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A Cross-Sectional Study On Association Between Varicose Veins And Deep Vein Thrombosis.

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ABSTRACT

Varicose veins are a chronic venous disorder that can lead to serious complications, including deep vein thrombosis (DVT). This study evaluates the relationship between varicose veins and DVT, analyzing risk factors and disease severity using the Clinical-Etiology-Anatomy-Pathophysiology (CEAP) classification. A total of 118 patients diagnosed with varicose veins were included in this cross-sectional study. Demographic details, clinical history, and duplex ultrasonography findings were analyzed. The overall prevalence of DVT among varicose vein patients was 8.5%, with a higher incidence in patients with CEAP stage C3 and above ($p < 0.01$). Superficial vein thrombosis (SVT) was found to be an independent risk factor, with 15% of SVT cases progressing to DVT. These findings highlight the importance of early screening in high-risk varicose vein patients to prevent thrombotic complications. Routine duplex ultrasonography in severe cases can help in early diagnosis and timely intervention.

Keywords: Varicose veins, Deep vein thrombosis, CEAP classification, Risk factors, Ultrasonography.

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INTRODUCTION

Varicose veins affect a significant proportion of the population, with an estimated prevalence of 10 - 40% in men and 26 - 32% in women. They result from venous valve incompetence, leading to venous reflux, increased pressure, and progressive vein dilation. While varicose veins are often viewed as a cosmetic concern, they can progress to chronic venous insufficiency (CVI) and, in severe cases, deep vein thrombosis (DVT) [1]. DVT is a potentially life-threatening condition characterized by the formation of blood clots in deep veins, which may lead to pulmonary embolism if left untreated. The CEAP classification system provides a standardized approach to assessing varicose vein severity, with advanced stages (C3 and beyond) being associated with an increased risk of complications, including thrombotic events [2]. Despite its clinical significance, the direct correlation between varicose veins and DVT remains a subject of debate. While venous stasis and endothelial dysfunction are thought to contribute to thrombogenesis in varicose vein patients, the exact risk remains unclear [3, 4]. This study aims to evaluate the prevalence of DVT among varicose vein patients, assess risk factors, and determine whether disease severity influences DVT occurrence.

MATERIALS AND METHODS

Study Design and Population

This cross-sectional study was conducted at a tertiary care hospital from August 2023 to December 2024. A total of 118 patients diagnosed with varicose veins were recruited based on the following criteria.

Inclusion Criteria

- Patients aged ≥ 18 years diagnosed with primary or secondary varicose veins
- Patients willing to undergo clinical evaluation and duplex ultrasonography

Exclusion Criteria

- Patients with a history of DVT, recent surgery, malignancy, or hypercoagulable states
- Patients on anticoagulant therapy

Assessment Tools and Data Collection

CEAP Classification: Used to categorize disease severity from C0 (no visible disease) to C6 (active venous ulceration).

Table 1: Clinical Classification of varicose veins

C Class	Description
C0	No visible or palpable signs of venous disease
C1	Telangiectasias or reticular veins
C2	Varicose veins
C2r	Recurrent varicose veins
C3	Edema
C4	Changes in Skin and subcutaneous tissue secondary to CVD
C4a	Pigmentation or eczema
C4b	Lipodermatosclerosis of atrophie blanche
C4c	Corona phlebectasia
C5	Healed
C6	Active venous ulcer
C6r	Recurrent active venous ulcer

Standard classification system categorizing varicose veins based on clinical presentation and severity.

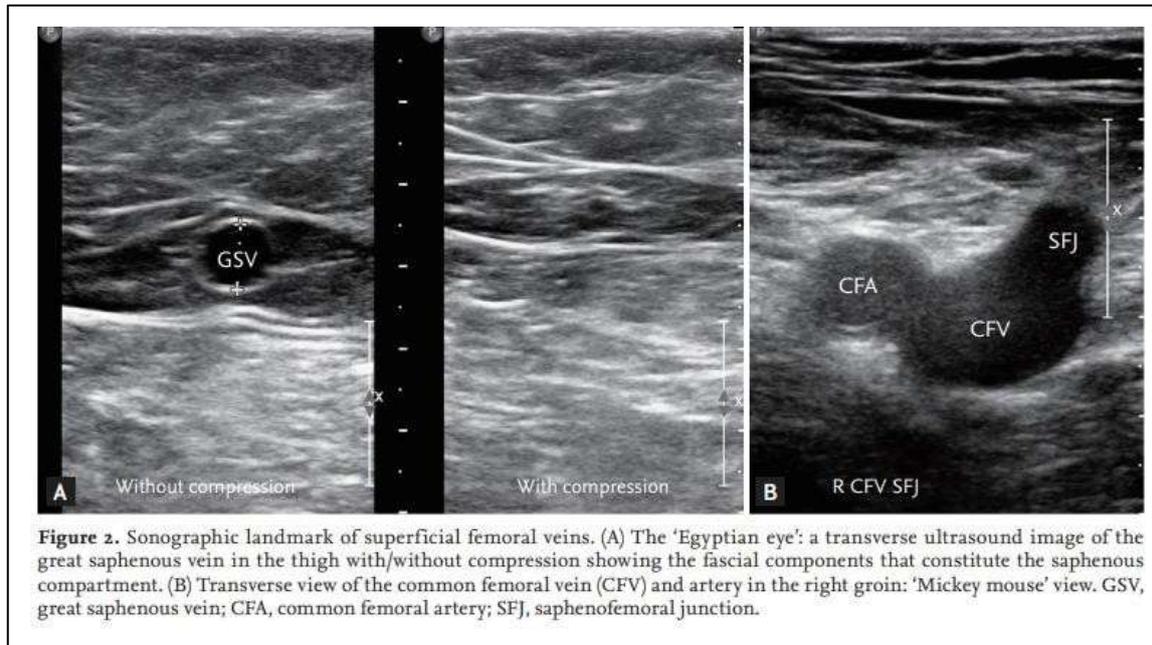
Duplex Ultrasonography: Performed using a 5 MHz probe to evaluate venous reflux and detect thrombosis.

Demographic and Clinical Data: Age, gender, BMI, comorbidities, and occupation-related risk factors were recorded.

Statistical Analysis

Data were analyzed using SPSS software v22. Chi-square tests were used to assess associations between CEAP classification and DVT occurrence. A p-value < 0.05 was considered statistically significant.

Figure 2: Ultrasonographic landmark of superficial venous system



OBSERVATIONS AND RESULTS

Demographics and Risk Factors

Among the 118 patients included in the study

Mean Age: 43.5 ± 6.7 years

Most Affected Age Group: 40 - 59 years (44.9%)

Gender Distribution: 80% male, 20% female

Table 2: Age distribution of the study subjects with varicose veins N=(118)

S.no	Age category	Frequency	Percent
1	20-39 years	36	30.5%
2	40-59 years	53	44.9%
3	60-79 years	24	20.3%
4	>80 years	5	4.3%

Presents the frequency and percentage of patients across different age groups.

Table 3: Gender distribution of the study subjects (N=118)

S.no	Gender	Frequency	Percent
1	Male	87	73.7%
2	Female	31	26.4%

Shows the male and female proportions among study participants.

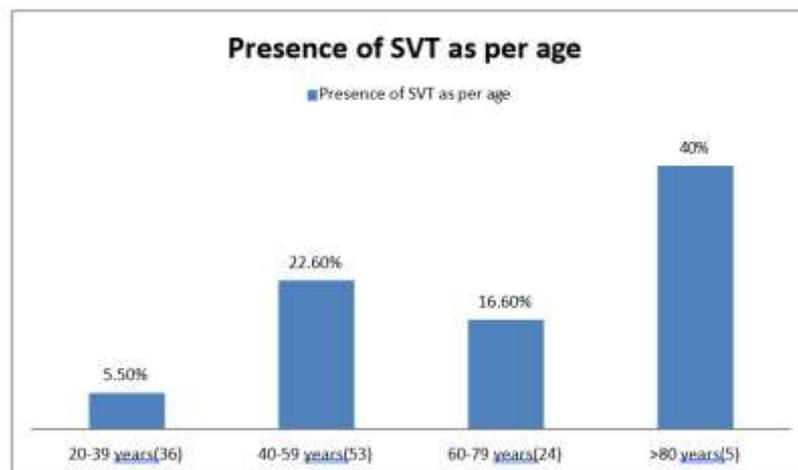
Table 4: Age wise distribution of SVT among the study subjects(N=118)

S.No	Age in years	Frequency of SVT	Percent
1	20-39 years (36)	2	5.5%
2	40-59 years (53)	12	22.6%
3	60-79 years (24)	4	16.6%
4	>80 years (5)	2	40%
Total	118	20	16.9%

Highlights the prevalence of superficial vein thrombosis across different age groups.

Risk Factors: 48.3% had a history of prolonged standing, 27.1% were obese (BMI >30 kg/m²), and 35.6% had a family history of varicose veins.

Bar Chart 1: showing Distribution of PVT as per age among the study subjects (N=118)



Bar chart showing the age distribution of patients with varicose veins, identifying the most affected age group.

CEAP Classification and DVT Prevalence

C1-C2: 45.8% of patients had mild varicose veins, with no DVT cases reported.

C3-C4: 39.8% of patients had moderate disease, with 6.3% developing DVT.

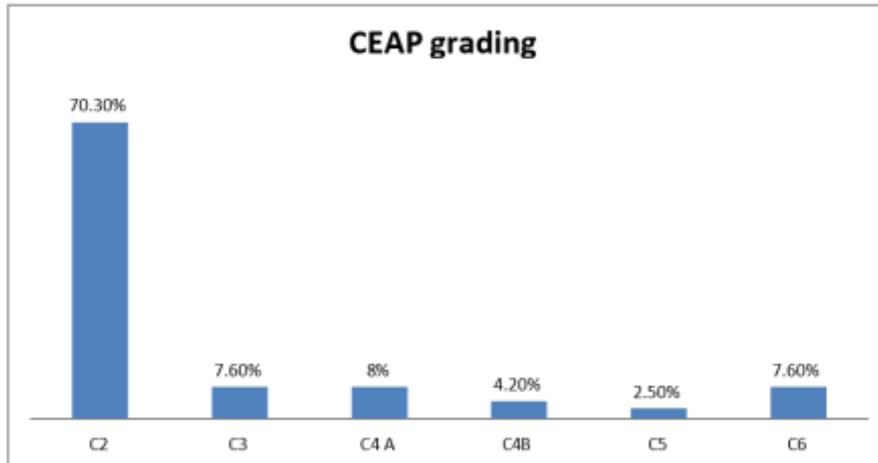
C5-C6: 14.4% of patients had severe varicose veins, with a significantly higher DVT incidence (25.7%, p < 0.01).

Table 5: Prevalence of DVT among the study subjects (N=118)

S.No	DVT	Frequency	Percent
1	Present	10	8.5%
2	Absent	118	91.5%

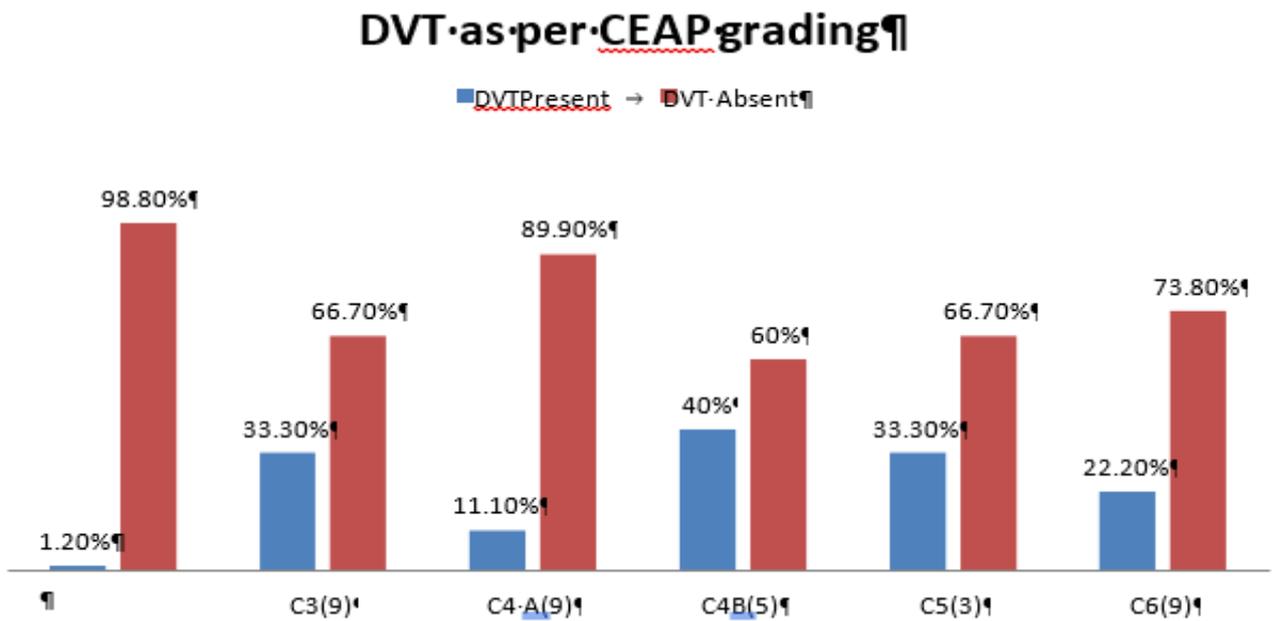
Displays the overall percentage of patients with DVT among those diagnosed with varicose veins.

Bar Chart 2: Showing the CEAP grading among the study subjects (N=118)



Bar chart representing the distribution of study participants across CEAP classifications, highlighting the prevalence of severe cases.

Bar Chart 3: Showing the presence of DVT as per CEAP gradings (N=118)



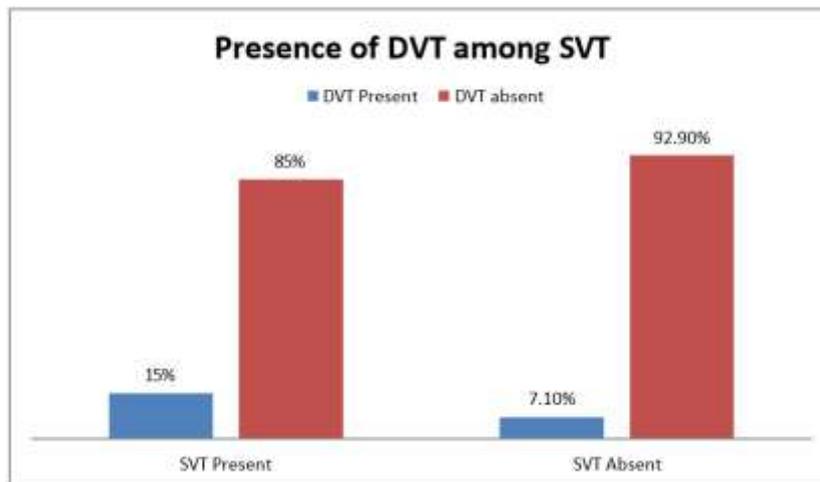
Bar chart indicating the proportion of patients who developed DVT among varicose vein cases.

Table 6: Association between SVT and DVT developed in the study subjects

S.No	SVT	DVT Present	DVT absent	Total	Chi Square value	P value
1	Yes	3(15%)	17(85%)	20	3.662	0.055
2	No	7(7.1%)	92(93.9%)	98		
	Total	10	108	118		

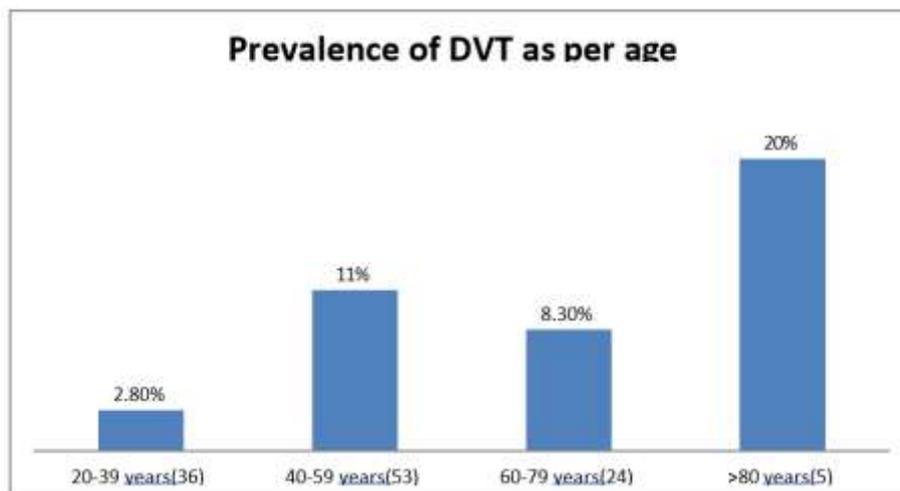
Examines how many SVT cases progressed to DVT, providing statistical significance (p-value)

Bar chart 4: Showing the presence of DVT among those who had SVT in the study subjects (N=118)



A graphical representation showing the percentage of SVT patients who developed DVT.

Bar Chart 5: Showing the prevalence of DVT among different age categories (N=118)



Displays the age-wise distribution of DVT cases, demonstrating higher risk in older patients

DISCUSSION

This study confirms a significant association between varicose veins and DVT, with an overall DVT prevalence of 8.5% [5]. The results indicate that patients in CEAP C3 and beyond have a 3.5-fold higher risk of developing DVT, supporting the hypothesis that venous stasis and endothelial dysfunction contribute to clot formation [6]. The current study was conducted to evaluate patients diagnosed with varicose veins in the General Surgery department for the presence of venous thrombosis especially deep vein thrombosis. In addition, we evaluated the relation of age and gender in the occurrence of deep vein thrombosis and also found out the proportion of superficial vein thrombosis patients affected by DVT [7]. We classified the patients of varicose veins clinically with help of CEAP classification and found the association of the degree of severity of venous disease with prevalence of DVT. The mean age of the recruited study subjects with varicose veins was 43.5+6.7 years. which also observed the nearly equal mean of 41.76 years [8]. It has been found that varicose veins is a disease of middle age groups in 20 various epidemiological studies. Thus, middle age poses a significant risk factor for varicose veins [9]. In the present study, there was a male preponderance among the subjects of varicose veins WE observed that according to CEAP classification done among the study subjects with varicose veins, the proportion of C2 cases was found to be higher with

75% [10]. The progression of superficial thrombophlebitis to the deep venous system, primarily from the long saphenous vein in the thigh to the common femoral vein, was observed in 30 (11%) of 263 patients within 2 to 10 days following the initial examination [11]. The potential discrepancies in prior studies may stem from the simultaneous enumeration of DVT and SVT [12]. The duration required for the progression of SVT to DVT has not been clearly established in the existing literature. 83 patients exhibited C2 venous insufficiency, of which only 1 (1.2%) had deep vein thrombosis (DVT) [13]. Thirty-five patients were classified as C3 and above according to the CEAP classification; among them, nine (25%) had deep vein thrombosis (DVT), with a p-value of less than 0.05. Clinical presentation with a C3 grade or higher was identified as a potential risk factor for concomitant DVT in patients with varicose veins, a finding that correlates with our study [14]. This finding tells that with increase in the severity of the venous disease, the risk of occurrence of DVT was higher as proved by the significant association of DVT and CEAP classification. Thus, apart from the diagnosis of varicose veins clinically. It is imperative to categorize them clinically so that the severity can be assessed and early diagnosis of DVT can be achieved [15].

Limitations and Future Research

- The study was conducted at a single center, limiting generalizability.
- Long-term follow-up is needed to assess DVT progression.
- Future research should explore genetic risk factors for thrombosis in varicose vein patients.

CONCLUSION

This study highlights the significant risk of deep vein thrombosis in varicose vein patients and emphasizes the importance of early screening and preventive strategies. The findings support the use of routine ultrasonography in high-risk individuals, particularly those with Clinical-Etiology-Anatomy-Pathophysiology C3 and beyond. Preventive measures, including compression therapy, lifestyle modifications, and selective anticoagulation, can reduce thrombotic complications and improve patient outcomes.

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