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

Dr. Dhrubajyoti Dey, Dr. B Jagadish and Dr. Sahana M

DOI: https://doi.org/10.33545/surgery.2020.v4.i2b.399

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 with stripping 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 0f 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” (pleural “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.
2. Aims and Objectives
a. To analyse the age and sex incidence of lower limb varicose veins.
b. To study the correlation between occupation and lower limb varicose veins.
c. To study the clinical manifestations of lower limb varicose veins.
d. To study the different treatment modalities like saphenofemoral 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.\cite{1} This study reported a prevalence of 15-20%. Considering the prevalence as 20%,

\[
\text{Sample size (n)} = \frac{4pq}{d^2}
\]

\[
P \text{ (Prevalence)} = 20% \\
Q \text{ (100-p)} = 80% \\
D \text{ (allowable error)} = 11 \\
\text{n} = \frac{4 \times 20 \times 80}{(11)^2} \\
= \frac{6400}{121} \\
= 52.89
\]

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:

a) Detailed history, general examination and clinical findings
b) Basic investigations as mentioned in the proforma.
c) 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:

1. Itching.
2. Hyper pigmentation.
3. Ulceration.
4. Patients with incompetent Sapheno-femoral junction and/or Sapheno-popliteal junction and/or perforators.
5. Patients who were above 18 years of age and willing to participate in the study.

3.3.2 Exclusion criteria
1. Proven cases of deep vein thrombosis.
2. Pregnant females with varicose veins.
3. Secondary varicose veins and recurrent varicose veins of lower limbs.
4. Unwilling patients to participate in the study.
5. Other associated peripheral arterial disorders (Ex-Atherosclerosis, Buerger’s disease etc.) and peripheral lymphatic disorders.
6. Other causes of lower limb oedema.
7. 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:

| 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 is 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.
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.

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%.

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-poalpitleal junction ligation with stripping of Great saphenous vein and ligation of incompetent perforators was performed in 2(3.2%) cases.

**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

---

### 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%|

### 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%      |

### 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%).
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.

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 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 10: Complication of stripping

| Complication                      | Long segment | Short segment |
|-----------------------------------|--------------|---------------|
| Saphenous neuritis                | 1 (20%)      | 0             |
| Surgical site infection           | 4 (6.45%)    | 0             |
| Wound gaping                       | 1 (1.61%)    | 0             |
| Residual pigmentation             | 2 (3.22%)    | 0             |
| Phlebitis                          | 3 (4.83%)    | 0             |
| Saphenous neuritis                | 1 (1.61%)    | 0             |

### 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             | 21.4%        |
| Sapheno-femoral flush ligation + Multiple subfascial perforator ligation | 20             | 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:

In my study, the age range was from 23 yrs. to 71 yrs. Malhotra et al. (1972) 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. [1] in their study of 1338 patients in England had an age range of 20-75 years.

### Table 12: Age range

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

In my study, 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. [5] in Germany recorded a ratio of 1.2. Widmer [7] in Switzerland recorded a ratio of 1:1. Callum et al. [8] in England recorded a ratio of 1:1. The decreased 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 13: Male to female ratio

| Studies            | Male: Female |
|--------------------|--------------|
| Present study      | 1.85:1       |
| Burkitt et al. [4]  | 1.5:1        |
| Callum et al. [9]   | 1:2          |
| Leipnitz et al. [5] | 1:2          |
| Widmer [7]          | 1:1          |
| Mecky et al. [3]    | -            |

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.

### Table 14: Limb involvement (present study Compared)

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

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. where 68% had perforator incompetence.

**Table 16: Site of incompetence and complications**

| Site of incompetence | T.A. Lees & D. Lambert (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 incompetence which is almost comparable to the 65% of combines superficial and perforator incompetence obtained in study by T.A. Lees & D. Lambert (15), 14 (22.58%) had isolated superficial incompetence 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 Finlandand 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 et al. (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 et al. (19) (n=49) (follow up 36months) | 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 was 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 fallow 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.

**7. References**

1. Dr. Pradeep Muley MD. Treating varicose veins without surgery, 2008. Available from:
   http://www.indianinterventionalradiology.in.
2. Malhotra SL. An Epidemiological study of varicose veins in Indian rail road workers from the South and North of India, with special reference to the causation and prevention of varicose veins. Int. J Epidemiol. 1972; 1:177-83.
3. Wright et al. The prevalence of venous disease in a west London population. In: Davy A, stemmer R, Eds. Phlebology’ 89. Paris: John Libbey Eurotext, 1989, 176-8.
4. Burkitt et al. Varicose veins in India, Lancet. 1975; 2:765-769.
5. Callum MJ. Epidemiology of Varicose veins-British Journal of Surgery. 1994; 81:167-73.
6. Leipnitz et al. Prevalence of venous disease in the population: first results from a prospective study carried out in greater Aachen. In: Davy A, Stemmer R, Eds, Phlebology 89. Paris: John Libbey Eurotext, 1989, 169-71.
7. Widmer LK. Peripheral venous disorders”, Basal III, Bern: Hans Huber, 1978.
8. Callum MJ. Epidemiology of varicose veins. Br. J Surg. 1994; 81:167-73. [PubMed]
9. Dur AHM, Mackay AJC et al. Duplex assessment of clinically diagnosed chronic venous insufficiency. Br. J Surg. 1992; 79:155-61.
10. Mekky et al. Varicose veins in women cotton workers: An epidemiological study in England and Egypt. BMJ. 1969; 2:591-5.
11. Pramod Mirji et al. Clinical Features and Management of Varicose Veins of Lower Limb. Journal of Clinical and Diagnostic Research. 2011; 5(7):1416-20.
12. Ziegler S, Eckhardt G, Stoger R et al. High prevalence of chronic venous disease in hospital employees. Wien KlinWochenshr. 2003; 115:575-9.
13. Minar E. To work in a hospital a new factor for development of venous disease? Wien KlinWochenshr 2003; 115:549-51.
14. Labropoulos N. et al. Where does venous reflux start? J Vasc Surg. 1997; 26:738-42.
15. Leese TA, Diltiazem Lambert. Patterns of venous reflux in limbs with skin changes associated with chronic venous insufficiency. Br. J Surg. 1993; 80:725-28.
16. Saarinen J, Suominen V, Heikkinen M, Saaristo R, Zeitlin R, Vainio J et al. The profile of leg symptoms, clinical disability and reflux in legs with previously operated Varicose disease. Scand. J Surg. 2005; 94:51-55. [PubMed]
17. Murli NL, Navin ID. Classical varicose vein surgery in a diverse ethnic community. Med. J Malays. 2008; 63:193-198. [PubMed]
18. Robertson L, Lee AJ, Gallagher K, Carmichael SJ, Evans CJ, McKinstry BH. Risk factors for chronic ulceration in patients with varicose veins: a case control study. J Vasc. Surg. 2009; 49:1490-1498. [PubMed]
19. Sarin S, Scurr JH, Coleridge Smith PD. Assessment of stripping the long saphenous vein in the treatment of primary varicose veins, Br. J Surg. 1992; 79:889-90.