



KASTURBA MEDICAL COLLEGE

MANGALORE

(A constituent unit of MAHE, Manipal)

**Anatomic description of the distal great saphenous vein-a
cadaveric study with clinical correlation**

**Committee: Institutional Ethics Committee, Kasturba Medical College,
Mangalore in Fulfillment for the**

By

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Date of Submission: 31st aug 2024

1. Introduction:

The great saphenous vein is the longest vein in the body, which originates as a continuation of the medial marginal vein in the medial aspect of the dorsal venous arch of the foot [1]. It ascends anterior to the medial malleolus obliquely in the medial aspect of the leg and thigh and ends by draining into the femoral vein at the saphenofemoral junction after piercing the cribriform fascia [2]. Getting vascular access is of paramount importance for the resuscitation of an acutely ill patient [3]. Even though the upper limb veins are targeted first

in gaining venous access, the distal great saphenous vein becomes a popular site in hemodynamically unstable patients with visually indiscernible veins, especially in a resource-poor setting [3]. Vascular access to the distal great saphenous vein can be achieved by percutaneous venous cannulation and distal saphenous venous cut-down, while the constant location of the vessel, its large caliber, having located on tough periosteum and thick wall of the vein facilitate these procedures [4].

The establishment of venous access is essential to the treatment and resuscitation of both the medically and traumatically ill patient. Adequate venous access allows the delivery of fluids, blood products, medications, and repeated blood sampling. [5]

The venous cutdown technique is a surgical procedure to gain venous access when relatively less invasive percutaneous procedures such as the Seldinger technique (percutaneous access), ultrasound-guided venous access, and intraosseous vascular access have failed. Percutaneous access can be difficult to achieve in certain patient populations (pediatric patients with small and nonpalpable veins, patients in hypovolemic shock with collapsed veins, patients with peripheral vascular disease with altered vascular anatomy) making venous cutdown a life-saving alternative.[6][7][8]

Venous disease is the most common cause of leg ulceration, and compression therapy improves venous ulcer healing. (9,10) Superficial venous reflux (varicose veins) is usually present in patients with venous leg ulcers. (11)

Knowledge gap identified:

The studies are scarce regarding the morphology of great saphenous vein as this is essential for the clinical practice. The implications include accurate cannulation of GSV, the saphenous nerve involvement during stripping surgery, the role of both GSV and SN in ulcer formation at medial malleolus and on dorsum of foot, ligation of perforators at ankle, summons more anatomical studies in this region.

2. Review of Literature.

Distal great saphenous vein was consistently located approximately 2.5 cm anterior to the medial malleolus, 4 mm deep to the skin and had a diameter of 4 mm. (12)

Similarly, the mean diameter of the vein is comparable to a previous study conducted on human saphenous venous grafts for cardiothoracic surgery where the reported diameter was 4.2 mm [13].

True duplications of the great saphenous vein at the ankle or accompanying large tributaries at this level, perhaps, could explain the double saphenous veins [14, 15]

Cochrane review states that saphenous venous cutdown takes longer to carry out compared to intraosseous access. We believe that the deficiencies of knowledge about the surface anatomy and dimensions of the great saphenous vein could be one of the reasons for longer procedure times in obtaining great saphenous venous access. [16] .

Therefore, using the dimensions described in our study may help improve the success rates of locating the saphenous vein, particularly in hemodynamically unstable patients with visually indiscernible veins in resource-poor settings.

Some surgeons now claim, however, that stripping of the distal part of that vein can be avoided, thereby reducing the risk of damage to the saphenous nerve. (17)

Sensory impairment in the saphenous nerve distribution after stripping of the long saphenous vein was noted in, the vein was stripped upward in one leg and downward in the other to determine whether the direction in which the vein is stripped contributes to the incidence of such sensory impairment. veins stripped upward demonstrated significant objective sensory deficits compared with those that had the veins stripped downward, fresh cadaver dissections were carried out. In four of five legs in which the vein was stripped in an upward direction, the pretibial branch was avulsed off the main trunk and in two of five,

the infrapatellar branch was avulsed. Such nerve avulsions did not occur on downward stripping. (18)

3. Shortcomings and limitations of the study

Gender difference will not be assessed since the shortage of female cadavers, and we use few amputated limbs done for various reasons of which the sex determination may be difficult.

4. **Aims:** The aim of this study was to describe the precise location of the distal great saphenous vein in relation to a prominent bony landmark and to obtain the external dimensions of the vessel which could help improve the success rate of percutaneous saphenous venous cannulation and saphenous venous cut-down procedure, especially in a resource-poor setting.

5. Objectives:

- a) to assess the distance between GSV and nearby bony landmarks
- b) to study its relations and understand the possibility of saphenous nerve injury during stripping procedure of GSV
- c) to determine the accurate distance of medial ankle perforators with bony prominences
- d) to study the morphology of distal GSV

a. Methodology:

- b. **Study setting:** The formalin-soaked cadaveric legs and foot will be taken. incision will be made on the leg at the junction of upper 2/3 rd. and lower 1/3rd.the same will be dragged till the head of 1st metatarsal passing along the medial border of tibia .Skin will

be reflected on either side of the incision .the distance will be noted from tibialis anterior, tibialis posterior ,and medial malleolus .the enclosure of GSV in relation with superficial and deep fascia in the vicinity will be recorded .the relation with saphenous will be recorded. The site of medial ankle perforators will be recorded with its origin to bony landmarks. the combined obtain information will be studied with clinical correlation of site for venipuncture, sensory injury during stripping ect will be noted and compared with similar previous studies done

c. Study design: This is an institutional based prospective study.

d. Inclusion criteria:

Adult embalmed cadavers irrespective of gender will be obtained from anatomy department

e. Exclusion criteria:

Limbs with visible deformity, with too stiffened limbs will be excluded.

f. Study duration: 4 months

g. Sample size: 50 cadaveric formalin fixed limbs

h. Sampling method: The sampling used for this study is based on the number of availability of specimens in our department.

i. Tool for data collection:

Digital calipers, digital camera with high resolution, SPSS software

j. Data collection methodology:

As and when we dissect the lower limbs, the morphology and morphometry of GSV will be studied.

Data analysis:

For all the parameters derived from the study we intend to use SPSS software (version 29, IBM, New York, USA) for the analysis

6. Implications:

Our study is useful in stripping surgeries of varicose veins to know the accurate location of the perforators, the relationship of the saphenous nerve to the great saphenous vein, to find out exact location of great saphenous vein in relations to the landmark, medial malleolus in precise in case of venesection or a canalization in acute emergency.

7. References.

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Form for submission of protocol to Institutional Ethics Committee, KMC, Mangalore	
I	INVESTIGATOR INFORMATION
1. Name of the investigator (in block letters)	Dr Latha V Prabhu
2. Official Address	Department of Anatomy, kmc bejai
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II	PROTOCOL INFORMATION
1. Title of the research project	Anatomic description of the distal great saphenous vein- a cadaveric study with clinical correlation
2. Name of the Guide (only for UG and PG students)	-
3. Name of the coguide/ co-investigator	Praveen Shenoy , Dr Rajanigandha vadagoankar -
4. Nature of Submission	
A. Undergraduate	-
B. Postgraduate / PhD	-
C. Staff	original study
III	PROTOCOL CHECKLIST (Tick the relevant boxes)
A. Title <input type="checkbox"/>	G. Implications of the study <input type="checkbox"/>
B. Introduction And Need For Study <input type="checkbox"/>	H. References in Vancouver style <input type="checkbox"/>
C. Review of Literature <input type="checkbox"/>	
D. Aims And Objectives <input type="checkbox"/>	
E. Materials And Methods – study design, sample size, methodology <input type="checkbox"/>	
F. Statistical Analysis <input type="checkbox"/>	

SIGNATURE OF THE INVESTIGATOR

SIGNATURE OF CO INVESTIGATOR/CO GUIDE

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