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A prospective study of etio-pathogenesis, management and complications of lower limb varicose veins among the patients admitted in a rural Tertiary Healthcare Centre

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Abstract

Background: In a developing country like India, study encompassing the clinical evaluation and management of lower limb varicose veins on the conventional lines seem a necessity to improve the quality care with the available resources.

Aims and Objectives

1. To analyse the age and sex incidence of lower limb varicose veins.
2. To study the correlation between occupation and lower limb varicose veins, the clinical manifestations of lower limb varicose veins, the different treatment modalities like sapheno-femoral flush ligation, multiple subfascial perforator ligations, stripping and sclerotherapy and the respective clinical outcomes at the end of three months of follow up.

Methods: A total 60 number of patients with primary lower limb varicose veins were admitted, investigated, operated and followed up from June 2019 to January 2020. Final outcome was evaluated.

Results: It was noted that the varicose veins affected the younger adult and middle age population. A greater portion (48.3) of the patients had combined valvular incompetence (sapheno-femoral and sapheno-popliteal incompetence) Sapheno-femoral flush ligation withstripping appeared to be the best method of surgical management for incompetence in the long saphenous vein territory. Subfascial perforator ligation in patients with no junctional incompetence showed no recurrence Sclerotherapy was found to be an effective procedure especially for early varicosities.

Conclusions: Majority Of the patients presented with complications of varicose vein with combined valvular incompetence and Sapheno-femoral flush ligation with stripping appeared to be the best method of surgical management for incompetence in the great saphenous vein territory. When no junctional incompetence is present, performing sub facial perforator ligation alone for isolated perforator incompetence showed no recurrence in this study.

Keywords: Varicose vein, sapheno-femoral flush ligation, subfacial perforator ligation, sapheno-popliteal ligation, sclerotherapy

1. Introduction

“Varicosity is the penalty for verticality against gravity”. The term “Varicose” is derived from the Latin “Varix” (plural “Varices”) which intern possibly derived from ‘Varus’ meaning bent. Varicose veins are subcutaneous dilated veins 3 mm or more in diameter frequently elongated and tortuous with intermittent ‘blowouts’, but are defined by the presence of reflux and may be straight and uniform morphologically. They are a manifestation of chronic lower extremity venous insufficiency and are one of the most common conditions prompting patients to seek medical attention. Varicose veins have been recognized as chronic disorder since ancient times. Hippocrates discussed them 2500 years ago. Although usually thought to be no more than a cosmetic nuisance, varicose veins can be the source of more serious complications. Varicose veins of the lower limb accounts to the most common peripheral vascular disease. The numbers of patients coming to the hospital for the treatments of varicose vein are much less than the real incidence. The reason could be that the patients did not come to hospital unless they develop some complications like pain, eczema and ulcerations. That is the reason, why, though common, varicose veins remain as an iceberg phenomenon.

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2. Aims and Objectives

- To analyse the age and sex incidence of lower limb varicose veins.
- To study the correlation between occupation and lower limb varicose veins.
- To study the clinical manifestations of lower limb varicose veins.
- To study the different treatment modalities like sapheno-femoral flush ligation, multiple sub fascial perforator ligation, stripping and sclerotherapy and the respective clinical outcomes at the end of three months of follow up.

3. Methodology

3.1 Source of data

In the present study, the clinical material consisted of all the patients with lower limb varicose veins who were admitted to the department of general surgery of KVG Medical College Hospital, Sullia during the period of study.

3.2 Sample size estimation

Sample size was calculated based on the study conducted by Pradeep Muley *et al.* [1]

This study reported a prevalence of 15-20%. Considering the prevalence as 20%,

Formula used to calculate sample size is

$$\text{Sample size (n)} = 4pq/d^2$$

P (Prevalence) = 20%

Q (100-p) = 80%

D (allowable error) = 11

$$n = 4 \times 20 \times 80 / (11)^2$$

$$= 6400 / 121$$

$$= 52.89$$

The minimum sample size required for the study is 52.89.

For the present study, 60 patients with primary varicose veins of lower limbs were selected.

3.3 Method of collection of data

The study was conducted in the Department of Surgery at KVG Medical College Hospital, Sullia. 60 patients were included in the present study after they satisfied the inclusion and exclusion criteria. Written and informed consents were taken from all the participants. All enrolled patients were evaluated by:

- Detailed history, general examination and clinical findings
- Basic investigations as mentioned in the proforma.
- Specific investigations – venous Doppler study of the lower limbs, to further locate and evaluate the site of incompetence in the lower limb venous system

3.3.1 Inclusion criteria

All patients with varicose veins presenting in our outpatient department, male/female, were having single or multiple symptoms as mentioned below:

- Itching.
- Hyper pigmentation.
- Ulceration.
- Patients with incompetent Sapheno-femoral junction and/or Sapheno-popliteal junction and/or perforators.
- Patients who were above 18 years of age and willing to

participate in the study.

3.3.2 Exclusion criteria

- Proven cases of deep vein thrombosis.
- Pregnant females with varicose veins.
- Secondary varicose veins and recurrent varicose veins of lower limbs.
- Unwilling patients to participate in the study.
- Other associated peripheral arterial disorders (Ex-Atherosclerosis, Buerger's disease etc.) and peripheral lymphatic disorders.
- Other causes of lower limb oedema.
- Patients of age less than 18 years.

3.4 Statistical tests used: Chi square test

3.5 Follow up period: 3 months.

4. Results

A total 60 number of patients (62 number of limbs) with primary varicose veins were admitted, investigated, operated and followed up. The observations are as:

Table 1: Age range

S. No.	Age distribution	No. of patients	Percentage
1	21 – 30 years	4	6.66 %
2	31 – 40 years	10	16.66 %
3	41 – 50 years	27	45 %
4	51 – 60 years	17	28.33 %
5	61 – 70 years	1	1.66 %
6	71 – 80 years	1	1.66 %

Varicose veins of the lower limb are disease of adult life. The youngest in the study was 23 years and the eldest was 71 years.

Table 2: Gender distribution

S. No.	Gender	No. of patients	Percentage
1	Male	39	65 %
2	Female	21	35 %

In my study of 60 patients, only 21(35%) patients were females and 39(65%) patients were males. The study revealed male to female ratio to be 1.85:1.

Table 3: Laterality

Limb involved	Patients	%
Right	28	45.16 %
Left	32	51.61 %
Both veins.	2	3.22 %

As noted in the observation, an increased incidence of varicosity was noted on left side.

Table 4: Venous system involved

System involved	Limbs	%
Great saphenous	50	80.6%
Short saphenous	12	19.4%

This study revealed that the majority of the patients had involvement of long saphenous system.

Table 5: Site of incompetence

Site of incompetence	No. patient limbs	%
Sapheno-femoral	14	22.5%
Sapheno-femoral +perforator	30	48.3%
Sapheno-femoral + Sapheno-popliteal + Perforator	2	3.2%
Isolated Perforator	16	25.8%

A greater portion of the patients had combined valvular incompetence (48.3%). Isolated perforator incompetence was seen only in 25.8% of the patients. 22.5% patients had isolated

Saphenofemoral junction incompetence and only 3.2% patients had combined Sapheno-femoral, sapheno-popliteal and perforator incompetence.

Table 6: Occupational status of the patients

Occupation	No. of patients	Percentage
House Wife	9	15 %
Shopkeeper	14	23.33 %
Manual Labourer	21	35 %
Farmers	8	13.33 %
Student	3	5 %
Tailor	1	1.66 %
Teacher	1	1.66 %
Police	1	1.66 %
Driver	1	1.66 %
Conductor	1	1.66 %

According to occupational status, majority of the cases were seen in the prolonged standing workers. In this study, manual

labourers were found constituting 35% of cases, shopkeepers 23.3%, housewives 15%, and farmers 13.3%.

Table 7: Symptom profile

S. No.	Symptoms	No. of patients	Percentage
1	Pain	26	43.33 %
2	Itching	13	21.66 %
3	Limb edema	10	16.66 %
4	Eczema	8	13.33 %
5	Ulcer	9	15 %
6	Lipodermatosclerosis	5	8.33 %

The most common presenting symptom in varicose veins in this study was pain seen in 43.3% of cases. Itching was reported in 21.6% cases. In this study, 8.3% cases presented with lipodermatosclerosis and limb oedema was seen in 10 cases (16.6%).

Treatment Strategy: Out of 62 subjects, isolated saphenofemoral flush ligation was performed in 14(25.5%) cases. Sapheno-femoral flush ligation with subfascial perforator ligation was done in 20(32.2%) cases. Sapheno-femoral flush

ligation with stripping of great saphenous vein up to the knee was performed in 5(8%) cases, whereas sapheno-femoral flush ligation with stripping of great saphenous vein was performed in 5 (8%) cases. Sclerotherapy was performed in 10(16%) cases. Only subfascial perforator ligation was performed in 6(9.66%) cases in which only perforators were incompetent. Sapheno-femoral junction and Sapheno-popliteal junction ligation with stripping of Great saphenous vein and ligation of incompetent perforators was performed in 2(3.2%) cases.

Table 8: Surgical procedures performed

S. No.	Treatment modality	No. of limbs	Percentage
1	Sapheno-femoral flush ligation	14	25.5 %
2	Sapheno-femoral flush ligation + subfascial perforator ligation	20	32.2 %
3	Sapheno-femoral flush ligation + stripping	10	16 %
4	Subfascial perforator ligation	6	9.66 %
5	Sclerotherapy	10	16 %
6	Sapheno-femoral flush ligation + subfascial perforator ligation + saphenopopliteal junction ligation+ stripping	2	3.2 %

In this study except sixteen patients who did not have Sapheno-femoral incompetence, all other patients underwent Sapheno-femoral flush ligation. 10 patients underwent sclerotherapy. 6 patients underwent multiple subfascial perforator ligation and only 2 patients underwent Trendelenburg operation with Sapheno-popliteal junction ligation with multiple subfascial perforator ligation and stripping.

Post-operative complications: In this study, we accounted post-operative complications in 12 cases which accounts to 19.3% over all complication rate. We observed that surgical site infection was the most common (seen in 3 cases) in patients who had undergone flush ligation of sapheno-femoral junction. Phlebitis was seen in 3 cases, who had undergone sclerotherapy. Hematoma was seen in 2 cases. Residual pigmentation was

observed in 2 cases after sclerotherapy. Wound gaping was seen in 1 case. Saphenous neuritis was observed in one patient who had undergone long segment stripping. No patients presented with saphenous neuritis among the 5 cases who underwent short segment stripping. There was no incidence of deep venous thrombosis or pulmonary embolism postoperatively in this study.

Table 9: Post operative complications

S. No.	Complications	No. of patients	Percentage
1	Surgical site infection	3	4.83 %
2	Hematoma	2	3.22 %
3	Wound gaping	1	1.61 %
4	Residual pigmentation	2	3.22 %
5	Phlebitis	3	4.83 %
6	Saphenous neuritis	1	1.61 %

Table 11: Recurrence after Sapheno-femoral flush ligation and multiple subfascial perforator ligation

Type of surgery	No of patients	Recurrence	%
Sapheno-femoral flush ligation	14	3	21.4%
Sapheno-femoral flush ligation + Multiple subfascial perforator ligation	20	1	5%

In 14 cases only sapheno-femoral flush ligation was done and recurrence was noted in 2 patients after 3 months follow up. In 20 patients, sapheno-femoral flush ligation with multiple subfascial perforator ligation was done, and recurrence was noted in 1 patient. The cause of recurrence was sapheno-femoral reconnection in two limbs and incompetent perforator in one limb.

5. Discussion

In the present study, a total number of 60 patients (62 limbs) with primary varicose veins were admitted, investigated, operated and followed up. The results were analysed. The analysis was as;

Table 12: Age range

Studies	Age range (yr.)
Present study	23-71
Malhotra <i>et al.</i> [2]	18-65
Wright <i>et al.</i> [3]	20-75

In my study, the age range was from 23 yrs. to 71 yrs. Malhotra *et al.* (1972) [2] in their study comprising 677 patients from both North and South India had an age range of 18-65 years. In the West, Wright *et al.* [3] in their study of 1338 patients in England had an age range of 20-75 years.

Table 13: Male to female ratio

Studies	Male: Female
Present study	1.85:1
Burkitt <i>et al.</i> [4]	1.5:1
Callum <i>et al.</i> [5]	1:2
Leipnitz <i>et al.</i> [6]	1:2
Widmer [7]	1:1
Mekky <i>et al.</i> [8]	-

In my series, male to female ratio was found to be 1.85:1. Burkitt *et al.* [4] (India) showed a ratio of 1.5: 1. The results obtained in my study are comparable to the study done by Burkitt *et al.* [4] Leipnitz *et al.* [6] in Germany recorded a ratio of 1:2. Widmer [7] in Switzerland recorded a ratio of 1:1. Callum *et al.* [5] in England recorded a ratio of 1:1. The decreased

Out of 62 limbs operated, 12(19.3%) cases had complications. Surgical site infection was seen in 3 cases (4.83%) and phlebitis in 3 cases (4.83%), which were the most common complications in this study. Hematoma was seen in 2 cases (3.22%) and residual pigmentation in 2 cases (3.22%) after sclerotherapy.

Table 10: Complication of stripping

Long saphenous stripping	No. of patients	Saphenous neuritis
Long segment	5	1(20%)
Short segment	5	0

Long segment stripping – Long saphenous vein stripped from Groin to ankle. Short segment stripping – Long saphenous vein stripped from Groin to Just below knee. One out of 5 patients who underwent long segment stripping of long saphenous vein had saphenous neuritis accounting for 20%.

occurrence of disease in females at our set up may be due to the fact that our middle class and lower-class women are not much worried about the cosmetic appearance. Secondly the women may be resistant to complications of varicose veins probably due to hormonal influence or less average height compared to male which has a direct impact on venous hypertension or less violent muscular activity

Table 14: Limb involvement (present study Compared)

Limb	A. H. M. Dur, A. J. C. Mackay <i>et al.</i> [9]	Presents study
Right	48.55 %	45.16 %
Left	51.45 %	51.61 %

In this study, the right limb involvement was 45.16% and the left limb involvement was 51.61% which were well comparable to the study conducted by A.H.M. Dur, A.J.C. Mackay *et al.* [9] which showed 48.55% involvement of right limb and 51.45% involvement of left limb.

The cause for the increased incidence on left side is not mentioned in any of the standard text books. But could be attributed to the longer course traversed by the left iliac veins. The increased incidence of varicosity noted on left side may be attributed to the venous drainage through the pelvis that follows a more tortuous course in the left lower limb because, the right common iliac artery traverses over the left common iliac vein thus enhancing the risk over the left side [10].

Occupation- Similar results were seen in the study of Pramod Mirji *et al.* [11] in his study farmers and house wives were affected in majority. Ziegler *et al.* reported that out of 209 workers of the hospital, (34%) with chronic venous diseases were standing longer at work than their colleagues who were free of chronic venous disease, the ratio being 1.6 for men and 1.2 [12, 13] for women.

Table 15: Incompetent perforator

Studies	Incompetent perforator (%)
Present study (n=62)	77.4%
Labropoulos N <i>et al.</i> [14] (n=125)	68%

In my study, 74% of patients had perforator incompetence which shows that majority of the cases presenting to the hospital for

treatment were advanced cases of hemodynamic disturbances of the limb and it is comparable with study conducted by

Labropoulos N *et al.* [14] where 68% had perforator incompetence

Table 16: Site of incompetence and complications

Site of incompetence	T.A. Lees & D. Lambert [15] (n=60)	Present study (n=62)
Isolated superficial incompetence	17 (28.33%)	14 (22.58%)
Combined superficial and perforator incompetence	39 (65%)	32 (51.61%)
Isolated perforator incompetence	4(6.66%)	16 (25%)

In this study, 32 (51.61%) cases had combined superficial and perforator incompetency which is almost comparable to the 65% of combines superficial and perforator incompetency obtained in study by T.A.Lees & D.Lambert [15]. 14(22.58%) had isolated superficial incompetency which is again well comparable to 22.33% of T.A.Lees & D. Lambert [18] study. In my study, isolated perforator incompetence was 25%. In this study, Great saphenous vein was involved in 50 cases (80.6%) and Short saphenous vein was involved in 12 cases (19.4%). In a similar study, conducted by Delbe and Mocquet had found 98% involvement of Great saphenous vein and only 2% involvement of Short saphenous vein. Incompetent perforators were noted in 82% cases. The clinical features are comparable to the studies conducted by Saarinen J *et al.* [16] in Finland and Murli. N *et al.* [17]. Itching was reported in 21.6% of cases which compares favourably with study conducted by Saarinen J *et al.* [16] However eczema was seen in 22% cases in study conducted by Murli. N *et al.* [17] greater than 13.3% reported in my study. In this study, 8.3% cases presented with lipodermatosclerosis which is greater than 2.5% cases reported in a study conducted by Robertson *et al.* [18] Limb oedema was seen in 10 cases (16.6%) On the basis of the CEAP classification, oedema is considered clinical class 3 of chronic venous disease. However, oedema can result from a number of conditions, such as congestive heart failure, in which venous disease is not the primary underlying pathology.

Table 17: Recurrence after Sapheno-femoral flush ligation and no stripping.

Study	Recurrence	%
Present (n=14) (follow up 3 months)	3	21.4%
Sarin <i>et al.</i> [19] (n=56) (follow up 36 months)	25	45%

Table 18: Recurrence after Sapheno-femoral flush ligation with stripping

Study	Recurrence	%
Present (n=12) (follow up 3 months)	0	-
Sarin <i>et al.</i> [19] (n=49) (follow up 36 months)	9	18%

In this study, 14 cases underwent isolated saphenofemoral junction ligation and 3 cases (21.4%) among them presented with recurrence in follow up of 3 months. No recurrence seen in patients underwent saphenofemoral flush ligation with stripping in my study. In a similar study, by Sarin *et al.* [19] the group in which no stripping of Great saphenous vein was done these were recurrence of 45% and in-group with stripping done 18% recurrence was seen. The difference in outcome of patients with stripping in my series (0%) and Sarin *et al.* [19] (18%) may be due to very short follow up period of 3 months in my study compared to 36 months in Sarin *et al.* [19] study.

6. Conclusions

The study showed that the disease is common in adult life with most common age being 41-50 years. The majority of the

patients were male. The reasons for a smaller number of females in the study is not known. Most of the patient presented to the hospital for pain but not for the cosmetic purpose. The study showed slight increase in the incidence of varicose veins on the left lower limbs than on the right side. The exact reason for this not known but can be attributed to the long course traversed by the iliac vessels in the left side. The study showed increased incidence of the disease in the people whose occupation demanded prolonged standing. Though no definite conclusion can be drawn regarding aetiology from this study, however there exists a strong relationship between the occupation and incidence of varicose veins. The most common presenting complaint was aching pain. Here, the great saphenous system was involved more than the short saphenous system in majority of the patients. A greater portion of the patients had combined valvular incompetence. The use of venous Doppler is an effective supplement to the clinical examination for effective treatment of varicose veins. The operative procedure is the primary line of treatment in patients with symptomatic varicose veins. When no junctional incompetence was present, performing sub facial perforator ligation alone for isolated perforator incompetence showed no recurrence in this study. Sapheno femoral flush ligation with stripping appeared to be the best method of surgical management for incompetence in the long saphenous vein territory. Sclerotherapy is a simple, safe and effective procedure especially for early smaller varicosities. When the procedure is done with adequate precautions, there are relatively very few complications which are usually minor. Though the results are good with the newer trends in managing varicose veins, they require long term follow up.

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