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# An Observational Study of Varicose Veins at a tertiary care hospital

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**ABSTRACT**
**Introduction:** Varicose veins are dilated and tortuous lower limb veins which may be accompanied by telangiectasia, skin changes or ulcer. Various predisposing factors have been implicated like pregnancy, prolonged standing, obesity, old age or athletics, but sometimes it may be hereditary. It is as common as 10 to 20% prevalence in many countries. The present study has been undertaken to evaluate the various clinical aspects of varicose veins of lower limbs. **Method:** This retrospective and prospective observational study was conducted on 125 patients of varicose veins and observed for demographic details, clinical findings, Doppler results, surgical management and complications. **Results:** The median age was 35.5 years. Maximum 40 patients (32%) were noted between 31-40 years. 110 patients (88%) gave the history of prolonged standing. Dilated & tortuous veins were present in 115 (92%) of the patients and telangiectasia in 100 (80%).55 patients (44%) belonged to CEAP class C2. Saphenofemoral & saphenopopliteal junction with perforators incompetence was commonest, present in 43 (34.4%). 20 (16%) presented with venous ulceration and Trendelenburg procedure with multiple ligation was the commonest surgery performed in 59(47.2%). **Conclusion:** Varicosities are common in fourth decade with male predominance and involve occupations with prolonged standing. Patients were classified according to CEAP classification. Most common investigation modality used is color duplex. Venous ulcers are commonly associated. Surgical management is the mainstay of treatment with Trendelenburg procedure and multiple ligation being the most common procedure performed. Conservative management includes compression with stockings.
**KEYWORDS:** Varicose, CEAP, Doppler, Trendelenburg

## I. INTRODUCTION

Varicose veins are the part of penalty we pay for the adoption of erect posture. It affects 10% to 20% of the population in the western world but in developing countries, because of their way of life, the incidence is about 2%. Various predisposing factors have been implicated like pregnancy, prolonged standing, obesity, old age, athletics, etc. but heredity also plays an important role. In varicose veins, the problem may lie in superficial veins, deep veins or in the perforating system. [1]

Varicose veins range in severity from telangiectasia to protuberant superficial varicose veins with or without edema, dermatitis, lipodermatosclerosis and venous ulceration.[2] It has been classified also according to symptoms and signs. Earlier varicography was done to visualize the veins and varicosities but it was an invasive method and not much reliable. Duplex scanning was introduced in the end of 1980s, and it has become the gold standard method of investigating venous reflux instead of phlebography.[3] Later on Color duplex ultrasound was introduced and it turned out to be superior to clinical examination in evaluation of superficial venous system and perforator incompetence and it is especially valuable in detecting and saphenofemoral and saphenopopliteal incompetence. In the developed countries, where attire reveals more than it's conceals, patients turn up in sizeable numbers for treatment for cosmetic reasons, while in our country, patients are hospitalized more for the complications of the disease than for the disease itself. Varicose veins of lower extremities are the most common peripheral vascular disease and it calls for treatment due to the morbidity and loss of working hours it causes. Therefore, the present study has been undertaken to evaluate the various clinical aspects of varicose veins of lower limbs of the patients.

## II. MATERIALS AND METHODS:

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Ethics committee approval was taken. This retrospective and prospective observational study was conducted on patients of varicose veins admitted in various surgical wards of a tertiary care hospital over last four years. The retrospective data was based on case records of all the admitted patients of varicose veins. Demographic data in the form of age, gender, occupation, presenting chief complaints were recorded in chronological order along with history of presenting illness, past history, personal history and family history. General physical examination was done. Detailed local examination was recorded followed by systemic examination in every case. Clinical findings, type of surgical procedure, various treatment modalities, and details of complications were noted. Similarly, relevant data was recorded of all prospective cases. Patients who refused to participate and patients with deep vein thrombosis of calf or thigh veins, secondary varicose veins or peripheral vascular disease were excluded from the study. Categorical data were assessed in the form of absolute numbers and percentages. Quantitative data was assessed by calculating range and measures of central tendency such as mean and standard deviation.

## III. RESULTS

The clinical analysis of 125 cases of varicose veins admitted in various surgical wards of a tertiary care hospital was carried out over a period of 4 years. 110 (88%) were males and 15 (12%) were females, showing a male preponderance. The median age of the study group was 35.5 years. 35 patients (28%) belonged to the age group of 18-30 years, 40 patients (32%) between 31-40 years, 26 patients (20.8%) between 41-50 years, 16 patients (12.8%) between 51-60 years and 8 patients (6.4%) belonged to the age group of 61-70 years. 110 patients (88%) gave the history of prolonged standing, out of which majority were farmers (39%) and labourers (29%). Rest were involved in occupations like watchmen (12%), shopkeepers (11%), bus conductors (6%) and teachers (3%). 15 (12%) patients gave a history of sedentary occupation style. Table 1 reveals that the commonest presentation in patients with varicose veins is dilated & tortuous veins followed by telangiectasia.

**Table 1: Clinical presentation in patients with varicose veins**

| S. No. | Clinical feature | Total No. of patients | Affected patients | |
|---|---|---|---|---|
| | | | Number | Percentage (%) |
| 1. | Dilated & tortuous veins | 125 | 115 | 92.0 |
| 2. | Telangiectasia | 125 | 100 | 80.0 |
| 3. | Changes in skin and subcutaneous tissue | 125 | 48 | 38.4 |
| 4. | Lower limb edema | 125 | 26 | 20.8 |
| 5. | Healed ulcer | 125 | 10 | 8.0 |
| 6. | Active venous ulcer | 125 | 10 | 8.0 |

Dilated & tortuous veins were present in 115 (92%) of the patients and telangiectasia in 100 (80%). Other clinical features included skin changes in 48 (38.4%), lower limb edema in 26 (20.8%) and venous ulcer (healed & active) in 20 (16%) each. According to CEAP classification, 10 patients (8%) belonged to C1, 55 patients (44%) belonged to C2, 4 patients (3.2%) belonged to C3, 36 patients (28.8%) belonged to C4, 10 patients (8%) belonged to C5 and 10 patients (8%) belonged to C6 classification. The CEAP Classification is based on clinical manifestations (C), etiologic factors (E), anatomic distribution of disease (A) and underlying pathophysiologic findings (P). (Table 2)

**Table 2: CEAP classification of varicose veins**

| Class | Manifestation |
|---|---|
| C0 | No visible or palpable signs of venous disease. |
| C1 | Telangiectasia or reticular veins. |
| C2 | Dilated & tortuous veins; dilated veins 3mm in diameter or larger. |

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| | |
|---|---|
| C3 | Limb oedema without skin change. |
| C4 | Changes in skin and subcutaneous tissue secondary to chronic venous disease (Eczema & Lipodermatosclerosis) |
| C5 | Healed venous ulcer. |
| C6 | Active venous ulcer. |

56 (45%) patients had involvement of right lower limb whereas 44 (35%) left lower limb. 25 (20%) of the cases had involvement of both the lower limbs. Duplex study was carried out in all patients and findings are depicted in Table 3.

**Table 3: Duplex findings in patients of varicose veins and venous ulcer.**

| S. No. | Duplex study findings: Incompetence of | | Varicose veins | | Venous ulcer | |
|---|---|---|---|---|---|---|
| | | | No. of patients | (%) | No. of patients | (%) |
| 1 | Saphenofemoral junction | | 20 | 16.0 | 8 | 40.0 |
| 2. | Perforators | | 35 | 28.0 | 5 | 25.0 |
| 3. | Combined | | 70 | 56.0 | 7 | 35.0 |
| | | Saphenofemoral & saphenopopliteal junction with perforator/s | 43 | 34.4 | 4 | 20.0 |
| | | Saphenofemoral junction with perforator/s | 18 | 14.4 | 2 | 10.0 |
| | | Saphenopopliteal junction with perforator/s | 9 | 7.2 | 1 | 5.0 |
| 4. | Total | | 125 | 100 | 20 | 100 |

Most common pathology was combined saphenofemoral & saphanopopliteal junction with perforators incompetence which was present in 43 (34.4%) of the cases followed by perforators incompetence alone in 35 (28%). Saphenofemoral junction incompetence alone was detected in 20 (16%) of the patients. Out of 125 patients of varicose veins 20 (16%) presented with venous ulceration, 8 (40%) of these patients were associated with saphenofemoral junction incompetence while 5 (25%) patients had perforator incompetence alone and 7 (35%) had combined incompetence. Most commonly performed surgery for varicose veins in our study turned out to be Trendelenburg procedure with multiple ligation 59(47.2%). Trendelenburg procedure with stripping was done in 37 (29.6%) of the cases. Ligation of perforator alone was done in 21 (16.8%) of cases while 8 patients (6.4%) were managed conservatively by elastic stockings. Out of 125 patients, 16 (12.8%) patients developed postoperative complications. Seroma was the most common in 7(43.75%) patients, followed by hematoma in 5 (31.25%) and wound infection in 4 patients (25%).

## IV. DISCUSSION

Varicose veins are far more common condition than it is consulted for the treatment. Many Indian patients suffer from the disease but only few seek the treatment. The fundamental pathophysiologic event in venous insufficiency is the reflux, the retrograde flow due to leaking venous valves.[4] This leads to a delayed emptying of blood from the leg, which thus contains a greater volume than normal, and leads to venous hypertension. The affected vein wall has a lower content of collagen than healthy veins, and histological studies of

varicose veins have demonstrated a disruption of the organization of the extracellular matrix and smooth muscle architecture (Jones 1999) M. Varicose veins also display a greater inflammatory cell infiltrate than normal veins (Ono 1998).

There was a male predominance in our study with M: F ratio: 7.33:1 which is comparable to the Mirji et al who observed 26 (81.25%) males with M: F ratio 4.33:1[5]. Whereas Joseph et al reported 127 (74.7%) males out of total 170 cases with M:F ratio 3:1[6] and Prasad et al observed 39 (78%) males in study of total 50 cases with M:F ratio 3.55:1[7]. There is significant rate of male predominance in this disease. In India, males are more involved due to male predominance as farmers, labourers, watchman, shopkeepers and bus conductors. Females are less involved in working outside and are more towards working as a housewife in lower and mid socio-economic status population.

In our study majority of the patients were between 31-40 years of age group, accounting for 32% of total burden of the disease. Mean age was 35.5 years. As reported by Joseph et al, majority patients were between 41-50 years, accounting for 31.2% of the total studied.[6] Mean age was 46.7 years. Mirji et al noted 31-40 years as the most affected age group, accounting for 37.5% of the total studied. [5] Prasad et al observed maximum affected age group to be 31-40 years, accounting for 24% of cases with a mean age of 39 years. [7] The age group of 31-40 years is most commonly involved probably due to more amount of labor work, skilled and professional workers are involved in this age group, hence more prone for varicose veins.

Prolonged standing has been related as a risk factor to varicose veins since a long time as it increases the venous pressure in lower limbs for long time and eventually leads to increase pre-load on valves and perforators. On longer duration and repeated events this might lead to weakness of valves and eventually incompetence of perforators and saphenofemoral junction. In this study 88% of cases were related to long standing hours of occupation which is comparable to Mirji et al with 81 % of the cases contrary to the study by Joseph et al with only 51% of cases. [5,6]

The chain of events from venous hypertension to skin changes or to a venous ulcer is not yet delineated. Several theories have been proposed, the most popular being the theory that white cells accumulating due to the venous stasis will become activated and release toxic substances deleterious to the skin and subcutaneous tissue (Coleridge: Smith 1996)[8]. Many varicose veins are asymptomatic, and the patient's complaint purely cosmetic. When symptoms occur, they are often described as: heaviness, swelling, aching, restlessness, cramps and itching. Most of our patients had symptoms of dilated and tortuous veins, followed by telangiectasia with reticular veins. Dilated and tortuous veins were seen in 92% of our patients. Contrary to this, Mirji et al reported only 31.15% patients with complaints of varicosities.[5] Varicosities mean dilated, tortuous, elongated superficial veins, which account for majority of the presentation along with non-specific symptoms of dragging and heaviness of the lower limb. However, it differs from place to place and according to literacy and knowledge of the disease, many times if it's not painful or giving any distracting symptoms, patient may not consult a specialist. Telangiectasia was seen in 80% of our cases and similarly Prasad et al reported it in 82% of the cases.[7] Whereas only 37.5% of cases were reported to have telangiectasia by Mirji et al. [5] Skin and subcutaneous tissue changes were seen in 38.4% of patients in present study compared to only 20% of cases in a study by Prasad et al and 12.5% by Mirji et al. [7,5] Ulceration was seen in 16% of our cases compared to 18% in study by Prasad et al and 18.75% by Mirji et al. [7,5] This shows that commonest feature of presentation is dilated and tortuous veins followed by telangiectasia and skin and subcutaneous changes, whereas ulcer is a late sequel of the disease and seen in very less number of the patients.

In present study, most cases fall under C2 category of CEAP classification (highest number of patients consulted with symptoms of varicosities), which is comparable in all 3 studies (40% in Mirji et al and 42% in Prasad et al). This signifies that most of the patients who seek medical advice are from C2 category. C4 category consists of skin changes, including eczema, pigmentation and lipodermatosclerosis, which was found in 28.80% of our cases compared to 11.43% in Mirji et al and 20% in Prasad et al. [5,7] Other categories had variable incidences but 3rd common presentation is ulcer, whether healed or active, which is of C5 and C6 category. Least common categories are C3 and C1, which consist of lower limb edema

and telangiectasia respectively and involve less number of patients.

Duplex, colour doppler ultrasound, has its name because it combines the ultrasound imaging with pulsed doppler spectral waveform analysis that is colour-encoded and superimposed on the image, thus creating an image with the anatomy of the vascular segment and the flow pattern. The duplex technology has developed rapidly the last decade, and it is now possible to examine even small vessels with accuracy. It has grown up to be an effective non-invasive method of identifying underlying pathology in varicose veins. It is an accurate method for identifying saphenofemoral junction and perforators incompetence. It is also an effective method for identifying underlying arterial pathology. In this study, saphenofemoral junction incompetence was found in 16% of the patients whereas Sahu et al reported 58.8% cases. [9] Joseph et al reported only 35.3% of cases having saphenofemoral junction incompetence. [6] In our study perforator incompetence was reported by duplex scan in 28% of cases compared to 60% by Joseph et al and 38.1% by Sahu et al. [6,9] Saphenofemoral junction with perforators incompetence was reported in greater percentage of cases (43% in present study and 4.7% and 3.1% by Joseph et al and Sahu et al respectively). Hence, most common underlying pathology is saphenofemoral junction incompetence followed by perforator incompetence.

Ulceration is due to increased venous pressure for long term in the lower limbs which further leads to ischemic changes. Present study shows that saphenofemoral junction incompetence was associated with ulceration in 6.4% of the cases compared to 17.14% reported by Mirji et al and 20 % by Sahu et al. [5,9] In all studies, combined incompetence was associated with ulceration in less number of the patients. This proves that saphenofemoral junction incompetence is more commonly associated with ulceration may be due to increased venous pressure changes.

In present study ligation of perforators was done in 16.8% of the cases whereas in the study by Sahu et al it was reported to be done in 43% of the cases and by Joseph et al in only 21% of the cases. [9,6]

There are 3 modalities for treatment of varicose veins available, which are used singly or in combined to achieve the appropriate therapeutic goals. [10,11] A) Conservative (compression, with stockings or bandages) B) Interventional (sclerotherapy, foam sclerotherapy, radiofrequency ablation) C) Surgical (stripping of veins, perforator ligation). When treatment of varicose veins is considered, there are two targets; cosmetic appearance and venous hypertension. Trendelenburg procedure with multiple ligation is the most frequently done procedure. It was done in 47.2% of the cases in present study compared to 46% reported by Joseph et al and 43% by Sahu et al.[9] These procedures are done alone or can be combined with other procedures as well. Trendelenburg procedure with stripping was performed in 29.6% of the cases in present study while Joseph et al performed in 13% and Sahu et al in 17% of cases. [6,9] This shows that most common and most preferable treatment is Trendelenburg procedure with multiple ligation and has better outcome than other methods alone. These methods are easy to perform and still remain the gold standard for the treatment of varicose veins. Common practice is to advise compression bandages or stockings post-operatively and pre-operatively to reduce the venous pressure as well as to prevent hematoma formation.

Out of 125 patients, 16% (20) patients developed complications. Seroma was the most common complication developed in 7 (35%) of these patients compared to the study by Prasad et al (25%). 25% patients developed hematoma while 20% each developed infection and ulcer. This shows that in spite of good surgical techniques still there are complications that can't be prevented. Hence it solely depends on isolated factors like treatment expertise, patient compliance and patient's adherence to the complete treatment plan.

To conclude, varicose veins are dilated and tortuous lower limb veins accompanied by telangiectasia, skin changes or ulcer, which occur commonly in fourth decade with male predominance and involving occupations with prolonged standing. Patients are classified according to CEAP classification. Most common investigation modality used is color duplex study with 100% sensitivity with most common finding and underlying pathology being saphenofemoral junction incompetence. Venous ulcers are commonly associated with varicosities. Surgical management is the mainstay of treatment with Trendelenburg procedure with multiple ligation being the most common procedure performed. Varicose vein

stockings should be advised for conservative management.

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