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Case Report

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UNILATERAL VARIATION IN THE COURSE AND TERMINATION OF SMALL SAPHENOUS VEIN: A CASE REPORT

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ABSTRACT

Variant anatomy of the superficial veins of the lower limb is clinically important in the management of chronic venous disease. The superficial veins are commonly accessed for intravenous cannulation and for coronary bypass grafts. In majority of the limbs, small saphenous vein opens into the popliteal vein. A variation in the termination of right small saphenous vein was observed in a male cadaver. The origin and course of the small saphenous vein in the leg was normal. However, the vein extended cranially and deep into posterior compartment of the thigh, without any communication with the popliteal vein. It pierced the adductor magnus muscle to drain into the femoral vein in the anterior compartment of the thigh. The high level of termination of small saphenous vein would make its exposure difficult during surgery for varicose veins. The occurrence of high termination can be determined by Doppler studies. It is hereby relevant for radiologists and surgeons to be aware of such variation.

KEYWORDS: Small saphenous vein, Great saphenous vein, Femoral vein.

INTRODUCTION

Venous anatomy of the lower limb is variable and many studies have described different types of termination of small saphenous vein. The short saphenous vein (SSV) is the continuation of the lateral marginal vein. It ascends posterior to lateral malleolus and lateral to tendocalacaneus lying in the subcutaneous tissue. It pierces the deep fascia and passes between the gastrocnemius muscles and terminates in the popliteal vein, 3-7.5 cm above the knee joint.[1] SSV may terminate in the great saphenous vein (GSV) in the thigh or bifurcate and join the GSV and popliteal vein or terminate distal to knee joint in the GSV or sural vein.[1]

De Oliveria et al. classified the mode of termination of small saphenous vein into three different types: Type 1 – into the popliteal vein, Type 2 – into the deep veins or veins of back of the thigh and Type 3 – into leg veins without terminating into popliteal vein.[2] We are reporting a unique presentation of the right small saphenous vein observed during routine dissection of a male cadaver.

CASE REPORT

The lower limb dissection in a 50 year old male cadaver disclosed a variation in course and drainage of SSV in the right limb. The origin and course of the right SSV was normal in leg. However, it extended towards the apex of the popliteal fossa between the tibial and common peroneal nerve. In the back of the thigh, the SSV traversed between the biceps femoris and semimembranosus muscles, on the adductor magnus muscle, deep to the sciatic nerve. In the upper third of the back of the thigh, it pierced the adductor magnus muscle and entered anteriorly into the femoral triangle (Fig. 1). In the femoral triangle, it drained into the posterior aspect of the femoral vein at the junction of the profunda femoris and femoral vein (Fig. 2). The GSV of same side had a normal course, but was smaller in size. An accessory anterior saphenous vein was observed which, after piercing the saphenous opening, drained into the GSV, close to the sapheno-femoral junction (Fig. 2). The superficial veins of the left lower limb had a normal anatomy.

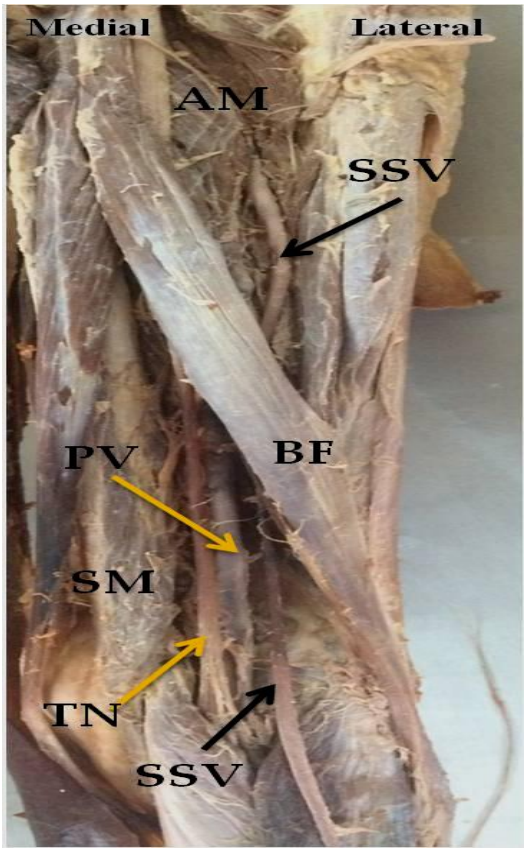

Fig. 1: Back of the right thigh showing the SSV. (PV-Popliteal vein, SSV- Small Saphenous vein, TN-Tibial n., BF- Biceps Femoris, SM- Semimembranosus, AM-Adductor magnus.

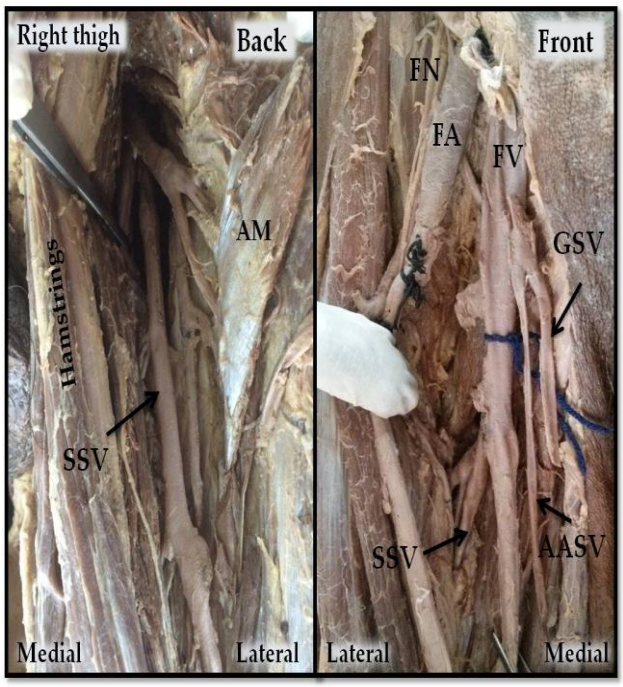

Fig. 2: Right thigh showing the termination of SSV. (FA-Femoral artery, FV-Femoral vein, SSV-Small Saphenous vein, GSV-Great saphenous vein, AASV–Anterior accessory saphenous vein, AM-Adductor magnus, FN- Femoral nerve).

DISCUSSION

Variant anatomy of the superficial veins have been studied by cadaveric dissection, venography and also by Doppler ultrasound. These studies have reported that in majority of the cases, the SSV terminates into the popliteal vein.[2,3] In 1873, Giacomini studied the SSV termination in 51 limbs by dissection and observed the thigh extension of the SSV and its anastomosis with the GSV in 72% of the limbs, which is now called "Vein of Giacomini".[4] The SSV might continue up the thigh to terminate in the internal iliac vein with or without communicating with the popliteal or profunda femoris vein.[5]

Delis et al. found Giacomini vein in 70.4% (212 of 301 limbs), which drained into the GSV in 49.5% and in posterior thigh muscle veins in 27.4%.[3] Sapheno-popliteal junction was observed in 236 of 301 limbs, 65% (153 of 236) of which extended into thigh and 51% (78 of 153) of them joined the GSV. In 21.6% (65 of 301), SSV extended into the thigh without saphenopopliteal junction and 40% of them joined the GSV.[3] In the present report, no communicating branches were observed between the SSV and popliteal vein or GSV.

Kosinski described three different patterns of SSV termination with subtypes.[6] In type-1, the SSV terminates in the region of knee joint into popliteal vein or divides into two branches and terminates into both the GSV and popliteal vein. In type-2, high termination of the SSV into posterior deep veins of the thigh or the GSV or both. In type-3, low termination of SSV, either into GSV or into the deep veins of calf, below the knee joint. In their study, the SSV extended into the back of the thigh without terminating into popliteal vein in 33% of the 120 dissections. De Oliveria et al. studied the mode of terminations of SSV using colour Doppler ultrasound based on Kosinski classification.[2] Type-1 termination was predominant, found in 52.8%. Type-2 was observed in 44.4%, with 28.6% terminating into the deep veins of the thigh, 5.6% into the GSV and 10.2% draining into both. Type-3 termination was found in 2.8%. There was no significant difference in genders.[2] In another study by duplex ultrasound scanning, the thigh extension of SSV was observed in 22% of the limbs.[7]

The SSV termination is classified as low if the vein drained into deep veins more than 2 cm below the popliteal skin crease, high if it terminated between 7 – 12 cm above the popliteal crease and very high if the extended more than 12 cm into the thigh. A typical saphenopopliteal junction is situated within 7 cm above and 2 cm below the popliteal skin crease.[3] Incompetency of veins with very high SSV termination will be difficult to approach surgically with popliteal incision.[3]

Shetty et al. described a case similar to that of the present report.[8] In their observation, the SSV pierced the

adductor magnus muscle in the middle of the back of thigh to enter the anterior compartment and drain into the femoral vein in the apex of the femoral triangle. Furthermore, the SSV communicated with the popliteal vein. However, the anatomy of the GSV was not mentioned in their report which we assume to be normal. Whereas in the present case, the SSV did not communicate with the popliteal vein and the GSV was of small caliber with an anterior accessory saphenous vein draining into it. The incidence of the anterior accessory saphenous vein passing through the saphenous opening is 06%.[9]

The GSV and SSV are pre-axial and post axial vein of the lower limb bud respectively. The first embryonic vein is the lateral/posterior fibular vein (LFV) which opens into the posterior cardinal vein. The LFV gives rise to anterior tibial vein and a connecting branch. The anterior tibial vein and the LFV form the sciatic vein, the second embryonic vein. The part of the LFV distal to the anterior tibial vein becomes the SSV. Subsequently, the SSV opens into the popliteal vein due to the growth and elongation of the limb. The connecting branch grows medially and communicates with the third embryonic vein, the femoral vein which opens into the posterior cardinal vein. Further evolution of the third embryonic vein forms the GSV.[6,10] Anastomoses between these veins may remain patent or disappear, resulting in variations in the anatomy of the veins.

Our report points out a rare variation in the mode of termination of superficial veins of the lower limb. Anticipation of these variations will be valuable in the diagnosis and management of varicose veins and also in coronary bypass procedures.

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