

"VARICOSE VEINS : A STUDY OF COMPARISON OF COMPLICATIONS OF VENOUS STRIPPING OPERATION AT DIFFERENT LEVELS OF THE LIMB WITH SPECIAL EMPHASIS ON SAPHENOUS NERVE INJURY IN A RURAL POPULATION IN INDIA"

Plastic Surgery

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ABSTRACT

BACKGROUND: Chronic venous disease is often overlooked by primary and cardiovascular care providers because of an under-appreciation of the magnitude and impact of the problem. In a developing country like India, a study encompassing the clinical evaluation and management of lower limb varicose vein on the conventional lines seems a necessity to improve the quality of care with the available resources.

This study intends to assess variability of complications associated with the surgical therapeutic modality of Great saphenous vein ligation and venous stripping at different levels of the limb in varicose vein management and the role and efficacy of Duplex ultrasound in diagnosing and guiding treatment modalities.

METHODS: This is a case series observational retrospective study conducted in the department of General Surgery, Government Medical College & Research Institute, Mysore, Karnataka from January 2013 to August 2014. 50 Patients were included on accrual. The study was conducted in accordance with all the ethical guidelines.

RESULTS: The study revealed that the disease is prevalent in the active (younger) phase of life. The majority of the patients were men; Smoking, prolonged standing and strenuous work were the associated risk factors. Left lower limb was more commonly affected than the right. 90% patients had Great saphenous vein involvement. 68% patients had combined Sapheno-femoral and perforator incompetence. Isolated Sapheno-femoral Incompetence was seen in 22% of the patients. Most common Surgical Procedure performed was Sapheno-femoral junction flush ligation with Stripping of the vein and Multiple Stab Avulsions (54%). Hematoma and Wound Infection were the two most common complications encountered in 6 (12%) and 7 (14%) patients respectively. Residual varicosities were seen in 4 (8%) patients especially in those who underwent Sapheno-femoral junction flush ligation only without stripping. Saphenous Neuritis was seen in 2 (4%) patients post-operatively, both of whom had undergone stripping upto ankle. No major complications like Femoral vein injury, arterial injury or foot-drop were encountered.

CONCLUSION: Sapheno-femoral flush ligation with stripping of Great Saphenous Vein appears to be the best option for lower limb varicose vein with Great Saphenous Vein truncal involvement and perforator incompetence.

Performing only a Sapheno-femoral junction flush ligation without concomitant Great Saphenous Vein stripping resulted in residual varicosity. Complications could be reduced if the level of Great Saphenous Vein stripping is based on preoperative Duplex-confirmed venous reflux mapping. The risk of saphenous nerve injury should not be considered a reason to avoid stripping of the great saphenous vein to the ankle

KEYWORDS

Varicose veins; Great saphenous vein; Perforators; Sapheno-femoral junction Incompetence; Sapheno-femoral flush ligation with stripping.

INTRODUCTION

CVI is often overlooked by primary care providers because of an under-appreciation of the magnitude and impact of the problem. Its importance is related to the number of people with the disease and its socioeconomic impact. The exact etiology is not known, but various risk factors have been ascribed to its predisposition.

Hence an understanding of the risk factors, clinical manifestations, diagnostic modalities, and therapeutic options is warranted. In the developed countries, patients seek treatment early, even for cosmetic reasons. In the Indian scenario, it is the complications and not the cosmetic reasons, that bring the patient to a health care provider. Hence, though common, varicose veins epitomise an iceberg phenomenon.

Dilated, tortuous and elongated veins of the superficial venous system of the lower limbs more than 3mm in diameter with a demonstrable reflux and an absence of deep venous involvement are defined as Varicose veins. Estimated prevalence is between 5% to 30% in the adult population, with a woman to man predominance of 3 to 1, although a more recent study supports a higher male prevalence^[1,2].

The San Valentino Vascular Screening Project found among the 30,000 subjects evaluated by clinical assessment and duplex ultrasound, a prevalence of 7% for varicose veins and 0.86% for "symptomatic" CVI^[3].

Risk factors found to be associated with CVI include age, sex, a family history of varicose veins, obesity, pregnancy, phlebitis, previous leg injury^[4,5,6], environmental or behavioural factors associated such as prolonged standing.^[6,7]

Varicose veins have a significant impact on healthcare resources. The overall prognosis of venous ulcers is poor, delayed healing and recurrent ulceration being common. More than 50% of venous ulcers require prolonged therapy lasting >1 year^[5].

Their socioeconomic impact is dramatic, resulting in an impaired ability to engage in social and occupational activities, thus reducing

the quality of life and imposing financial constraints, loss of productive work hours, estimated at 2 million work days/year, and may cause early retirement, in up to 12.5% of patients.

AIMS & OBJECTIVES OF THE STUDY

1. Study the complications of varicose vein stripping surgery at different levels of the limb with special emphasis on saphenous nerve injury.
2. Study the role and efficacy of duplex ultrasound in diagnosing and guiding treatment modalities of varicose veins.
3. To understand the pathophysiology of recurrence of varicose veins after surgical intervention

METHODS

This is a case series observational retrospective study conducted in the Department of General surgery, Government Medical College & Research Institute, Mysore, Karnataka from January 2013 to August 2014. Patients were included on accrual. The study was conducted in accordance with all the ethical guidelines.

METHOD OF COLLECTION OF DATA (including sampling procedure):

A study of these cases with regard to admission date, history, clinical features, special investigations including duplex ultrasound, type of surgery, preoperative preparation, incidence and management of postoperative complications is done till patient is discharged from hospital

In history, presenting complaints, duration, associated diseases, personal history including diet, smoking noted Preoperative findings which include preoperative bath, skin preparation, type and time of operation, preoperative antibiotics, were noted. Operative findings include the site of incompetent perforators Postoperative findings which include, wound assessment, presence of any wound infection, development of any complications, day of 1st dressing, frequency of change of dressing, local application of antibiotics and post-operative antibiotics.

Findings on the day of diagnosis of wound infection were noted which included fever, erythema, discharge, type of discharge.

Wound infection was diagnosed on the basis of CDC definitions, swab for culture and sensitivity was collected and sent to laboratory.

INCLUSION CRITERIA FOR THE STUDY:

1. Only those cases which were admitted and operated in KR HOSPITAL, Mysore were included under the ambit of the study.
2. All patients with primary varicose veins of the lower limbs due to superficial and perforator venous incompetence
3. All varicose vein patients undergoing flush ligation and stripping surgeries only
4. Patients of either sex
5. Patients with complications of varicose veins such as chronic swelling, skin changes (lipodermatosclerosis), eczema, pigmentation, ulceration.

EXCLUSION CRITERIA :

1. Secondary varicose veins
2. Recurrent varicose veins
3. Deep venous incompetence
4. Varicose veins other than lower limbs.

SAMPLE SIZE:

50 cases of varicose veins (50 lower limbs) were included in the study on accrual.

RESULTS

The observations are as follows:

1. AGE DISTRIBUTION

The youngest in the study was 16 years and the oldest was 74 years. The commonest age group was between 31 to 40 years (28%) followed by 21 to 30 years (20%). The lowest incidence was in the age group of < 20 years (4%)

2. SEX DISTRIBUTION

Majority of the cases were men (84%) while women accounted for only 16% of the cases. Man: woman Ratio was approximately 7: 1.

3. RISK FACTORS

It was observed that cigarette or bidi smoking was the most common risk factor accounting for 56% of cases, either alone (20%) or in combination with other risk factors (36%). Erect posture was the second most common (36%). Strenuous work accounted for 20%. Obesity was seen in about 12%. 1 lady patient was pregnant and 3 patients had a positive family history.

4. LIMB INVOLVEMENT

Right lower limb was involved in 44% (22 patients) and left lower limb in 54% (27 patients). Only 2% (1 patient) was bilateral.

5. CLINICAL PRESENTATION

Prominent symptoms include dilated veins which were present in all 50 (100%) patients and was the commonest complaint associated with pigmentation/eczema/itching seen in 28 patients (56%) followed by Prominent veins with edema with or without pain in 10 patients (20%). Prominent veins with Active ulceration was seen in 5 patients (10%).

6. DISTRIBUTION ACCORDING TO CEAP CLASSIFICATION

The majority was Class 4 (prominent veins with skin changes) - 44%. Patients with Class 2 (prominent veins only± pain), Class 3 (prominent veins with edema), Class 5 (prominent veins with healed ulcers) and Class 6 (prominent veins with active ulceration) accounted for 14%, 20%, 12% and 10% respectively. (Table 1)

Table 1: Distribution as per CEAP classification

Classes	Limbs	Percentage
Class 0	0	0
Class 1	0	0
Class 2	7	14
Class 3	10	20
Class 4	22	44
Class 5	6	12
Class 6	5	10

7. DISTRIBUTION ACCORDING TO VENOUS DISABILITY SCORE (VDS)

52% of presented with a score of 2 (patients were symptomatic but could carry on with their daily activities). Only 8% were severely

disabled despite using compression and/or limb elevation.(Figure 1)

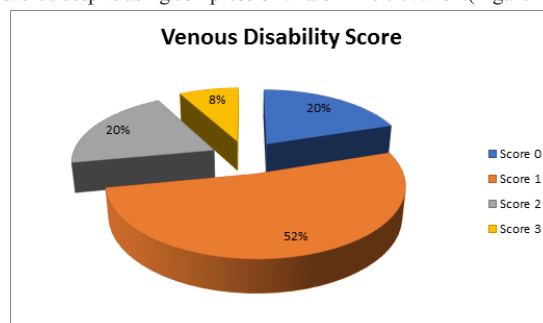


Figure 1: Venous Disability Score

8. VENOUS SYSTEM INVOLVEMENT

Majority (90%) had involvement of GSV. Isolated SSV involvement is seen in 6%. Both systems were involved in only 4%

9. DISTRIBUTION ACCORDING TO SITE OF VENOUS INCOMPETENCE

Majority had combined valvular and perforator incompetence. Sapheno-femoral incompetence with Perforator incompetence was seen in 68% (statistically significant). Isolated Sapheno-femoral Incompetence was seen in 22%. Isolated perforator incompetence was seen only in 4%. (Figure 2)

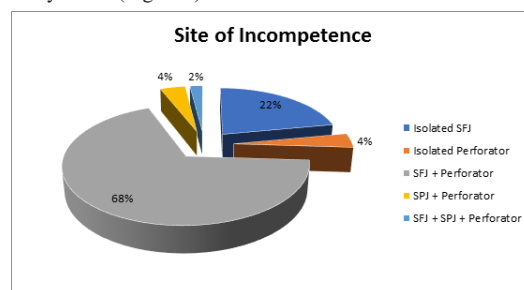


Figure 2: Site of Venous Incompetence

10. SURGICAL PROCEDURES PERFORMED

Sapheno-femoral junction flush ligation was performed in 92% of patients overall, except in four patients who did not have Sapheno-femoral incompetence. 20% underwent restrictive stripping (upto below-knee level) and 8% patients underwent stripping upto the ankle as added procedures to SFJL. 54% patients underwent stripping with multiple stab avulsions. Three patients underwent Sapheno-popliteal junction flush ligation, of which two were isolated cases. 4 % underwent Subfascial ligation only. 8% underwent only SFJL.(Table 2)

Table2: Surgical Procedures Performed

Surgical Procedure	No. of Patients	Percentage
SFJFL (Trendelenberg) only	4	8
SFJFL+ Restrictive STR (knee level)	10	20
SFJFL + Ankle level STR	4	8
SFJFL+STR+MSA	27	54
SFJFL+STR+SPL+MSA	1	2
SPJL + MSA	2	4
SFL only	2	4

SFJFL – Sapheno-femoral junction flush ligation; STR- Stripping; MSA- Multiple stab avulsion; SPL- Sapheno-popliteal junction flush ligation; SFL- Subfascial ligation.

11. POST OPERATIVE COMPLICATIONS

12% had wound infection post operatively and were treated with appropriate antibiotics and wound care. 14% had haematoma. One patient (2%) had lymph collection which was managed by aspiration. 4% had saphenous neuritis and were treated conservatively. 8% had residual varicosity. Major complications like DVT, Foot-drop and Femoral vein injury were not seen.

A. SAPHENOUS NEURITIS :

Both the cases of saphenous neuritis were seen in SFJ Flush ligation with Stripping upto ankle.

B. RESIDUAL VARICOSITY: Residual varicosity was most commonly seen in SFJ Flush ligation (Trendelenberg operation) only. Out of 4 patients, 2 (50%) had residual varicosity. Only 1 out of 27 patients operated with SFJFL + STR + MSA (3.7%) had residual varicosity.(Table 3)

Table3:Residual Varicosity

Type of surgical Procedure	No. of patients with Residual varicosity
SFJ Flush ligation only	2
Sub fascial ligation (SFL) only	1
SFJFL + STR + MSA	1

DISCUSSION

The results were analysed and discussion is as follows

1. Age distribution:

Various studies have demonstrated a similar age range of patients. 'Edinburgh Vein Study' by Robertson LA et al^[5] had an age range of 18-64 years in 1566 patients studied. Wright et al^[8] in their study of 1338 patients had an age range of 20-75 years. Malhotra et al^[9] in their study comprising 677 patients had an age range of 18-65 years. In the Present study, range is from 16 -74 years with the commonest age group being 31-40 years (28%)

2. Sex distribution:

In studies by Dur AH M et. al.^[10] and Chang C J et al^[11], majority of the patients were women (73.24% and 81.88% respectively). Studies by Franks et al^[12] and Komsuoglu^[13] et al had an equal distribution. In the present study only 12% were women. The decreased incidence of women in present study may be due to the fact that Indian women are less conscious about cosmetic appearance probably due to traditional way of Indian dressing which covers most of the body including leg. Secondly, it may be due to less average height or less strenuous activities compared to men, which has a direct impact on venous hypertension.

3. Risk factors:

In the present study, cigarette or bidi smoking was the most common risk factor accounting for 56% of cases, either alone (20%) or in combination with other risk factors (36%). Erect posture was the second most common (36% of cases). Strenuous work accounts for 20% of cases. Obesity was seen in about 12% of the cases. 1 lady patient was pregnant and 3 patients had a positive family history

4. Clinical presentation:

In a study by Pittaluga P et al^[14], most common group of presentation was C 2 CEAP class (82.1%). Class C 3, 4, 5 & 6 accounted for 6.7%, 4.3%, 3% and 2.4% respectively. In the present study all patients presented with prominent, dilated veins (100%). The most common complaint was Prominent veins with pigmentation/eczema/itching (CEAP class 4/5). This was observed in 56% followed by Prominent veins with edema with or without pain (CEAP class 3) in 20%. Prominent veins with Active ulceration (CEAP class 6) was seen in 10%

5. Limbs involved

In a study by Kharrazi M H et al^[15], right limb accounted for 46% and left limb for 54%. In a study by Dur AH M et al^[16], involvement of right limb was 48.55% and left limb was 51.45%. Bilateral involvement was in 4%. In present study, right and left limb involvement is 44% and 54% respectively. Bilateral limb involvement was seen in 2%. Thus in accordance with various studies, the present study shows an increased incidence of varicosity on the Left side.

6. Venous system involvement:

Engelhorn C A et al^[17] found involvement of GSV in 77% of the patients, while SSV was involved in 20% and both in 3% of the patients. In a study by Kharrazi M H et al^[15] GSV, SSV and both were involved in 74.44%, 15.32% and 10.24% respectively. In a study conducted by Al-Mulhim et al^[18], GSV involvement was 68.48%. SSV involvement was seen in 7.02% and both system involvement in 24.50% of patients.

Present study depicts a similar trend with majority of the patients presenting with involvement of GSV (90%). Isolated SSV involved in 6%. Both systems were involved in 4%

7. Site of incompetence: The site of incompetence was detected by

clinical examination and confirmed by venous Doppler/Duplex scanning of the involved limb. Engelhorn CA et al^[17] found 77% of the patients to have SFJ and Perforator incompetence. Only 2% had isolated Perforator incompetence. In the present study, majority of the patients had combined valvular and perforator incompetence- 68% - statistically significant, $p < 0.005$). Isolated Sapheno-femoral Incompetence was seen in 22%. Isolated perforator incompetence was seen in 4%.

8. Post-operative Complications:

In a study by Critchley G et al^[19], 10% developed haematoma post operatively, 4% had wound infection. Saphenous neuritis was seen in 6.7%. Residual varicosity was seen in 6.2%. The results are comparable in our study.

9. Neurological injury:

Holme et al^[20] found saphenous nerve injury in 7% of patients having stripping to the level of below-knee and in 39% of patients having stripping to the ankle.

In the present study 2 cases of saphenous neuritis were observed, both of which were noted in patients undergoing stripping of GSV upto ankle. Direct enquiry was made for this complication because often the symptom is not volunteered.

CONCLUSIONS

Analysis of the data collected has enabled this study to arrive at the following conclusions.

Majority of the patients presented in their active phase of life with complications of varicose vein and with combined valvular and perforator incompetence. The commonest age group was 21 to 40 Years.

Only 12% were women. Smoking was the most important risk factor, prolonged standing and strenuous work being the other most common ones.

Majority presented only after developing complications of varicose veins. Incidence is more common on the left side. The involvement of GSV is more common than SSV.

The use of colour Doppler is an invaluable supplement to clinical examination for effective diagnosis of varicose veins and its use is strongly recommended for accurate diagnosis and for guiding appropriate management as it enables complete venous mapping.

Operative line of treatment is the primary mode of management of varicose veins. Sapheno-femoral flush ligation with stripping is the best method of surgical management for Sapheno-femoral incompetence; if associated with Perforator incompetence the relevant Perforator ligation may be required. Minor complications can be managed by treating conservatively.

Performing only a Sapheno-femoral junction flush ligation without concomitant GSV stripping resulted in residual varicosity in two patients. Surgery for primary varicose veins of the GSV with dissection & ligation of the sapheno-femoral junction and short-stripping the GSV has a beneficial effect on visible varicose veins in the below-knee-level GSV in the great majority of patients.

Correlating the development of Saphenous Neuritis (SN) with the extent of stripping (knee or ankle level), a decrease in the rate of SN in limbs subjected to restricted GSV stripping was observed (none versus 2 cases of SN respectively) but this difference was not significant.

Therefore, *extent of GSV stripping should not be misled by the intent of avoiding SN, rather injury to nerve and residual varicosities following GSV varicose vein surgery, could be reduced if the level of stripping is based on preoperative Duplex-confirmed venous reflux mapping.*

Saphenous nerve injury is possible after great saphenous vein stripping to the ankle. However, there is little resultant morbidity. The risk of saphenous nerve injury should therefore not be considered a reason to avoid stripping of the great saphenous vein to the ankle. Minor Complications following varicose vein surgery are a part of the process of surgery and can be managed conservatively

REFERENCES

1. Van Den Bremmer J, Moll F L. Historical overview of Varicose vein Surgery. *Ann Vasc Surg.* 2010 Apr; 24(3): 426-32.
2. Burnand K. Bailey and Love's Short Practice of Surgery. 25th ed. London: Edward Arnold; 2008: 925-43.
3. Angle N, Bergan J J. Vascular surgery : A comprehensive review, 6th Edition. USA: W.B.Sunders; 2002: 826-36.
4. Freischlag J A, Heller J A. Sabiston Textbook of Surgery. 18th ed. Philadelphia: Saunders; 2012: 2-19, 1801-19.
5. Evans C J, Fowkes F G, Ruckley C V, Lee A J. Prevalence of varicose veins and chronic venous insufficiency in men and women in the general population: Edinburgh Vein Study. *J Epidemiol Community Health* 1999; 53: 149–53.
6. Ruckley C V, Evans C J, Allan P L, Lee A J, Fowkes F G. Chronic venous insufficiency: clinical and duplex correlations. The Edinburgh Vein Study of venous disorders in the general population. *J Vasc Surg* 2002; 36: 520–5.
7. Casarone M R, Belcaro G, Nicolaidis A N, Geroulakos G, Griffin M, Incandela L, De S M, Sabetai M, Geroulakos G, Agus G, Bavera P, Ippolito E, Leng G, Di R A, Cazaubon M, Vasdekis S, Christopoulos D, Veller M. Real epidemiology of varicose veins and chronic venous disease: the San Valentino Vascular Screening Project. *Angiology* 2002; 53: 119–30.
8. Wright et al. The prevalence of venous disease in a west London population. In: Davy A, Stemmer R, Eds. *Phlebology*, Paris :John Libbey Eurotext, 1989: 176-8.
9. Malhotra S L. 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.
10. Dur A H M, Mackay A J C et al. Duplex assessment of clinically diagnosed chronic venous insufficiency. *Br. J. surg.* 1992; 79: 155-61.
11. Chang C J, Chua J J. Endovenous laser photocoagulation (EVLP) for varicose veins. *Lasers in Surgery and Medicine.* 2002; 31(4): 257-62.
12. Franks P J, Wright D D, Moffatt C J, Stirling J, Fletcher A E, Bulpitt C J, McCollum C N. "Prevalence of venous disease: a community study in west London." *Eur J Surg* 1992; 158(3): 143-7.
13. Komsuoglu B, Goldeli O, Kulan K, Cetinarslan B, Komsuoglu S S. "Prevalence and risk factors of varicose veins in an elderly population." *Gerontology* 1994; 40(1): 25-31.
14. Pittaluga P, Chastanet S, Guex J J. Great saphenous vein stripping with preservation of sapheno-femoral confluence: Hemodynamic and clinical results: *J Vasc Surg* 2008; 47: 1300-5.
15. Kharrazi M H, Taheri M S, Haghighatkah H R, Ayoobi N, Dolatshahi M, Shakiba M. Comparison of Doppler Ultrasonographic Findings in Complicated and Uncomplicated Lower-Limb Varicose Veins. *Iran J Radiol* 2010; 7(3): 179-84.
16. Dur A H M, Mackay A J C et al. Duplex assessment of clinically diagnosed chronic venous insufficiency. *Br. J. surg.* 1992; 79: 155-61.
17. Engelhorn C A, Engelhorn A L V, Cassou M F, Salles-Cunha S X. Patterns of saphenous reflux in women with primary varicose veins. *J Vasc Surg* 2005; 41: 645-51.
18. Al-Mulhim A R et al. Surgical correction of main stem reflux in the superficial venous system : Does it improve the blood flow of incompetent perforating veins world J. Surg. 2003; 27: 793-6.
19. Critchley G, Handa A, Maw A, Harvey A, Harvey M R, Corbett C R. Complications of varicose vein surgery. *Ann R Coll Surg Engl* 1997; 79: 105-10.
20. Holme J B, Skajaa K, Holme K: Incidence of lesions of the saphenous nerve after partial or complete stripping of the long saphenous vein. *Acta Chir Scand* 1990; 156: 145-8.