

Lower Limb Varicose Veins: Evaluation, Diagnosis, and Treatment Outcomes in a Tertiary Care Setting

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Received: 19-10-2024 / Revised: 20-11-2024 / Accepted: 27-11-2024

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Conflict of interest: Nil

Abstract:

Background: Varicose veins can lead to various leg discomforts, though it is crucial to distinguish these symptoms from other potential causes of leg pain. Therefore, this study aimed to assess the clinical and radiological characteristics and outcomes of treatment in patients with lower limb varicose veins.

Materials and Methods: The study included 56 patients diagnosed with varicose veins in the lower limbs. Comprehensive demographic and clinical data were collected for each patient. Radiological assessments were conducted to evaluate the condition. Treatment was administered based on the patient's evaluation, either through conservative or surgical interventions. The patients were followed for up to one year, and all data were recorded in a Microsoft Excel sheet for statistical analysis using SPSS software.

Results: Among the 56 patients evaluated, the mean age was 46.4 years, with 69.64% of the participants being male. Unilateral involvement was observed in 73.21% of cases. Clinical symptoms included dull, aching pain, non-healing ulcers, night cramps, and deep vein thrombosis. The common femoral vein was involved in 57.14% of patients. SPJ competency was noted in 26.79%, 16.07%, and 30.36% of patients with Class 2, Class 4, and Class 6 grades, respectively. Surgical procedures included SEJ flush with GSV stripping (60.71%), SEJ flush ligation with perforator ligation (12.50%), SEJ flush ligation (10.71%), and subfascial perforator ligation (10.71%). Post-surgical evaluation showed a significant relief of pathology in 87.50% of the patients.

Conclusion: Varicose veins are characterized by the permanent enlargement and dilation of veins. Surgical intervention is recommended to prevent complications, such as ulceration, in the future.

Keywords: Varicose Veins, Ulcer, Deep Vein Thrombosis.

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Introduction

The management of superficial and deep venous reflux and obstruction, which contribute to the formation of varicose veins (VV) and post-thrombotic syndrome (PTS), accounts for a substantial portion of the clinical workload for vascular and endovascular specialists. This burden is expected to increase as the global population ages. Despite its clinical significance, the epidemiology, genetics, and pathophysiology of these conditions remain incompletely understood, and many clinicians still lack a clear and comprehensive understanding of the underlying vascular anatomy and biology. This knowledge gap contributes to less-than-optimal treatment outcomes in many cases [1-3]. Varicose veins can present with a range of symptoms, including leg discomfort, but distinguishing these symptoms from other potential causes of leg pain is essential for accurate diagnosis. The Edinburgh Vein Study identified itching, heaviness, and aching as symptoms most significantly associated with varicose veins, though the relationship between these symptoms and varicose veins was found to be

inconsistent, particularly in male patients. Traditional indicators that suggest varicose veins as the source of symptoms include the exacerbation of discomfort following prolonged standing or walking, symptom relief with leg elevation or compression hosiery, and tenderness over the affected veins [4-7]. In light of these observations, the present study was conducted to perform a clinico-radiological evaluation and to explore treatment options for patients presenting with varicose veins of the lower limbs.

Material and Methods

The primary objective of this study was to conduct a comprehensive clinico-radiological evaluation of patients diagnosed with varicose veins of the lower limbs, with the goal of identifying the most effective treatment modalities based on individual patient characteristics. The study enrolled a cohort of 56 patients who had been clinically diagnosed with lower limb varicose veins, a condition characterized by the pathological enlargement, elongation, and twisting of veins, which typically

results from venous insufficiency or valve dysfunction. Upon enrollment, detailed demographic and clinical data were collected from all participants, including age, gender, medical history, and symptomatology.

Additionally, the patients underwent radiographic evaluations, including duplex ultrasonography or other imaging techniques, to assess the extent of venous dilation, valve incompetence, and other anatomical features that may contribute to venous insufficiency. Radiographic assessments were essential for confirming the diagnosis and determining the most appropriate treatment approach.

Based on a thorough evaluation of both clinical and radiological data, treatment options were tailored to each patient's specific condition. Management strategies were classified into conservative and surgical treatments. Conservative approaches, such as compression therapy, lifestyle modifications, or

pharmacological interventions, were considered for patients with mild symptoms or early-stage disease. In contrast, patients with more advanced disease, extensive venous dilation, or those at higher risk for complications, such as ulceration, were offered surgical treatments, including procedures like endovenous laser therapy (EVLT), vein stripping, or sclerotherapy. Data were systematically recorded using Microsoft Excel, and statistical analysis was performed using SPSS software to evaluate the outcomes of the different treatment options.

Results

Table 1 shows demographic and clinical characteristics of study participants. Among the 56 study participants, a significant majority were male. A higher proportion of patients had unilateral varicose veins (73.21%) compared to bilateral involvement. The most common clinical presentation was dull aching pain, reported by 60.71% of the patients.

Table 1: Demographic and clinical variables in study patients

Variable	n	%
Male	39	69.64
Female	17	30.36
Unilateral varicose veins	41	73.21
Bilateral varicose veins	15	26.79
Dull aching pain	34	60.71
Common femoral vein involvement	32	57.14
Non-healing ulcer	19	33.93
Night cramps	6	10.71
Deep vein thrombosis	4	7.14

The clinical severity of varicose veins was measured in terms of the CEAP classification (Table 2). Class 2 (varicose veins) was most prevalent, affecting 26.79% of patients, while Class 4 (skin changes such as pigmentation) was

observed in 16.07% of the participants. Class 6 (ulceration) was observed in 30.36% of cases. No patients were classified under Class 1, Class 3, or Class 5, indicating that none presented with mild symptoms or post-thrombotic complications.

Table 2: Correlation of clinical severity and SPJ incompetence (Doppler)

Severity	n	%
Class 1	0	0.00
Class 2	15	26.79
Class 3	0	0.00
Class 4	9	16.07
Class 5	0	0.00
Class 6	17	30.36

The most common surgical intervention was SEJ flush with GSV stripping, performed in 60.71% of patients (Table 3). Other procedures included SEJ flush ligation combined with perforator ligation (12.50%), SEJ flush ligation alone (10.71%), and sub fascial perforator ligation (10.71%).

Table 3: Surgical interventions in study participants

Type of Surgery	n	%
SEJ flush + GSV stripping	34	60.71
SEJ flush ligation + perforator ligation	7	12.50
SEJ flush ligation	6	10.71
Subfascial perforator ligation	6	10.71
Others	4	7.14
Total	56	100.00

A favorable outcome, defined as relief from symptoms, was observed in 87.50% of patients, indicating that the majority of the surgical interventions were successful in providing

symptomatic relief (Table 4). However, 12.50% of participants did not experience relief following surgery, suggesting that some patients did not benefit from the treatment approaches used.

Table 4: Details of outcomes in study participants

Outcome	n	%
Relieved	49	87.50
Not relieved	7	12.50
Total	56	100.00

Discussion

Lower extremity venous insufficiency, often referred to as reflux or incompetence, occurs when the normal one-way venous flow to the heart is disrupted, leading to bidirectional blood flow. The venous valves, which are typically thin and flexible in all peripheral veins, serve to prevent retrograde blood flow. Dysfunction or damage to these valves is thought to contribute to venous insufficiency. Factors that increase the risk for this condition include lifestyle choices, central venous hypertension, thrombosis, and genetic variations in valve number or fragility.

When the valves fail and veins become incompetent, local venous hypertension, venous dilation, tissue edema, and altered tissue perfusion may arise. These changes can either be localized or affect the entire limb. Varicose veins, which are enlarged, tortuous superficial veins, are the visible manifestation of superficial lower extremity venous insufficiency. Any vein can be involved, including the great and small saphenous veins, perforators, or smaller venules. Varicosities can result from incompetence in the vein itself or from faulty perforators that expose the superficial veins to elevated pressures from the deep venous system [8-10].

Consequently, this study was designed to assess the clinico-anatomical and radiological findings in patients with lower limb varicose veins. A total of 56 patients were included, with a mean age of 46.4 years; 69.64% were male. Unilateral involvement was observed in 73.21% of the patients. Common clinical symptoms included dull aching pain, non-healing ulcers, night cramps, and deep vein thrombosis.

The common femoral vein was involved in 57.14% of the cases. SPJ competence was noted in 26.79%, 16.07%, and 30.36% of the patients with Class 2, Class 4, and Class 6 grading, respectively. Surgical interventions included SEJ flush with GSV stripping (60.71%), SEJ flush ligation with perforator ligation (12.50%), SEJ flush ligation (10.71%), and subfascial perforator ligation (10.71%). Post-surgical evaluation showed a significant relief of pathology in 87.50% of the patients. Nagre A et al. investigated the

demographic factors, clinical presentation, and outcomes of various management methods for lower limb varicose veins. All patients underwent clinical assessments and venous Doppler imaging, followed by treatment, which included conservative measures, surgery, or endovenous laser ablation. Complications following the procedures were also recorded. Of the 54 patients, 39 (72%) were under the age of 50 years, with prominent lower limb veins being the most common presentation. The sapheno-femoral junction was the most commonly affected vein. Male predominance was observed, with a male-to-female ratio of 12.5:1. Venous Doppler demonstrated 92.59% accuracy in detecting sapheno-femoral and perforator incompetence. The study showed that endovenous laser ablation had similar outcomes to surgery but with lower morbidity. They concluded that the disease is most prevalent in the active years of life, with male preponderance, and that complications are more severe when both the great saphenous and perforator veins are involved. Venous Doppler remains the preferred diagnostic tool due to its high accuracy [11].

Lalatendu Swain et al. assessed the frequency and risk factors for various types of lower limb varicose veins using Doppler ultrasound. They found that varicose veins were most commonly observed in the 30-50 year age group (52%), and less frequently in those aged 10-20 years (4%). Unilateral cases were more common, with 64% presenting unilaterally and 36% bilaterally. The most common clinical presentation was dilated, tortuous veins in the lower limb. In patients with varicose veins and chronic venous disease, Color Doppler was an essential tool for identifying the extent and distribution of venous reflux [12].

Joseph N et al. [13] studied the clinico-epidemiological profile, risk factors, and management practices of varicose veins. The majority of patients (31.2%) were in the 41-50 year age group, with a male predominance (74.7%). Most patients were unskilled workers (59.4%), and superficial veins were involved in 72.4% of cases. The great saphenous vein and perforators were the most frequently affected. Left-sided veins were more commonly involved than right-sided veins. Common symptoms at presentation included

ulceration (57.6%) and leg pain (56.5%). Ulceration was more prevalent among females ($p = 0.027$) and housewives ($p = 0.004$). Complications such as eczema (27.1%), non-healing ulcers (12.3%), and deep vein thrombosis (5.9%) were reported. Eczema was more common in patients over 60 years ($p = 0.019$). Prolonged standing was a significant risk factor, observed in 50.6% of cases, especially among males ($p = 0.001$) and unskilled workers ($p < 0.001$). A recurrence rate of 13.5% was found, primarily in the 21-30 year age group ($p = 0.021$). Doppler ultrasound was the most common diagnostic tool (70.6%). Micronized purified flavonoid fraction was used in 8.8% of cases, and conservative treatments like limb elevation (29.4%) and compression stockings (21.2%) were commonly recommended. Saphenous vein stripping was the most frequently performed surgical procedure (23.5%). This study highlighted the importance of educating high-risk groups about the potential development of varicose veins and suggested that compression stockings at the workplace, along with newer treatment methods, could improve quality of life.

Conclusion

Varicose veins are a condition characterized by the abnormal enlargement, elongation, and twisting of veins, primarily affecting the lower limbs. If left untreated, varicose veins can lead to serious complications, such as chronic venous insufficiency, skin changes, and the development of venous ulcers, which are painful and difficult to heal. Surgical treatment is often recommended as the most effective approach to manage varicose veins, particularly when conservative methods fail or when there is a risk of ulceration. By addressing the underlying venous insufficiency, surgical intervention helps to prevent further vein enlargement, reduce symptoms, and decrease the risk of future ulceration or other complications associated with chronic venous disease.

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