

Original

ARTICLE

PERSISTENT SCIATIC VEINS AND SCIATIC NERVE VARICOSITIES

DAVID JENKINS, MB BS, FACP

Introduction

Persistent sciatic vein and sciatic nerve varicosities are a relatively rare presentation of varicose veins being reported in approximately 1% on patients¹. They are essentially the persistence of embryological remnants and can be found surrounding the sciatic nerve or its distal branches and are more commonly associated with the common peroneal nerve². Persistent sciatic veins were predominantly identified by phlebography in years past, particularly in association with Klippel-Trenaunay syndrome³. With the improvement in, and more frequent use of duplex imaging, these veins and their associated nerves should be readily identifiable⁴.

Embryology

Embryological development of the veins of the lower limb can be divided into axial and pre-axial veins (Figure 1). The axial veins give rise to the sciatic vein. The pre-axial veins develop in association with the femoral vessels and great saphenous vein⁵. The sciatic vessels are the predominant vessels of the developing lower limb until the 22mm stage, after which they involute and the femoral system develops as the major vascular supply⁶.

The aetiology of vascular abnormalities is poorly understood. It is thought to be a complex mesenchymal developmental fault due to the high incidence of associated capillary malformations, atypical varicose veins, bone or soft tissue hypertrophy and arterio-venous malformations;

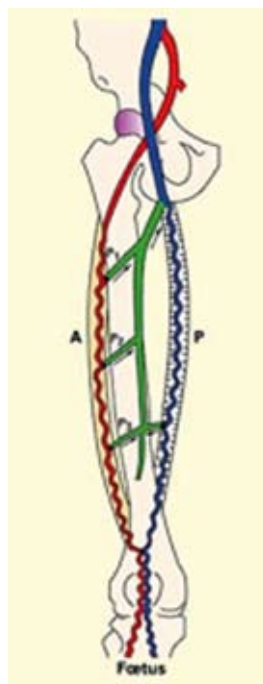
ABSTRACT

Aim: To summarise the anatomy of veins associated with the sciatic nerve and identify specific treatment recommendations if available.

Methods: A search of e-journals was made via Journals@Ovid, Science Direct and SpringerLink as was the "Phlebologie" website. The terms used in the search included various combinations of Persistent Sciatic Vein and Sciatic Nerve Varices.

Results: There are relatively few articles discussing persistent sciatic vein (PSV) and varicosities of the sciatic nerve. The larger persistent sciatic veins are generally seen in conjunction with Klippel-Trenaunay syndrome. Smaller PSVs are seen as the proximal extension of superficial varicosities presenting on the lateral aspect of the calf below the popliteal crease.

Conclusions: The anatomical variants of sciatic nerve varicosities are reported as being rare though have been reported in approximately 1% of patients. As clinicians and sonographers may not be routinely looking for these veins, the incidence of these variations could be significantly higher than is currently recognised. Looking for these veins should be included in the routine sonographic surveillance of the superficial and deep venous systems.



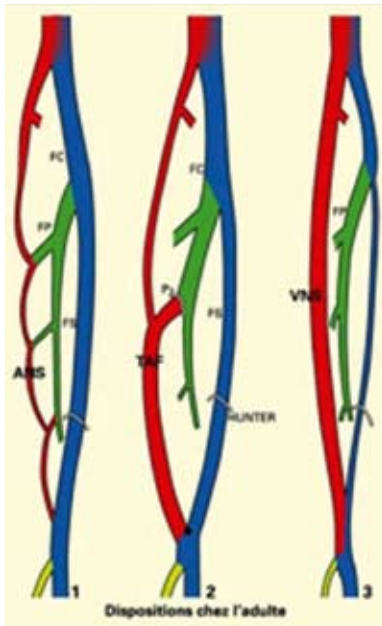
abnormalities of the deep venous and lymphatic systems can also occur⁷. Persistence of the sciatic artery (PSA) or sciatic vein (PSV) may be a failure of development of femoral vessels or failure in regression of the sciatic vessels⁶.

Figure 1: Axial and Pre-axial Veins. Gillot C. (2000) *Le prolongement post-axial de la petite veine saphène. Étude anatomique. Considérations fonctionnelles. Intérêt pathologique. Phlébologie Vol 53: 299.*

Address Correspondence to: David Jenkins MB BS FACP.
Suite 24, 12 Railway Pde, Burwood NSW 2134 Australia.
Email: djenkins@sovein.com.au

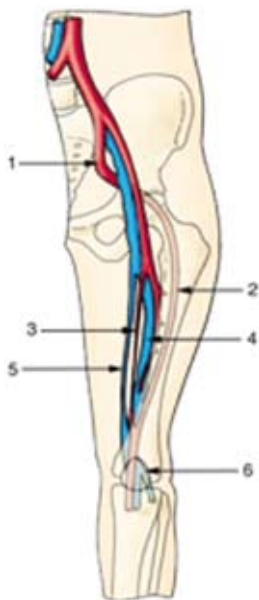
Anatomy

Persistence of sciatic veins may take a number of forms. Gillot⁵ describes three variants of persistent sciatic vein seen in adults (Figure 2): (i) a more frequent finding with axial veins persisting as small arcades communicating with the profunda femoris vein (ii) the distal sciatic vein persisting resulting in two deep vein outflow paths for the thigh and (iii) the rare persistence of the sciatic vein as the major outflow tract for the lower limb.



Cherry et al also described three similar anatomical variations of PSV and called them: (i) complete PSV – if it traversed the entire length of the thigh and buttock, (ii) upper PSV – if it involved the buttock and upper thigh and (iii) lower PSV - if it was limited to the distal and middle thigh⁸.

Figure 2: Three variants of persistent sciatic veins. Gillot C. (2000) *Le prolongement post-axial de la petite veine saphène. Étude anatomique. Considérations fonctionnelles. Intérêt pathologique. Phlébologie* Vol 53: 299.



Parry et al described a case of persistent PSA and PSV with Figure 3 being the schematic representation of the complete persistence of both sciatic vessels⁷. The PSV was ectatic and incompetent. It refluxed into the popliteal vein and subsequently the small saphenous vein which showed aneurysmal dilatation.

Figure 3: Persistent sciatic vein and artery. Parry D, Aldoori M, Hammond R, Kessel D, Weston M, Scott D (2002) *JVasc Surg* Vol 36:399

1. Ectatic hypogastric artery gives rise to PSA.
2. PSA passes through the sciatic notch and posteriorly down the thigh to the popliteal artery
3. Femoral artery is aplastic and profunda femoris artery is patent
4. PSV courses posteriorly emptying into profunda femoris vein and thence the femoral vein
5. Femoral vein is hypoplastic
6. Small saphenous vein drains into popliteal vein

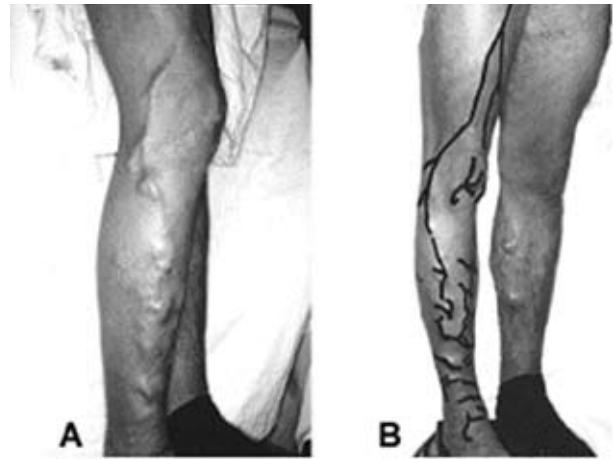


Figure 4: Incompetent lateral embryonic vein. Noel A, Glociczki P, Cherry K, Rooke T, Stanson A, Driscoll D. (2000) *Surgical treatment of venous malformations in Klippel-Trenaunay syndrome. J Vasc Surg* Vol 32:841

Noel et al describe 11/20 patients with PSV who underwent surgery for venous problems associated with Klippel-Trenaunay syndrome as having “large lateral embryonic veins”⁹. These veins are not defined anatomically, and from the associated photograph and description, appear to be tributaries of the anterior accessory great saphenous vein. The presentation as an “embryonic vein” highlights poor anatomical classification and the absence of consistency for the nomenclature of leg veins. The sciatic vein is included in the 2002 international consensus statement on nomenclature of the veins of the lower limbs¹⁰ and is again listed in the extensions and refinements statement of 2005¹¹.

“A) A 19 year old man with a large incompetent lateral embryonic vein extending from the ankle to the saphenofemoral junction. B) Same patient is allowed to stand for 5 minutes, and the veins are marked with ink pen before vein stripping and avulsion of varicosities.”

Longitudinal duplex image of a patent and competent PSV. The sciatic nerve (SN) is clearly seen. Both structures lie

deep to the biceps femoris muscle (BFM).

Transverse view from the same patient in Figure 5 above. The sciatic nerve is seen to lie adjacent to the PSV below the SN annotation.

Incidence

PSV is seen in clinical practice as an uncommon anatomical variant. It has been reported on numerous occasions in connection with Klippel-Trenaunay syndrome. Noel et al found that 20% of patients (4/26) with Klippel-Trenaunay syndrome had PSV⁹. Cherry et al reported 48% of patients (20/41) with Klippel-Trenaunay syndrome having PSV and one patient with PSV who complained of posterior thigh pain who underwent MRI but did not have Klippel-Trenaunay syndrome. They noted PSV to be unilateral in 90.5% of patients (19/21) and bilateral in 9.5% of patients (2/41)⁸. There is no published data on the overall incidence PSV in the general population. Cases of persistence of both the sciatic artery and vein appear to have been reported on three occasions in the English literature⁷. PSV has been reported in association with recurrent varicose veins².

Creton et al looked at a group of 24 women presenting with pelvic venous incompetence, each of whom had a competent sapheno-femoral junction. Two of these patients were reported as having varicosities of the sciatic or fibular [peroneal] nerve¹². Labropoulos et al found that in a cohort of 835 limbs with chronic venous insufficiency, 84 (10%) were found to have non-saphenous vein reflux and of these, 9 (10%) were found to have incompetent veins from the sciatic nerve¹.



Figure 5: Longitudinal duplex image of PSV. Author's file copy (2007)

Signs and Symptoms

Hamilton et al report a case of a 27-year-old patient who suffered persistent aching in the calf following an episode of superficial thrombophlebitis in varicosities involving the sural nerve that were subsequently traced proximally to a PSV¹³ and Cherry et al describe a patient with PSV who suffered sciatic type thigh pain though had no other associated vascular abnormalities⁸. PSV can be found in the investigation of varicose veins in patients with no symptoms attributable to the PSV itself⁸. Ricci et al reported four cases who suffered sciatic type pain in the buttock and thigh that radiated to the lateral aspect of the leg. In all four cases the sciatic nerve varices were visible distal to the popliteal crease, lateral to and separate from the small saphenous vein. Thumb pressure over the area on the popliteal crease where the varicosities became subfascial (disappeared externally) evoked sciatic type pain².

Investigation

Cherry et al reported MRI diagnosis in 21 patients. The diagnosis was additionally evident by ascending or descending phlebography, one patient on CT scan and one on magnetic resonance angiography (MRA)⁸. Almost a decade later Ricci et al indicated PSV can be well visualised on duplex scanning. With newer generation duplex machines the thigh segment of PSV in these patients was readily seen with a 7.5-10MHz probe. These veins were only 2 to 3mm in diameter and often presented as multiple channels that spiralled around and within the sciatic nerve². Unusual veins such as the popliteal-profunda vein, persistent sciatic vein, vein of the sciatic nerve and vein of the popliteal fossa



Figure 6: Transverse duplex image of PSV. Author's file copy (2007)

have been documented with the use of duplex scanning⁴. The high incidence of non-saphenous sources of reflux underlines the necessity of colour-flow duplex scanning as a diagnostic tool for the assessment of venous disease¹.

Management

Management is directed at the alleviation of symptoms such as sciatic pain, heaviness and aching in the lower limbs or for the treatment of reflux to associated distal varicose veins. Cherry et al reported surgical excision of PSV in 2/41 patients (9.5%) with Klippel-Trenaunay syndrome, the remainder requiring no specific therapy⁸. Of the patients described by Ricci et al, three were treated by surgical excision and one by foam ultrasound guided sclerotherapy using 1% Laureth-9².

Complications

With regard to Klippel-Trenaunay syndrome, Cherry et al indicated that 24% of their patients had a history of pulmonary embolism with a fatal PE in one female patient aged 22. One patient had a caval filter inserted. None of these patients had complaints due to PSV alone with their problems being associated with KTS⁸. It would seem reasonable to expect that thrombosis could occur in ectatic PSV resulting in PE. The groups treating varicose veins secondary to PSV reported no complications.

Discussion

In a dedicated phlebology practice both clinicians and sonographers need to be aware of the uncommon and rare. With veins of the sciatic nerve being present in approximately 1% of patients¹, most phlebologists should be seeing this anatomical variant on a regular basis. Looking for these veins should be included in the routine sonographic surveillance of the superficial and deep venous systems.

There is relatively little published data on both PSV and veins of the sciatic nerve. This makes specific treatment guidelines impossible to give. Each patient needs to be assessed on an individual basis regarding the possible risks and benefits of proposed treatment, whether by surgical or non-surgical techniques. While injury to the peroneal nerve is a well documented complication of small saphenous vein surgery¹⁴ it will be interesting to see whether ultrasound

guided foam echosclerotherapy will provide a safer and more effective treatment for varicosities associated with PSV and varicosities of the veins of the sciatic nerve.

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