of the variant venous network illustrating the PSV (Persistent Sciatic Vein), formed by union of the PTV (Posterior Tibial Vein), CSV (Central Soleal Vein) and PerV (Peroneal Vein) and its termination into the PFV (Profunda Femoris Vein). The other veins are labelled as follows: ATV (Anterior Tibial Vein), PV (Popliteal Vein), FV (Femoral Vein), CFV (Common Femoral Vein), GSV (Great Saphenous Vein), EIV (External Iliac Vein), IIV (Internal Iliac Vein), CIV (Common Iliac Vein).

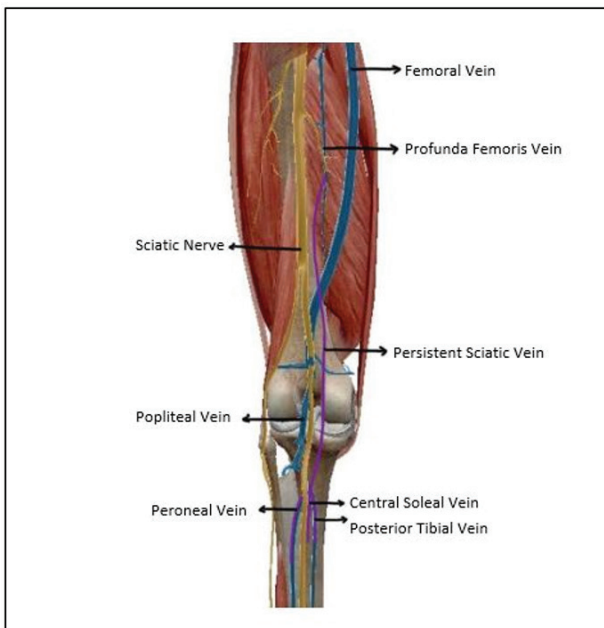


Figure 3) Anatomical Schema of the left posterior thigh and leg illustrating the Persistent Sciatic Vein.

Discussion

The sciatic vein is an embryonic venous structure that typically regresses during embryonic development, being supplanted by the mature venous pathways of the lower limb [8]. However, in the case presented, the persistence of the sciatic vein is evident, resulting in a unilateral variant. This pattern of formation of the persistent sciatic vein has not been reported in previous literature to the best of our knowledge. It predisposes to an increased risk of deep vein thrombosis due to increased turbulence as a result of abrupt venous connections.

Anomalies in venous development can stem from disturbances in the genetic and molecular mechanisms that govern vascular remodeling [9]. The persistent sciatic vein could be a result of aberrant interactions between signaling pathways responsible for venous regression, potentially involving factors like Vascular Endothelial Growth Factor (VEGF) and Notch signaling [10].

The precise prevalence of PSV within the general population remains uncertain. Emerging evidence suggests potential correlations between PSV and certain conditions, such as

recurrent varicose veins of the lower limb [3]. A study by Trigaux et al. identified PSV in 0.5% of cases through ascending phlebographies and varicographies [11]. Variable prevalences of PSV has been observed among individuals with Klippel-Trenaunay-Weber syndrome (KTWS), with studies reporting prevalence ranging from 20% to 48% within this specific population [6,12].

PSV can manifest unilaterally or bilaterally and may appear as a single substantial vein or a network of veins. Additionally, it may coincide with a persistent sciatic artery or exhibit distinct forms [3,13,14]. While the persistent unilateral sciatic vein is often asymptomatic, it can have implications for venous return and potentially increase the risk of thrombotic events including pulmonary thromboembolism [6,11,15]. The altered venous drainage caused by the persistence of the sciatic vein could disrupt the normal flow dynamics in the lower limb, potentially predisposing the patient to venous stasis and thrombosis this in turn can cause swelling of the lower extremity with associated pain [2,7,16]symptomatology, and pathophysiology associated with the sciatic nerve (SN. Venous varicosities in the lower extremities have attributed to incompetence of the PSV [17].

The embryological basis of the persistent unilateral sciatic vein lies in the complex process of vascular development and regression. During embryogenesis, the lower limb veins undergo a series of dynamic changes to establish a functional venous system. The sciatic vein, originating from the lateral venous plexus, typically regresses as the fetal limbs differentiate into distinct structures [1]. Evolutionary evidence points to the loss of the vein with lengthening and increased rigidity of the lower limb; its persistence in human adults is an atavistic feature. This anatomical anomaly underscores the intricate balance between genetic programming, signaling pathways,

and mechanical forces that shape the vascular system during development [10].

The diagnosis of a persistent unilateral sciatic vein can be challenging due to its rarity and the lack of awareness among clinicians. Non-invasive radiological imaging techniques, such as Doppler ultrasound and magnetic resonance imaging, play a crucial role in identifying this anomaly and have largely replaced the traditional invasive methods such as varicography and ascending phlebography [3,14]. Increased awareness and consideration of this anatomical variation in the differential diagnosis of lower limb venous disorders are vital to ensure accurate patient management.

The treatment of PSV is variable and depends on the severity of the symptoms. In less severe cases, conservative measures, such as compression stockings and elevation of the leg, may be sufficient to relieve the symptoms [2]. However, if severe symptoms are present, treatment options may include sclerotherapy or surgery. Due to the infrequent occurrence of PSV, standardized management techniques are still developing. Asymptomatic cases usually require no action, while treatment is necessary for those with recurring varicose veins in the PSV area. Minor cases may be suitable for procedures like stab avulsion, stripping, or varicosity excision. Severe cases of claudication

might call for surgical removal of the PSV, if there's a functioning superficial and deep femoral venous system [12-14]. In femoral venous system hypoplasia, reconstruction could involve using the great saphenous vein from the unaffected side via a popliteal vein-great saphenous vein anastomosis [3,12]. The prognosis for patients with PSV is generally good. With appropriate treatment, most patients experience significant improvement in their symptoms [6].

While the management of PSV remains tailored to individual cases, a deeper understanding of its clinical implications and therapeutic options will undoubtedly facilitate improved patient care. Further research is warranted to elucidate the underlying mechanisms of PSV development, refine diagnostic approaches, and establish evidence-based management strategies.

Conclusion

Although a rare anomaly, clinicians should be aware of PSV when evaluating patients with lower limb venous insufficiency or unexplained lower limb edema. Furthermore, the presence of a persistent sciatic vein should be considered during surgical procedures in the gluteal and sciatic regions, as its inadvertent ligation or damage could lead to iatrogenic injury and other complications.

References

1. Jean-François UH. Focus on venous embryogenesis of the human lower limbs. *Phlebology*. 2015;22:55-63.
2. Rovira OJ, Repollet-Otero C, Rodriguez LE, et al. Symptomatic, unilateral, isolated, complete persistent sciatic vein. *J Vasc Surg Venous Lymphat Disord*. 2018;6:104-6.
3. Kipkorir V, Ochieng D, Nyaanga F, et al. A large unilateral persistent sciatic vein: a case report. *Anatomy* 2022;16:127-30.
4. John PR. Klippel-Trenaunay syndrome. *Tech Vasc Interv Radiol*. 2019;22:100634.
5. Asghar F, Aqeel R, Farooque U, et al. Presentation and management of Klippel-Trenaunay syndrome: a review of available data. *Cureus* 2020;12:e8023.
6. Cherry KJ, Gloviczki P, Stanson AW. Persistent sciatic vein: diagnosis and treatment of a rare condition. *J Vasc Surg*. 1996;23:490-7.
7. Labropoulos N, Tassiopoulos AK, Gasparis AP, et al. Veins along the course of the sciatic nerve. *J Vasc Surg* 2009;49:690-6.

8. Byung-Boong LE. Venous embryology: the key to understanding anomalous venous conditions. *Damar Cer Derg.* 2012;19:170-82.
9. Uhl J-F, Gillot C. Anatomy, and embryology of the small saphenous vein: nerve relationships and implications for treatment. *Phlebology J Venous Dis.* 2013;28:4-15.
10. Gridley T. Notch signaling in the vasculature. *Curr Top Dev Biol.* 2010;92:277-309.
11. Trigaux JP, Vanbeers BE, Delchambre FE, et al. Sciatic venous drainage demonstrated by varicography in patients with a patent deep venous system. *Cardiovasc Intervent Radiol.* 1989;12:103-6.
12. Noel AA, Gloviczki P, Cherry KJ, et al. Surgical treatment of venous malformations in Klippel-Trénaunay syndrome. *J Vasc Surg.* 2000;32:840-7.
13. Buyukertan M, Soztanacı US, Balcıoğlu HA. Persistent sciatic vein. *Folia Morphol.* 2022;81:1062-5.
14. Victor Mathias Dias S, Flumignan RLG, Iared W, et al. Persistent sciatic veins. *J Vasc Ultrasound.* 2023;47:97-101.
15. Srisuwan T, Arworn S, Rerkasem K. Case series of isolated primary persistent sciatic vein. *Int J Low Extrem Wounds.* 2013;12:219-22.
16. Trihan J-E, Perez-Martin A, Thollot C, et al. Thrombosis of previously silent Persistent Sciatic Vein in non-Klippel-Trenaunay syndrome patient. *JMV-J Médecine Vasc.* 2020;45:13-7.
17. Jung SC, Lee W, Chung JW, et al. Unusual causes of varicose veins in the lower extremities: CT venographic and Doppler US findings. *Radiographics.* 2009;29:525-36.