

Correlation of Great Saphenous Vein Diameter in Development of Reflux and Varicosity

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A B S T R A C T

Introduction: Varicose vein is a common venous problem usually affecting superficial veins of the lower limb and characterized by prominent vein, swelling, itchiness, pigmentation, and ulcer. Venous insufficiency can arise from obstruction, such as in the case of deep vein thrombosis (DVT) or valve incompetence as in saphenous reflux or post thrombotic syndrome.

Material and methods: The present study was carried out on 43 patients attending the outpatient and inpatient of Swaroop rani hospital, Department of General surgery and department of radiology over a period of 12 months. A written informed consent was obtained from all subjects prior to the performance of study related procedure.

Results: Majority of patients in both the groups were males, in the age group of 21-40 years. Most patients presented within 5 years of developing the disease. Both the limbs had equal incidence of disease occurrence. Most common symptom was swelling of limbs in 48.15% patients. Long duration of standing more than 8 hours was found to be significantly related to development of varicosity (p value= 0.0016). Mean great saphenous vein diameter was 6.91 ± 0.579 in the study group.

Conclusion: we conclude that occupations involving prolonged periods of standing are the major contributing factors for prevalence of varicose veins. Also, increasing diameter of great saphenous vein is directly related to development of reflux and varicosity.

Keywords: Great Saphenous Vein Diameter, Development of Reflux, Varicosity

INTRODUCTION

Chronic venous disease (CVD) is defined as abnormal functioning of the venous system caused by venous valve incompetence, which may affect the superficial or deep venous system or both. Limbs with CVD should be classified according to the CEAP system.¹ The seven categories of clinical classification are based on objective signs of CVD that are universally recognised.² Venous insufficiency can arise from obstruction, such as in the case of deep vein thrombosis (DVT) or valve incompetence as in saphenous reflux or post thrombotic syndrome.

Varicose vein is a common venous problem usually affecting superficial veins of the lower limb and characterized by prominent vein, swelling, itchiness, pigmentation, and ulcer. The prevalence of varicose vein in studies has shown to range from 5% to 30%.³ Obesity, age, parity, standing for long times, and family history are risk factors. Many patients undergo treatment of varicose veins for cosmetic reasons, other indications are edema of limb, difficulty in walking, pigmentation and non-healing ulcer.⁴ The introduction of non-invasive methods for preoperative evaluation of varicose veins, such as hand-held Doppler (HHD) and duplex ultrasound has been associated with marked changes in the

diagnosis and planning of treatment as compared with clinical assessment alone.⁵ Currently, colour flow duplex scanning is considered the gold standard for non-invasive anatomical and functional assessment of venous reflux (Dixon 1996).

The aim of this study was to investigate the correlation between great saphenous vein reflux and diameter change 2 cm below from saphenous femoral junction, to evaluate the best cutoff value for great saphenous vein diameter for predicting reflux and to analyze the various risk factors associated with varicose vein.

MATERIALS AND METHODS

All the cases of varicose vein of lower limb pain symptoms who attended surgical outpatient Department of M.L.N. Medical College, Allahabad, from September 1, 2018 to August 31, 2019 were taken for this study. As soon as patient came with complaints pertaining to peripheral arterial disease, complete history was taken and thorough clinical examination done.

Inclusion criteria

- Numbness
- Severe Pain
- Non-healing ulcer

- Discoloration of skin
- Occupation related to long standing
- Varicocele

Exclusion criteria

- DVT
- Patients who are already diagnosed and on treatment for varicose vein.
- Any pelvic mass with obstructive features/pregnancy
- Non-healing ulcer (traumatic Arterial)
- AV malformation
- Patients with gangrene (dry and wet)
- Coronary heart disease
- Patients unwilling to take part in the study or leaves in between the study.

With duplex scan the inner anechoic diameter of great saphenous vein were measured 2 cm distal from SFJ.

The diameter was correlated and analysed the relation

Age group	Study group		Control group	
	No.	%	No.	%
16-20	1	3.7	1	6.25
21-30	14	51.85	5	31.25
31-40	9	33.33	7	43.75
41-50	2	7.4	1	6.25
51-60	1	3.7	2	12.5
Total	27	32.59±9.88	16	30.437±6.99
P value = 0.449				

Table-1: Age distribution

Symptoms	No.	Percentage
Prominent vein	5	18.51
Pain and prominent vein	13	48.14
Prominent veins and swelling of limb	4	14.81
Prominent veins with ulcer	2	7.4
Prominent vein with pain and ulcer	1	3.7
Ulcer	1	3.7
Prominent vein: swelling of limb and pain	1	3.7
Bleeding	0	
Total	27	

Table-2: Different symptoms at presentation

Vein	Normal(mm)	Reflux(mm)	Difference	P-value
GSV	5.03±0.420142	6.91±0.579	1.88mm	<0.0001

Table-3: Diameter of the great saphenous vein

Criterion	Sensitivity	95% CI	Specificity	95% CI	+LR	-LR
>4.2	94.44	72.7 - 99.9	33.33	9.9 - 65.1	1.42	0.17
>4.3	88.89	65.3 - 98.6	41.67	15.2 - 72.3	1.52	0.27
>4.5	77.78	52.4 - 93.6	50.00	21.1 - 78.9	1.56	0.44
>4.6	77.78	52.4 - 93.6	58.33	27.7 - 84.8	1.87	0.38
>4.7	66.67	41.0 - 86.7	66.67	34.9 - 90.1	2.00	0.50
>4.8	66.67	41.0 - 86.7	83.33	51.6 - 97.9	4.00	0.40
>5	50.00	26.0 - 74.0	83.33	51.6 - 97.9	3.00	0.60
>5.1	38.89	17.3 - 64.3	91.67	61.5 - 99.8	4.67	0.67

Table-4: Criterion values and coordinates of the ROC curve

between the diameter of great saphenous vein distal to 2 cm from SFJ and the appearance of clinical symptoms.

At first for several months, we used 4 layer compressive stocking and lifestyle modifications. After 6 months of conservative management the cases who did not improve or deteriorated, went through operative procedure.

RESULTS

The present study was carried out on 43 patients attending the outpatient and inpatient of Swaroop rani hospital, Department of General surgery and department of radiology over a period of 12 months. There were 27 patients in the study group (M: F 24:3) & 16 in control group (M: F 14:2), with both the groups containing mainly male patients (88.88% in study group and 87.5% in control group).

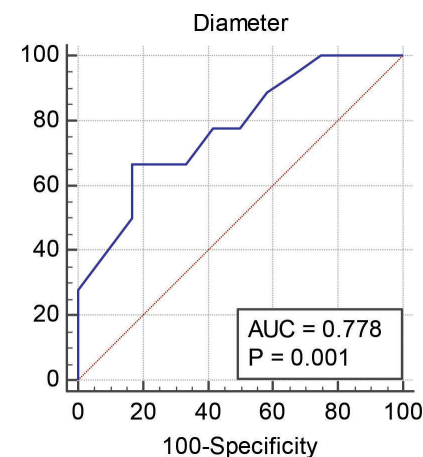
The maximum number of cases were in the age group 21-40 years in both males as well as females according to table 1.

In both males and females in the study, right limb varicosity was common than left limb varicosity; 12 males (50%) and 2 females (66.67%) had right limb varicosity, while 10 had left limb varicosities (M:F ; 9:1) and bilateral in 3 male patients.

In this study pain and prominent vein, in the leg was the most common presenting symptom in 13(48.15%) cases while 5(18.52%) cases presented with prominent vein (table-2).

The mean diameter of GSV with reflux was 6.91± 0.579 and this was larger than normal GSV, which measured 5.03 ± 0.420 mm On average. The diameter difference between the normal and reflux GSV was 1.88mm and statistically significant (p value< 0.0001) (table-3).

ROC analysis for determining the best cut of value for diagnosing reflux. Receiver operating characteristic (ROC)



curve of great saphenous vein (GSV) diameter at 2cm below SFJ and varicose vein prediction in male area under the curve: 0.778 cut off of points as 4.8mm with sensitivity as 66.67% and specificity 83.33%.

In the study, cases who stood for more than 8 hours per day (n=25, 92.59%) were more likely to have developed varicosity when compared to cases who stood for less than 8 hours (n=2, 7.41%) with significant p-value of 0.0016 (table-4).

DISCUSSION

Incidence of varicose veins in adult population has been shown to vary among populations (between 10% and 60%) and to increase by age in various studies.⁶⁻¹¹ Our study consisted of both males and females in both the groups. Number of males was however far higher in both the groups i.e. 24(88.88%) in study group and 14(87.5%) in the control group. Males might be more prone to develop chronic venous insufficiency owing to their nature of occupation and long-standing working hours. Obesity and lack of physical activity were strongly associated with CVI in women, more so than in men.

Maximum patients belonged to age groups 21-40 years as most patients presenting to us were occupational workers in this age group and had such nature of their job that required standing for long duration. Majority of the patients developed varicosity in right limb(50%), left limb(37.5%) and bilateral in 12.5%. these findings were compared to Dur et al¹² study in which right limb affection was in 48.55%, left limb in 51.45% and both limbs in 14.28%. Maximum patients presented within 5 years suggesting that development of symptoms due to the disease led them to seek medical attention as this is the duration taken for symptoms to develop which cannot be further tolerated. Engelhorn et al. [13] found that GSV diameter thresholds equal to or greater than 7 mm most accurately predicted reflux. Navarro et al. [14] reported that a GSV diameter of 5.5 mm or less predicted the absence of abnormal reflux, with a sensitivity of 78%, a specificity of 87%, positive and negative predictive values of 78%, and an accuracy of 82%. A GSV diameter of 7.3 mm or greater predicted critical reflux with 80% sensitivity, 85% specificity, and 84% accuracy. The mean diameter of the great saphenous vein in normal cases was 5.03±0.420 and that in diseases cases was 6.91±0.579. The difference in this aspect was found to be statistically significant (p = <0.0001). The diameter measurement has been assessed with different techniques: upright or recumbent patient position and cross sectional or longitudinal imaging. Venous diameter naturally changes according to patient position. The diameter measured in an upright position or upper body elevation will be larger than that measured in a recumbent position. It is warranted that diameter measurement should be done with a consistent method at each vascular laboratory. Upright position was most commonly used to measure the diameter of the saphenous vein [15]. We adopted the recumbent and upright valsalva position.

Most patients presented with limb swelling 13 (48.15%). Next symptom in presentation was pain or discomfort in the limb present in 5 (18.52%) cases. Mendoza et al. [16]

measured GSV diameters at both the SFJ and proximal thigh (15 cm distal to the groin). They concluded that the GSV diameter correlated with clinical class, with measurement at the proximal thigh being more sensitive and more specific than measurement at the SFJ. venous diameter is significantly related to reflux, as expected. GSV diameter of ≥4.8 mm had the best cutoff value for predicting pathologic reflux.

CONCLUSION

This study revealed that the disease is more prevalent in the age of 21-40 years. we conclude that occupations involving prolonged periods of standing were associated with varicose veins.

Most of the patients came to the hospital because of swelling or pain in limbs, rather than cosmetic purpose. Increasing diameter of great saphenous vein was directly and significantly related to the development of varicosity. Clinical examination along with duplex sonography was almost confirmative in diagnosis of the disease.

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