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### Key Words

Varicose vein surgery, deep vein thrombosis

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**Received:** 13<sup>th</sup> March 2025

**Accepted:** 14<sup>th</sup> April 2025

**Published:** 27<sup>th</sup> May 2025

**Citation:** S.R. Eashwar Maniyen and Alex Arthur Edwards, 2025. Study of Post Operative Outcome of Varicose Vein Surgery in Rural Population of South Tamilnadu. Res. J. Med. Sci., 19: 50-55, doi: 10.36478/makrjms.2025.4.50.55

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## Study of Post Operative Outcome of Varicose Vein Surgery in Rural Population of South Tamilnadu

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### Abstract

Varicose veins are dilated and tortuous veins, which affect a significant proportion of adults. They cause physical and emotional symptoms and affect quality of life in sufferers. More than 5% of the population have varicose vein and 1% have or had venous ulceration. Varicose vein causes substantial morbidity, cosmetic, monetary loss and psychological effect. To study the post operative outcome of patients who undergone varicose vein surgery-towards symptom, signs of patients after a prescribed period. To evaluate quality of life of patients undergone varicose vein surgery To evaluate incidence of post operative complications of varicose vein surgery and recurrence. The study carried out with the follow-up information relating to 53 patients who were undergone varicose vein surgery. The patients were followed in the post operative period for the expected complications. All the patients were subjected to duplex scan in the follow-up period ranging from 3 months to 1 year. A questionnaire was prepared to collect precise information regarding the life style and symptomatic improvement of the patients. The post operative follow-up and questionnaire data was analysed. It is observed that, out of 53 patients, 6 patients (11.25%) had mild wound infection which did not require any additional treatment. There was no incidence of deep vein thrombosis, pulmonary embolism. No patients experienced neurological deficit or paraesthesia in the post operative period. No patients experienced bleeding from wound. After surgery 34 patients felt leg pain cured, 24 patients felt cosmetic improvement and 7 patients had ulcer completely cured. Overall quality of life was improved in 42 patients after surgery. Patients with complications of varicose vein combined with valvular incompetence underwent surgery like saphenofemoral junction flush ligation, with/ without stripping., with/without perforator ligation have had improvement in their cosmetic appearance, cure in leg pain, leg ulcer cured, improvement in life style, improvement in ability to do work as well as recurrence of varicose vein was not seen. The study period was short, so the patients need long term follow-up to find out recurrence.

## INTRODUCTION

Galen in second century used silk ligature to tie off blood vessels and suggested varicose veins should be treated by incision, avulsion with use of hooks<sup>[1]</sup>. In 14th century Maitre Henre de Mondeville successfully used bandage on limbs with ulceration to drive back evil humours. In 16th century anatomy of venous system was presented in great details in work of Andeas Vesalius. Presence of venous valves was probably first mentioned by JB Canano in 1547. Hieronymius Fabricius de Aquapendente wrote on surgical treatment of varicose vein in his book Opera Chirurgica published in 1593. William Harvey described blood circulation. In 1810, Ferriar described a patient with phlegmasia alba dolens<sup>[1]</sup>. Davis in 1822 recognised relation between venous thrombosis and child birth. Brodie in 1846 described his test of venous valvular incompetence and used compression bandages to treat venous ulcer. Unna developed unna boot in 1854-an elastic plaster dressing with glycerine gelatine mixtue. Virchow described his revolutionary discovery of three main causes of Deep Vein Thrombosis [DVT]-changes in venous wall, stasis of venous blood and changes in blood coagulation in his book Die cellular pathologie. In 1864 Pravez initiated sclerotherapy and injected perchloride of iron to sclerose varicose veins using hypodermic needles. Proximal ligation of great saphenous vein was described by Trendelenburg in 1891. Kellar described internal stripper in 1905. Charles H Mayo used an external ringed stripper in 1906. Bobcock's contribution was development of flexible internal saphenous stripper. Reconstructive surgery-Eck was the 1st to perform anastomosis between portal vein and inferior vena cava. John Homan in 1917 introduced the term venous stasis and post thrombotic syndrome<sup>[2-4]</sup>. First attempt at phlebography by injection of strontium bromide were made by Berberick and Hirsch in 1923. Fibrinolytic effect of streptococcus was 1st described in 1993 by Tillet and Garner. Bauer showed beneficial effect of heparin in DVT in 1941. Linton described subfascial ligation of incompetent communicating vein in 1938. Franck Cockett suggested the term blow out syndrome. Inner layer is known as intima. Its main component endothelium lines entire vascular tree including heart. This layer is absent in venules. An internal elastic lamina is present in the sub endothelial layer of the larger veins. Special endothelial cells produce plasminogen activator. The middle media is composed of elastin connective tissue and smooth muscle cells. It varies in size between veins of different calibre. It is thin in venules. This layer is thickest in arteries. The outer layer is known as adventitia, it consists of collagen fibres, largely longitudinal. It contains vasa vasorum and sympathetic nerve fibres<sup>[5]</sup>. Large venules

and veins form an extensive but variable large volume low pressure system of vessels conveying blood back to the heart. The outer adventitial layer of venous wall contains adrenergic fibres mainly in cutaneous veins. Venous wall tone can be altered by central sympathetic discharge and brainstem thermoregulatory centres and also other stimuli like change in body temperature change in blood volume and pain. Vein histology varies depending on calibre of vein. Smallest veins are venules size range from 0.1mm to 1mm. The large veins present in lower limb have less smooth muscle. Veins are thin walled, distensible and collapsible structures. The two important functions of vein are transportation of blood back to heart and storage of blood. Blood flow in veins is depends on following factors such as gravitation, competent valves, volume of blood, cardio respiratory cycles and muscle pump. Any alteration in equilibrium of these factors may leads to pathology of vein. Blood flow in veins is unidirectional and this is maintained by presence of valves in the wall of veins. The valves are more in distal part of vein and become progressively few in proximal part of vein. Venous valves have two leaflets. They allow unidirectional flow of blood. The venous valves become closed if blood flow is craniocaudal direction, at a speed of atleast 30 cms/s<sup>2</sup>. Common iliac veins, inferior vena cava, portal vein and venous sinuses in soleus and gastracnemius are valve less<sup>[8]</sup>. Superficial veins form a network that connects superficial veins to deep veins. Superficial veins lie above deep fascia. The dorsal venous arch lies on dorsum of foot. It receives four dorsal meta tarsal veins, each of which is formed by union of two dorsal digital vein<sup>[7]</sup>. This is longest vein in lower limb. It is formed by union of medial end of dorsal venous arch with medial marginal vein. It run upwards anterior to medial malleolus, crosses the lower one third of medial surface of tibia obliquely and run along its medial border to back of knee. The saphenous nerve runs in front of GSV. In the thigh, it inclines forwards to reach the saphenous opening where it pierces the crebriform fascia and opens into the femoral vein. Before piercing the cribriform fascia, it receives three named tributaries corresponding to the cutaneous arteries and also many unnamed tributaries. It contains about 10-15 valves which prevent back flow of the venous blood, which tends to occur because of the gravity. One valve is always present at the saphenofemoral junction. The saphenofemoral junction is present 2.5-3.5 cm below and lateral to pubic tubercle. Incompetence of these valves makes the vein dilated and tortuous leading to varicose veins. The vein is also connected to the deep veins of the limb by perforating veins. The perforating veins are also containing valves. These valves permit flow of blood from GSV to deep veins. If those valves incompetent, will gives rise to

varicose veins. The saphenous nerve in leg and foot is anterior to GSV. The GSV is accompanied by the lymphatic trunk draining the dorsum of foot and anterior and medial aspect of the leg and thigh draining to superficial group of inguinal lymph nodes<sup>[6,7]</sup>. The posterior arch vein of Dodd and Cockett (Leonardo's Vein) is large and constant. It begins from series of small venous arches which connect medial ankle perforators, runs upwards to communicate with GSV just below the knee. In the thigh-it receives two large tributaries which join it close to its termination. They are postero medial and antero lateral veins. Postero medial vein drains the postero medial side of the thigh. It may communicate with small saphenous vein. It receives numerous small tributaries from skin and subcutaneous tissue of popliteal fossa and upper half of the inner thigh. The anterior cutaneous vein of the thigh drains the lower part of front of thigh. Just before piercing the cribriform fascia superficial epigastric, superficial circumflex iliac and superficial external pudendal. Just before termination-deep external pudendal vein. The vein is formed on the dorsum of the foot by the union of lateral marginal vein with dorsal venous arch. It enters back of leg by passing behind the lateral malleolus. In the leg it ascends lateral to the tendocalcaneus and then along the middle line of the calf, to the lower part of the popliteal fossa. It penetrate deep fascia to join the popliteal vein. It drains lateral border of the foot, the heel and the back of the leg. It connected with great saphenous vein and with deep veins and is accompanied by sural nerve. The anatomical position of saphenopopliteal junction is variable significantly<sup>[8]</sup>. Tributaries-Several small vessels communicate with the short saphenous vein to venous arches on inner side of the leg. Small saphenous vein communicate to peroneal vein by a large constant lateral ankle perforator vein. It communicates with soleus sinusoids and therefore indirectly with posterior tibial and peroneal vein by an inconstant mid calf perforator. Small saphenous vein in its upper part communicates with GSV via posteromedial vein of thigh-vein of giocomini. The popliteal vein and femoral vein are major veins of lower limb and usually single conduits. They receive many tributaries from the surrounding muscles, corresponding with arteries. The veins draining muscles are valved with exception of those in soleus. The Soleus contains venous sinuses, they are non-valved and empty segmentally into posterior tibial and peroneal veins, sometimes directly into posterior tibial vein. A resting stage of muscles there is sluggish flow of blood in the soleal sinuses. The plantar digital veins in foot are drain into metatarsal veins which composes deep plantar venous arch. This continues into the medial and lateral plantar veins that then drain into posterior tibial veins. The dorsalis pedis veins

on the dorsum of the foot form the paired anterior tibial veins at the ankle. The posterior tibial vein accompany posterior tibial artery, receiving veins from sural muscles, especially the venous plexus in the soleus, connections from superficial veins and peroneal veins. Veins from soleus and superficial veins drain into the peroneal vein<sup>[9]</sup>. Posterior tibial vein goes under fascia of deep posterior compartment. Then they enter soleus and link the popliteal vein, after joining with the paired peroneal and anterior tibial veins. There are large venous sinuses within the soleus muscle-the soleal sinuses-that empty into the posterior tibial and peroneal veins. There are bilateral gastrocnemius veins that empty into the popliteal vein distal to the point of entry of the lesser saphenous vein into the popliteal vein. Now an elastic bandage is applied from toes and gradually followed up, while the stripper is steadily pulled through the groin incision severing all the tributaries and perforating veins up to the groin incision. If stripper is stuck somewhere, the vein is freed and the vein distal to this incision is stripped. Again the olive point is introduced through the vein here and pushed up. The stripper with the vein kept aside. The skin margins of groin incision are sutured and dressed. Following saphenofemoral junction flush ligation, the GSV is pulled taut in a cephalad direction. A forefinger is pushed down into the thigh posterior to the vein via the groin wound and a simple stab made just distal to the finger. The upper portion of the vein is then directed on to a hook or clip and delivered through the stab incision. The GSV is again put on traction to render it taut in the thigh. It could be palpated about 10 cm distally. A further stab incision is made at this point and the upper portion of vein hooked out. This procedure is repeated sequentially down the thigh until the whole GSV is removed. Compression bandage is applied. It is argued that this procedure is less painful, reduces bruising and avoids a significant scar below the knee compared to stripping. Radio frequency ablation method (VNUS closure technique, VNUS Medical technologies, Inc, Sunnyvale CA, USA, by Goldman 2000) Performed under local anaesthesia and sedation. Percutaneous access to the GSV is obtained using duplex USG at the level of knee. A guide wire is passed till SFJ over which a closure catheter passed. The prongs of the catheter are made to contact with the intima of the vein. The tip of the catheter and the prongs are made to attain 85 C temperatures with the help of a Radio frequency generator and the catheter is withdrawn slowly at the rate of 3cm/min. Collagen in the vein wall denatures and contract closing the lumen of the vein. No incisions necessary. Return to normal activity At 2 years after the procedure > 90% of saphenous vein remains closed which compare favorably with traditional procedures. This procedure offer advantages over the conventional

stripping operation in terms of less post operative pain, short hospital stay, shorter sick leaves and faster return to normal activities<sup>[10,11]</sup>.

## MATERIALS AND METHODS

The study was carried out on 53 patients who were underwent varicose vein surgery in general surgery department in sree mookambikai Medical College, with an objective to analyse the post operative outcome of varicose vein surgery. Inclusion Criteria is Patients with symptom and signs of varicose vein, admitted for varicose vein surgery. Age group 15 years to 70 years. Exclusion Criteria are vPregnant women patients, Elderly patients (age above 70 years), Children (<15 years), Patients with raised intra abdominal pressure, Patients with DVT, Patients with Congenital Venous Disease, Patients with secondary varicose vein. The study performed is a prospective, observational study. The study was conducted during the time frame of 12 months between September 2022 and August 2023.

## RESULTS AND DISCUSSIONS

The study of outcome of varicose vein surgery performed to 53 patients which is analysed in detailed manner and the observations are presented below.

Table 1: Age Distribution

Age in years	No. of Cases	Percentage
20-30	8	15
31-40	14	26.5
41-50	15	28.3
51-60	11	20.8
61-70	5	9.4
Total	53	100

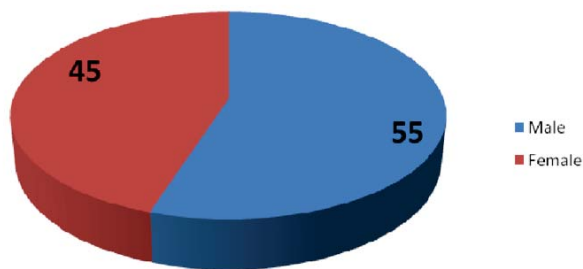


Fig. 1: Sex Distribution in Percentage

In age distribution, 29 patients (55%) belong to age group 31-50 years. Only 15% of cases belong to less than 30 years of age. Hence varicose vein is commonly present in age group 31-50 years in this study.

Table 2: Sex Distribution

Sex	No. of Cases	Percentage
Male	29	55
Female	24	45
Total	53	100

It is observed that 29 male patients (55%) were affected and 24 female patients (45%) were affected.

Table 3: Side Affected

Side	No. of Cases	Percentage
Right	24	45
Left	25	47.5
Both Limbs	4	7.5
Total	53	100

There is no significant difference in side affected, in 4 cases both limbs were affected.

Table 4: PRE-OP Symptomatology

Symptoms	No of cases	Percentage
Leg Pain	53	100
Cosmetic	53	100
Dermatitis	17	32
Pigmentation of skin	14	26.5
Ankle swelling	12	22.5
Ulceration non	14	26.5
Phlebitis	0	-
Bleeding	0	-

All 53 patients had leg pain, cosmetic problem. 17 patients had dermatitis and 14 patients suffered from leg ulcer.

Table 5: Ceap Class

Class	No. of Cases	Percentage
0	Nil	
1	Nil	
2	18	34
3	12	22.5
4	9	17
5	14	26.5
6	Nil	

It is observed that 18 patients (34%) belong to CEAP class 2 and 14 patients (26%) were belong to CEAP class 5.

Table 6: System Involved

System	No. of Cases
GSV	53
SSV	0
Perforator	39

Table 7: Sugery Performed

Surgery Type	No. of Cases	Percentage
SFJ Flush Ligation only	10	19
SFJ Flush Ligation + Perforator Ligation	35	66
SFJ Flush Ligation + Stripping	2	3.75
SFJ Flush Ligation + Stripping + Perforator Ligation	6	11.25
Total	53	100

SFJ Flush Ligation+Perforator Ligation was done for 35 patients (66%).

Table 8: Complications

Complications	No. of Cases	Percentage
Wound Infection	6	11.25
Bleeding	Nil	-
Seroma	9	17
Delayed Healing	Nil	-
Major vessel injury	Nil	-
Neurological problem	Nil	-
Deep vein thrombosis	Nil	-

Wound infection was seen in 6 cases (11%) and Seroma was seen in 9 cases (17%).

**Table 9: Post OP Outcome**

Symptoms	Cured	Better	Same	Worse
Leg Pain	34	19	-	-
Pigmentation of Dermatitis	10	4	-	-
Cosmetic appearance	17	-	-	-
Leg Swelling	24	29	-	-
Ulcer healing	7	4	1	-
Bleeding	8	4	2	-
Ability to do work	-	-	-	-
Overall QOL	45	8	-	-
Pleased with result of surgery	42	11	-	-
	53	-	-	-

Overall quality of life was improved in all patients. 79% cases felt cured and 21% felt better after surgery. 34 patients felt leg pain was cured. Leg swelling was disappeared in 7 patients. Leg ulcer was cured in 8 patients. 45 patients were able to work well after surgery.

**Table 10: Duplex Scan Study**

Reflux	Present	Absent
SFJ Reflux	-	52
SPJ Reflux	-	53

All patients had competent SFJ and SPJ post operatively.

**Table 11: Post Operative Perforator Incompetence**

Post Operative Perforator Incompetence	No. of cases	Percentage
Single	12	22.5
Multiple	7	13.25
No-Incompetence	34	64.25

It is observed that perforator incompetence was present in 35% of cases. In this prospective study a total number of 53 patients with primary varicose vein were admitted, investigated and operated. They were followed up regularly and the post operative results were analysed. The study carried out with patient's age range from 20-70 years. Most of the patients are belong to 30-50 years age group. The male and female patient's ratio is 1.2:1. There is no significant difference in the left and right limb involvement. In this study, all the patients had sapheno femoral junction incompetence. Sapheno popliteal junction incompetence not present in these patients. Perforator vein involvement is seen in 77% of patients<sup>[12]</sup>. The patients were followed in the post operative period for the expected complications and improvement in symptoms and sign. Out of 53 patients, 6 patients (11.25%) had mild wound infection which did not require any additional treatment. There was no incidence of deep vein thrombosis, pulmonary embolism. No patients experienced neurological deficit or paraesthesia in the post operative period. No patients experienced bleeding from wound. Leg pain

was cured in 34 patients, leg ulcer was cured in 8 patients, cosmetic appearance was very much improved in 24 patients. 45 patients were able to work well after surgery<sup>[13,14]</sup>. All the patients were subjected to duplex scan in the follow-up period ranging from 3 months to 1 year. There is no evidence of recurrence of varicose vein on clinical examination. The duplex scan study reveals that competent sapheno popliteal junction in all patients, competent Sapheno femoral junction in all patients. Perforator vein incompetence was seen in 19 patients (36%)<sup>[15-18]</sup>.

## CONCLUSION

This work was carried out successfully which was aimed at studying the outcome of the patients who have undergone varicose vein surgery in our college. The patients were followed in the post operative period for the expected complications and symptoms and sign improvement. All the patients were subjected to duplex scan in the follow-up period ranging from 3 months to 1 year. To conclude, patients with complications of varicose vein combined with valvular incompetence underwent surgery like saphenofemoral junction flush ligation, with/without stripping; with/without perforator ligation have had improvement in their life style as well as recurrence of varicose vein was not seen in our study group. Most of patients had improvement in cosmetic appearance, cure in leg pain and leg ulcer healed. The study period was very short, so patients need long term follow-up to find out recurrence. Duplex scan study revealed new perforator occurrence in some of patients. These patients require life style modifications and use of elastic stockings for longer period. These patients also need long term follow up to study any other problem.

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