



VARIATIONS IN THE TERMINATION OF SMALL SAPHENOUS VEIN – A GENDER BASED CADAVERIC STUDY IN INDIAN POPULATION.

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ABSTRACT

BACKGROUND – The various modes of termination of the small saphenous vein is important to prevent recurrent varicose veins in humans.

AIM - To study the course and different modes of termination of the small saphenous vein in both the sexes.

METHOD – 60 formalin hardened lower limbs from both sexes were dissected and the entire course of small saphenous vein including its termination were noted and classified according to Kosinski classification.

CONCLUSION – The most common mode of termination of small saphenous vein was found to be into the popliteal vein irrespective of sex. However, other modes of termination were also seen. This knowledge is important for surgeons to prevent recurrent varicose veins following surgery.

KEYWORDS :

INTRODUCTION

Chronic venous diseases of the lower extremity are one of the common conditions affecting people in today's world. Varicose veins affect one out of two people aged 50 years and above and accounts to nearly 15 to 25 percent of all adults, seen more commonly in women than men. These if left untreated may lead to pulmonary embolism which has a mortality rate as high as 60-85%. Approximately 200,000 patients die every year across the world due to pulmonary embolism.¹

The venous system of the lower extremity includes the deep veins, which lie beneath the muscular fascia and drain the lower extremity muscles; the superficial veins, which are above the deep fascia and drain the cutaneous microcirculation; and the perforating veins that penetrate the muscular fascia and connect the superficial and deep veins.²

The superficial venous system includes the reticular veins as well as the great and small saphenous veins and their tributaries. The small saphenous vein is formed by the union of the lateral end of the dorsal venous arch with the lateral marginal vein, draining the lateral side of the little toe. It passes along the lateral side of the foot with the sural nerve and ascends along the lateral side of the tendon calcaneus (Achilles tendon), posterolateral to lateral malleolus. On the posterior side of the leg, the small saphenous vein passes on the deep fascia, between the two heads of the gastrocnemius muscle, to the popliteal fossa and usually terminates in the popliteal vein but its termination into the popliteal vein is highly variable.³

The different modes of termination of the small saphenous vein are classified as follows:

Type I - termination in the popliteal vein. This type has two subtypes: (a) termination exclusively in the popliteal vein, or (b) divided into two branches, one to the popliteal vein and the other to the greater saphenous vein.

Type II - termination in thigh veins or in deep veins (femoral vein/veins of the posterior aspect of the thigh) and/or in the greater saphenous vein. This type has three subdivisions: (a) deep veins of the thigh, (b) both the deep veins of the thigh and the greater saphenous vein, and (c) directly in the greater saphenous vein.

Type III - termination in leg veins, before reaching the popliteal region. This type has two subtypes: (a) termination in the greater saphenous vein of the leg or (b) in the gastrocnemius veins of the leg.⁴

The small saphenous vein has been the object of many studies, specially its anatomical features; considerable variations in its

trajectory and most of all its termination may contribute to recurrent varicose veins in the lower extremity. Experience gained from surgical removal of the small saphenous vein and repeated surgery following recurrence of a popliteal varicose vein after surgery of the small saphenous vein has shown us that the junction of the small saphenous vein was usually easily accessible via an incision in the popliteal fossa. In contrast, anatomical dissections of the small saphenous vein have revealed a high degree of variability in the level of anastomosis with the popliteal vein. This variability is not reflected in surgery for incompetent small saphenous vein. This discrepancy led us to speculate that the variation in the level of junction of small saphenous vein could be linked with an increased incidence of varicose veins.

Hence, understanding the various pattern of termination of small saphenous vein is important during investigative procedures involving phlebectomies. This is because the variant termination of small saphenous vein may contribute to recurrent varicose veins in this territory;

Also, the knowledge of superficial veins of lower limbs is useful for clinicians during coronary bypass procedures, as these vessels are commonly used in such surgeries. The long saphenous vein is often harvested for grafts and used both in peripheral and coronary arterial surgeries. It is therefore essential for surgeons before harvesting the great saphenous vein to look for abnormal drainage pattern of small saphenous vein into great saphenous vein.

This study aims at finding out the course and different modes of termination of small saphenous vein in both the sexes of 30 embalmed cadavers on which the dissection was performed at Medical College and Hospital, Kolkata over a period of 3 years.

MATERIAL AND METHODS

30 Embalmed cadavers were collected for the study and their lower limbs were dissected bilaterally (sample size -60). The cadavers were from both sexes and above 18 years of age. The cadavers were supplied by Department of Anatomy of Medical College and Hospital, Kolkata. All the cadavers were fixed and well maintained for more than a year in 10% formaldehyde solution. All properly embalmed cadavers without any amputated leg and disease free (no signs of venous ulcer, fracture) lower limb were taken into the study. Cadavers with pathological and macroscopical alterations in lower limbs like ulcers, signs or scar marks of varicose vein surgeries were excluded from the study.

All dissections were conducted following Cunningham manual of surgery with the use of a dissection box. The cadavers were placed on a suitable table in right or left lateral decubitus position. Cadavers with

termination extending to the greater saphenous vein were placed in dorsal decubitus position

The small saphenous vein was dissected carefully from the lateral malleolus and its trajectory was followed until it reached the popliteal fossa. On the popliteal fossa, the termination of the small saphenous vein was studied in more details. If it did not terminate into the popliteal vein, its course was further followed in the thigh and its termination in the great saphenous vein was noted. When the small saphenous vein presents more than one branch on the popliteal fossa, the branch with larger caliber was followed. Based on Kosinski classification, the data was registered in a protocol. Finally digital photographs were taken from different angles to show the small saphenous vein and its termination.

RESULTS

Among the 60 lower limbs dissected in this study, 24 were females and 36 were males. The study about the variation in the termination of the small saphenous vein showed Type I predominance in 55.56% (subtype a: 33.33%, and b: 21.67%) of cases. Type II was found in 40% (subtype a: 18.33%, b: 13.33%, and c: 8.34%), and Type III in 5% (subtype a: 3.33%, and b: 1.67%). The analysis between genders did not show significant difference, with predominance of Type I in males and females. In males, Type I was found in 55.56% (subtype a: 33.34%, and b: 22.22%); Type II in 38.89% (subtype a: 13.89%, b: 13.89%, and c: 11.11%); and Type III in 5.55% (subtype a: 2.77%, and b: 2.77%). In females, Type I was found in 54.16% (subtype a: 33.33%, and b: 20.83%); Type II in 41.67% (subtype a: 25%, b: 12.5%, and c: 4.17%); and Type III in 4.17% (subtype a: 4.17%, and b: 0%).

It was seen that type 1 subtype a i.e termination exclusively in the popliteal vein was most common mode of termination of small saphenous vein in both the sexes. The p value is 0.95677 for male and female comparison which is more than 0.05. This means that there is no statistical significant difference regarding the type of termination of small saphenous vein between males and females. Hence we can say that type 1a is the most common mode of termination irrespective of sex, though variations are also possible.

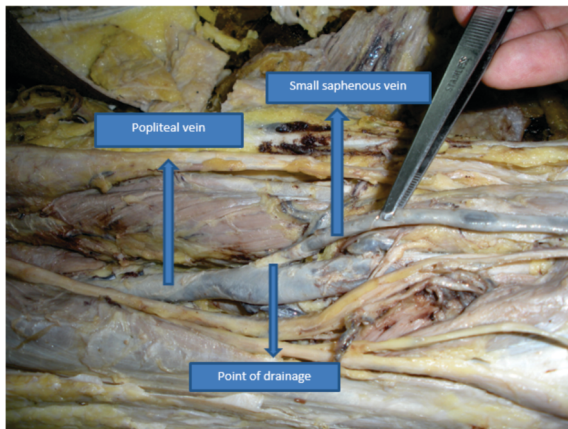


Fig 1 showing drainage of small saphenous vein into popliteal vein (Type 1 termination).

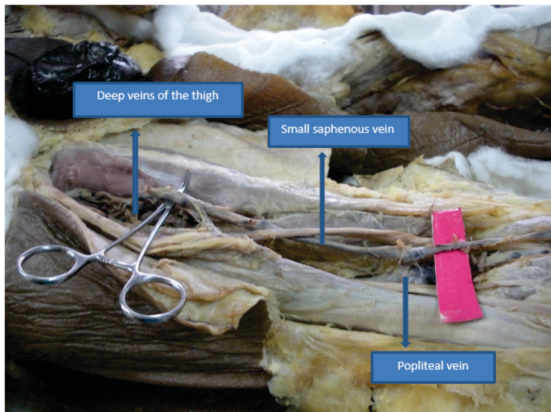


Fig. 2 showing the small saphenous vein draining into the deep veins of the thigh (Type 2 termination).

DISCUSSION

In our present study the analysis between genders did not show significant difference, with predominance of Type I in both males and females. In males, Type I was found in 55.56% (subtype a: 33.34%, and b: 22.22%); Type II in 38.89% (subtype a: 13.89%, b: 13.89%, and c: 11.11%); and Type III in 5.55% (subtype a: 2.77%, and b: 2.77%).

In females, Type I was found in 54.16% (subtype a: 33.33%, and b: 20.83%); Type II in 41.67% (subtype a: 25%, b: 12.5%, and c: 4.17%); and Type III in 4.17% (subtype a: 4.17%, and b: 0%).

This when compared to a study done by Aguinaldo de Oliveira et al⁴ in 20014 showed that in males Type I was 59% (subtype a: 50% and subtype b : 9%); Type II was 40% (subtype a: 26.5%, subtype b: 7% and subtype c: 6.5%); Type III was 1% (subtype a: 1% and b 0%). In females Type I was 51.3% (subtype a: 41.4% and subtype b: 9.9%); Type II was 45.5% (subtype a 29.1% ,subtype b 11% and subtype c 5.4%); Type III 3.2% (subtype a 2.2% and subtype b 1%).

Thus we can see regardless of gender, there is a predominance of the termination of the small saphenous vein in the popliteal vein, either exclusively, in cases of single termination, or in cases of multiple terminations, where the major branch communicates with the popliteal vein.

Table 1 – Comparison of the types of termination of the small saphenous vein between different studies:

Authors	No. Of Cases	Type 1 %	Type 2 %	Type 3 %	Type A (upper Third Of Thigh Or Buttock)%	Type 4 (drainage Into Gastrocnemius Veins)%
Kosinski 1926 ⁵	124	57.3	33	9.7%	-	-
Vasdeskis et al 1989 ⁶	64	60	30	10	-	-
Engel et al 1994 ⁷	104	52.4%	46.6%	1	63.2%	-
Labrapoulis et al 1997 ⁹	383	60.8	19.3	15.4	-	4.5
Cibor et al ⁹		59.5	30.5	10	-	-
Aguinaldo de Oliveira et al 2001 ⁴	1000	52.8	44.4	2.8	-	-
Present study	60	55.56	38.89	5.55	-	-

CONCLUSION

The small saphenous vein presents anatomical variations in terminations, termination in popliteal vein being the most common mode. It often terminates in thigh veins and seldom terminates in leg veins, irrespective of gender. This result is important for surgeons for better management of varicose vein operations.

REFERENCES

- Holier HR, Stronness E, Towne BJ, Calligaro K. Journal of Vascular surgery; New York 2004;3:1234-1240.
- Caggito A, Bergan J, Gloviczki P, Jantet G, Wendell-Smith C, Partsch H. Nomenclature of the veins of the lower limbs: an international interdisciplinary consensus statement. Journal of Vascular surgery 2002;36:416-422.
- Gardner E, Gray DJ, O'Rahilly. Angiographic study of small saphenous vein termination 4th edn, Rio de Janeiro 1975;12:196-199.
- Aguinaldo de Oliveira, Enrique Antonia Vidal, Graciliano Jose Fransco, Jefferson Toregiana. Anatomic variation study of small saphenous vein termination using colour Doppler. Journal of Vascular surgery 2004;3:223-230.
- Kosinski C. Observations on the superficial venous system of the lower extremity. J Anat 1926;60: 131-43.
- Vasdeskis SN, Clarke GH, Hobbs JT, Nicolaidis AN. Evaluation of non-invasive and invasive methods in the assessment of short saphenous vein termination. Brazilian journal of surgery 1989;76:929-932.
- Engel AF, Davies G, Keeman JN, Vdorj TA. Colour flow imaging of the normal short saphenous vein. European journal of vascular surgery 1994;8:171-181.
- Labropoulos N, Buckaman J, Size G, Wightman R, De Rosa C. Patterns of short saphenous vein termination. Journal of vascular technology 1997;21:5-9.
- Cibor Z, Cencora A. La veine saphène externe: données anatomique. J vas surg 1968;26:13-15.