



EPIDEMIOLOGY OF PRIMARY VARICOSE VEINS OF LOWER LIMB IN A TERTIARY CARE HOSPITAL.

Vascular Surgery

Dr Praveen Kumar Nookala

Post Graduate, Department Of Vascular And Endovascular Surgery.

Dr Sandeep Mahapatra*

Associate Professor, Department Of Vascular And Endovascular Surgery.
*Corresponding Author

Dr Anusha Arumalla

Assistant Professor, Department Of Vascular And Endovascular Surgery.

Dr Muneer Ahmad Para

Post Graduate , Department Of Vascular And Endovascular Surgery.

Dr Venu Gopal Mustyala

Post Graduate , Department Of Vascular And Endovascular Surgery.

Dr Md Fayazuddin

Post Graduate , Department Of Vascular And Endovascular Surgery.

Dr Sanjeeva Rao

Post Graduate , Department Of Vascular And Endovascular Surgery.

ABSTRACT

Introduction: Epidemiological studies plays an important role in providing information on the spectrum and frequency of venous disease distribution in a population. In India, study encompassing the clinical evaluation and surgical management of varicose veins on the conventional lines seems a necessity to improve the quality care with the available resources. We have undertaken an epidemiological study on influence of age, sex, body mass index, posture on clinical manifestations and complications of varicose veins of lower limbs in patients attending the Department of Vascular Surgery.

Materials and Methods: A prospective observational study was conducted in Department of vascular surgery on patients with primary varicose veins of lower limb. Patients with secondary varicose veins, recurrent varicose veins, patients less than 18 years, deep vein thrombosis & peripheral arterial disease were excluded from the study.

Results: In the present study 88.89% of ulcer patients had combined saphenofemoral(SFJ) and perforator incompetence, while 11.11% of ulcer patients had combined saphenofemoral, saphenopopliteal (SPJ) and perforator incompetence. 14% patients present with combined SFJ, SPJ and perforator incompetence. The patients with higher CEAP classification had combined SFJ and SPJ valvular incompetence. Most commonly, the disease affected the males in the age group of 40-50 years.

Conclusion: The present study shows that prolonged standing, obesity, increasing age are the common risk factors for development of varicose veins.

KEYWORDS

Epidemiology, varicose veins, CEAP classification

INTRODUCTION

Varicose veins are dilated, tortuous, subcutaneous veins with a demonstrable reflux in duplex scan performed in the lower limbs in upright position.¹ Primary varicose veins of lower limb affect 10–20% of population in the Western world² which is considered as the penalty for vertical bi-pedality against gravity³. Epidemiological studies contributes to the recognition of mechanisms that cause varicose veins and helps to identify the various risk factors which play a role in the causation of varicose veins and helps to implement diagnostic, treatment and preventive strategies. The impact of venous disease on productivity in the form of lost work days, medical costs, and its cost to society in general can be better understood by assessing the prevalence and incidence of venous disease in general population and be able to identify subgroups who have or who are likely to develop venous disease.

A considerable advance in understanding of pathophysiology of venous disease and modern imaging techniques, in particular duplex scan, have revolutionized the concept of management of varicose veins. In India, study encompassing the clinical evaluation and surgical management of varicose veins on the conventional lines seems a necessity to improve the quality care with the available resources. Hence this epidemiological study was done with an objective to assess the effect of various risk factors such as age, sex, body mass index and posture on the presentation of varicose veins, to study the various clinical manifestations and complications of varicose veins of lower limbs and to correlate with the CEAP severity score.⁴

MATERIALS AND METHODS

This is a prospective observational study which was carried out on 200

patients attending vascular surgery department in Nizams institute of medical sciences, Hyderabad, after obtaining prior approval from Institutional Ethics Committee. All participants were given an information sheet regarding this study and its purpose, and prior written informed consent was taken from all the participants. The sample size of minimum 196 was calculated at 95% confidence interval using $n_0 = 2 [Z^2 PQ/E^2]$ formula. The epidemiological factors such as age, sex, area of residence, occupation were assessed and recorded. Clinical manifestations and complications of varicose veins were recorded. Patients with secondary varicose veins, recurrent varicose veins, patients less than 18 years, deep vein thrombosis and peripheral arterial disease, pregnant and lactating women were excluded from the study.

Patients were assessed clinically for the signs and symptoms of varicose veins and were subjected to colour doppler study of the venous system to document the reflux time at the sapheno femoral and sapheno popliteal junction. They were then categorized based on the CEAP classification as listed below:

CLINICAL CLASSIFICATION (C) : based on defined objective clinical signs suffixed as A for asymptomatic limbs or S if symptoms exist.

- C0 -----No visible sign of venous disease
- C1 -----Telangiectases and/or reticular veins
- C2 -----Varicose veins
- C3 -----Edema
- C4 -----Changes in skin and subcutaneous tissue
- 4A ----- Pigmentation or eczema
- 4B ----- Lipodermatosclerosis or atrophie blanche

C5 -----Healed ulcer

C6 -----Active ulcer

S : Symptoms including ache, pain, tightness, skin irritation, heaviness, muscle cramps, as well as other complaints attributable to venous dysfunction.

A: Asymptomatic

ETIOLOGICAL CLASSIFICATION (E):

Ep -----Primary

Es -----Secondary

ANATOMICAL CLASSIFICATION (A) : based on segment of vein affected.

As -----Superficial

Ad -----Deep

Ap -----Perforator

PATHOPHYSIOLOGICAL CLASSIFICATION (P):

Pr -----Reflux

Po -----Obstruction, thrombosis

Pr,o -----Reflux and obstruction

The severity of the disease was then correlated with the presence of refluxing territories which was based on the findings of the duplex study of the lower limb venous system.

STATISTICAL ANALYSIS

Descriptive statistical analysis of the tabulated findings was carried out. Results on continuous measurements were presented on mean SD (Min-Max) and results on categorical measurements were measured in Number (%). Significance was assessed at 5% level of significance. 95% confidence interval was computed to find the significant features. P value obtained from EPI Infoversion 7. P value (P <0.05) was considered statistical significant.

RESULTS

The age distribution of study population ranged from 19 years to 70 years and majority of patients (82.5%) were between the age group of 30 to 60 years. (Table 1) Male preponderance was seen with male: female ratio of 2.8:1.

Table 1: AGE WISE DISTRIBUTION OF THE STUDY POPULATION

Age (years)	Number of cases	Percentage
≤ 20	04	2%
21-30	20	10%
31-40	42	21%
41-50	52	26%
51-60	71	35.5%
61-70	11	5.5%
Total	200	100%

Obesity is one of the risk factors for the development of varicose veins which is evident clearly in the present study. Majority of patients (58.5%) were either overweight or obese with a Mean=25.12±4.16, while 38% had normal BMI. (Table 2)

Table 2: DISTRIBUTION ACCORDING TO BODY MASS INDEX (BMI)

BMI	Number of cases	Percentage
<18 (Underweight)	07	3.5%
18-24.9 (Normal)	76	38%
25-30.0 (Over weight)	103	51.5%
>30 (Obese)	14	7%
Total	200	100%

Around 50% of the patients affected with varicose veins were involved in works that required long standing hours like manual labourers, watchmen, conductors, carpenters, tailors, hotel workers, barbers etc which emphasizes the posture to be one of the risk factors in the development of varicose veins of the leg. With regards to the limb most commonly affected with the varicose veins, it was found that 37.5% had right lower limb varicosities and 52.5% had left lower limb varicosities. Bilateral involvement was seen in 10% of the total study population. As the long saphenous vein extends along the whole length of the limb, it bears the brunt of the erect posture. The long saphenous vein territory was involved in 188 (94%) patients while the short saphenous vein territory involvement was seen in 32 (16%) patients. On studying the results of the duplex examination of the patients for valvular incompetence, majority of the patients 140 (70%) had

sapheno-femoral and perforator incompetence. (Table 3)

Table 3: SITE OF INCOMPETENCE

Site of Incompetence	Number of cases	Percentage
Sapheno femoral Incompetence	20	10%
Sapheno femoral + Perforators Incompetence	140	70%
Sapheno femoral + Sapheno popliteal + Perforators Incompetence	28	14%
Perforator incompetence alone	04	2%
Sapheno femoral + Sapheno popliteal Incompetence	04	2%
Sapheno popliteal Incompetence	04	2%

On assessing the patients based on CEAP classification, majority of patients were under CEAP class 2 and 3 (66%) which included patients presenting with dilated veins and leg edema as their only symptoms. Under the Anatomical class of CEAP 86% of patients had incompetence of superficial venous system along with perforator incompetence. (Table 4)

Table 4: CEAP classification

CEAP	Number of cases	Percentage
Clinical class (C)		
Reticular veins (C1)	—	—
Varicose veins (C2)	76	38%
Edema (C3)	56	28%
Pigmentation and Lipodermatosclerosis (C4)	32	16%
Active ulcer (C5)	12	6%
Healed ulcer (C6)	24	12%
Etiology (E)		
Primary varicose veins	200	100%
Secondary varicose veins	—	—
Anatomical (A) distribution of Reflux		
Superficial varicose system	24	12%
Perforator alone	4	2%
Superficial varicose system + Perforator	172	86%
Pathophysiology (P)		
Reflux	200	100%
Obstruction	—	—

On correlating the CEAP class with the site of incompetence, the patients with higher CEAP classification had combined SFJ and SPJ valvular and perforator incompetence. This has been demonstrated in the table below (Table 5) showing a significant P value of 0.000005.

Table 5: CORRELATION BETWEEN CEAP CLASS AND SITE OF INCOMPETENCE

CEAP Class	Limbs	SFI	SFI+PI	SFI+SPI+PI	SFI+SPI	SPI	PI
0	--	--	--	--	--	--	--
1	--	--	--	--	--	--	--
2	76	8	52	4	4	4	4
3	56	12	36	8	--	--	--
4	32	--	20	12	--	--	--
5	12	--	8	4	--	--	--
6	24	--	24	--	--	--	--

p=0.000005 (statistically significant)

DISCUSSION

Varicose veins and venous insufficiency of the lower extremities are among the most common disease entities affecting the general adult population. In India, approximately 5% of the population suffers from venous disease.⁵ Pathologically, primary varicosities ascribe the defect to be in the walls or the valves of superficial venous system or the perforating veins. Secondary varicose veins are usually due to the obstruction in venous flow such as deep vein thrombosis. Various predisposing factors of varicose veins have been implicated such as prolonged standing, obesity, old age, chronic rise in intra abdominal pressure, athletics & heredity.⁶

Evidence on the association between age and varicose veins is relatively conclusive, as the majority of studies suggest that the prevalence increases with increasing age. At baseline in the Edinburgh Vein Study, the overall prevalence increased from 11.5% in 18-24 year

olds to 55.7% in those aged 55-64 years ($p=0.001$)⁷. The San Diego population study reported a prevalence of 16.9% in subjects aged less than 50 years which rose to 29.9% in subjects aged over 70 years.⁸ In the present study 82.5% were between the age group of 30 to 60 years with maximum members (71) in the age group of 51-60 years.

Many studies have shown that varicose veins are more common in women than in men. In a population based study in Italy, the prevalence of was twice as high in women as in men ($p<0.0001$)⁹ but in the present study, 74% of cases were males and 26% were females. These findings are comparable with the study conducted by Vashist *et al.*⁵, which showed 64% of males and 36% of females. In the present study, distribution among women was very low when compared to the western studies, the reason may probably be related to regional Indian custom where women population are less inclined towards hospital visits for cosmetic purpose.

It has been postulated that in obese patients, fat tissue augments surrounding veins thus impeding the normal exchange of blood between deep and superficial veins and increases the ambulatory venous pressure secondary to the raised abdominal pressure. The Basle Study,¹⁰ Framingham Study¹¹ and a study of 4,488 participants in Jerusalem⁶ all reported a significant association between varicose veins and BMI. The present study showed that majority of patients (58.5%) were either overweight or obese, while 38% had normal BMI indicating obesity as one of the major risk factors in the development of varicose veins.

Certain occupations, in particular those involving prolonged standing, have been proposed as risk factors for varicose veins. Standing for prolonged periods of time results in increased hydrostatic pressure which leads to impeded blood flow and stasis in the leg veins. Increase in pressure can also impair the function of the calf muscle pump, which is important for the venous return of blood. In the present study, most of the patients (50%) affected with varicose veins were workers, who required prolonged standing. Similar findings were described by Borschberg E.¹² Tensing and relaxing of the calf muscles repeatedly will help in aiding venous return and help in relieving symptoms.¹³

The majority of patients with varicose veins are asymptomatic. Symptoms can be variable and may include pain, swelling, heaviness, pruritis, burning, restlessness and cramps. These symptoms may be exacerbated by ambulation and alleviated by lower limb elevation. Presentation with acute complications like hemorrhage is not uncommon and chronic complications (pigmentation, eczema, lipodermatosclerosis and ulceration) are also seen in some patients. In the present study all patients had dilated veins as the main symptom. 54% presented with pain and 58% presented with edema. 28% presented with pigmentation and lipodermatosclerosis and 6% presented with ulceration. These findings in the present study is supported by study conducted by O'Shaughnessy M *et al.*¹⁴ in which 92% of patients presented with dilated veins and 54% presented with pain and 62% with edema as the presenting symptom.

In order to standardize the reporting and treatment, a comprehensive classification system (CEAP) has been developed by an international ad hoc committee of the American Venous Forum in 1994, and is now accepted as standard for classifying chronic venous disorders. Majority of patients (66%) in the present series were patients of CEAP Clinical class 2 and 3 which is comparable to study done by de Andrade *et al.*¹⁵ Higher CEAP score was associated with combined SFJ, SPJ and perforator incompetence and more morbidity. (P value of 0.000005).

CONCLUSION

The present study draws a conclusion that prolonged standing, obesity and increasing age are among the major risk factors for varicose veins. Classifying the varicose veins has an impact on the course of the disease and preventing its complications. As varicose veins and its complications are potentially preventable, more epidemiological studies are needed to assess the incidence and natural course of the venous disease in different populations belonging to different regions and different socio economic status.

REFERENCES

1. Eklöf B, Rutherford RB, Bergan JJ, Carpentier PH, Gloviczki P, Kistner RL, Meissner MH, Moneta GL, Myers K, Padberg FT, Perrin M. Revision der CEAP-Klassifizierung für chronische Venenleiden. *Phlebologie*. 2005;34(04):220-5.
2. McCollum P, Chetter I. Venous disorders. In: Bailey H, Love McN, editors. *Bailey and Love's Short Practice of Surgery*. 26th ed. Boca Raton, FL: CRC Press; 2013. p. 903
3. Beale RJ, Gough MJ. Treatment options for primary varicose veins—a review.

- European journal of vascular and endovascular surgery. 2005 Jul 1;30(1):83-95.
4. Julie I. Freischy "Venous disorders", Sabiston textbook of surgery, the biological Basis of modern surgical practise, 18th edition, 2009, W.B. Saunders's company; 2002-2019.
5. Vashist M, Godara R, Sen J, Panwar S. Management of varicose veins: Status of clinical examination and colour Doppler in the present Indian scenario. *Internet J Surg* 2008;20:1-4.
6. Abramson JH, Hopp C, Epstein LM. The epidemiology of varicose veins. A survey in western Jerusalem. *Journal of Epidemiology & Community Health*. 1981 Sep 1;35(3):213-7.
7. Evans CJ, Fowkes FG, Ruckley CV, Lee AJ. Prevalence of varicose veins and chronic venous insufficiency in men and women in the general population: Edinburgh Vein Study. *Journal of Epidemiology & Community Health*. 1999 Mar 1;53(3):149-53.
8. Criqui MH, Jamosmos M, Fronck A, Denenberg JO, Langer RD, Bergan J, Golomb BA. Chronic venous disease in an ethnically diverse population: the San Diego Population Study. *American journal of epidemiology*. 2003 Sep 1;158(5):448-56.
9. Canonico S, Gallo C, Paolisso G, Pacifico F, Signoriello G, Sciaudone G, Ferrara N, Piegari V, Varricchio M, Rengo F. Prevalence of varicose veins in an Italian elderly population. *Angiology*. 1998 Feb;49(2):129-35.
10. Da Silva A, Widmer LK, Ziegler HW, Nissen C, Schweizer W. The Basle longitudinal study: report on the relation of initial glucose level to baseline ECG abnormalities, peripheral artery disease, and subsequent mortality. *Journal of chronic diseases*. 1979 Jan 1;32(11-12):797-803.
11. Brand FN, Dannenberg AL, Abbott RD, Kannel WB. The epidemiology of varicose veins: the Framingham Study. *American journal of preventive medicine*. 1988 Mar 1;4(2):96-101.
12. Borschberg E. The Prevalence of Varicose Veins in the Lower Extremities. Vol. 9. Basel: Karger; 1967. p. 541-5.
13. Schoonover JP, King JT, Gray C, Campbell K, Sherman C. 3 alternatives to standard varicose vein treatment: for many patients with chronic venous insufficiency, thermal and chemical ablation could mean less pain and a speedier recovery. *Journal of Family Practice*. 2009 Oct 1;58(10):522-7.
14. O'Shaughnessy M, Rahall E, Walsh TN, *et al.* Surgery in the treatment of varicose veins. *Ir Med J* 1989;82(2):54-5.
15. de Andrade ART, Pitta GBB, Castro AA, Miranda Júnior F. Evaluation of venous reflux by color duplex scanning in patients with varicose veins of lower limb: Correlation with clinical severity by CEAP classification. *J Vasc Bras* 2009;8:1677-708.