

A Comparative Study on Complications of Surgical Management of Varicose Veins with and Without Great Saphenous Vein STRIPPING

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ABSTRACT

Background: Varicose veins are common peripheral vascular disorder. Multiple methods of management are available, however Trendelenburg Procedure remains the most preferred. Whether stripping of Long Saphenous Vein is beneficial or just adds to the morbidity to the procedure remains controversial. This study compares the outcomes of surgical management of varicose veins with and without venous stripping.

Aims and objectives : The primary objective of this study is to compare the outcome of two surgical treatment modalities of varicose veins. One group undergoes the Trendelenburg procedure with subfascial ligation of incompetent perforators, while the other group undergoes the same procedure, but with the addition of long saphenous vein stripping from the groin to the knee. The two modalities are compared in terms of

1. Contusion formation in the thigh.
2. Comfortable ambulation without much pain on first post-operative day.
3. Postoperative hospital stay.
4. Recurrence after 6 months.

Methodology: 66 cases were allocated into 2 groups, by systematic allocation, GROUP A (Trendelenburg procedure with venous stripping with perforator ligation) had 33 patients and GROUP B (Trendelenburg procedure without venous stripping with perforator ligation) had 33 patients. The two procedures were compared in terms of complications like contusion formation, healing of wounds in the leg at the site of incompetent perforators, comfortable ambulation without much pain assessed by Visual Analog Scale on first post-operative day, duration of hospital stay and recurrence. Patients were followed up regularly for a maximum period of 18 months.

Results : Males constitute majority in both groups. 78.8% population reported prolonged standing in group A and 60.6% in group B, with the highest incidence of disease found in daily wage workers, cooks and bakers. Both the groups were comparable in terms of clinical presentation, past medical history, family history, personal habits, age, and doppler findings.

Group A had a higher percentage of short term complications, including infections (3.0%), paraesthesia (3.0%), and early surgical site infection (3.0%), while Group B had fewer complications. Duration of hospital stay was extended in Group A. There was a statistically significant difference noted in the duration of hospital stay with 30.3% of the patients requiring an extended stay until post-op day 3 in Group A. Group B had a slightly higher recurrence rate (12.1%) compared to Group A (6.1%) after a 6 month follow up period.

Conclusions: On comparison of outcomes of surgical management of varicose veins with and without venous stripping, Venous stripping is associated with a

higher short term complications including pain, contusion, paraesthesia, infection, and extended hospital stay, however it comes with advantage of lesser rate of long term complications including recurrence. We also found the use of Trendelenburg operation with GSV stripping with Perforator ligation is a technically sound option than Trendelenburg procedure with Perforator ligation alone in case of varicose veins with Grade 3, 4 SFJ incompetence.

Keywords: Varicose veins; Trendelenburg procedure; Great saphenous vein; Venous stripping; Postoperative pain; Recurrence.

INTRODUCTION

Varicose veins do not have a universally accepted definition. In Latin, the term "varix" refers to an enlarged vein, artery, or lymphatic vessel. Commonly, "varix" is used to refer to a vein, while "varicosity" describes a vein that is enlarged in diameter and tortuous. Varicose veins of the lower limbs appears to be the price mankind has to pay for his erect posture. It is one of the most common peripheral vascular disorders with a prevalence of 20-60% and upto 25% adults with at least one limb affected [1]. Its clinical manifestations such as swelling, dull, aching pain that occurs after standing for long periods, especially towards the end of the day [2], pigmentation, lipodermatosclerosis, and ulceration seriously affect patients' physical and mental health and greatly increase the social and economic burden. The surgery for varicose veins is seen to have evolved over various stages to reach a modern era. New strategies such as laser, radiofrequency ablation, cyanoacrylate glue, and other intracavitary minimally invasive techniques have improved varicose vein treatment in the lower extremities in recent years. The new modalities of treatment have emerged as a viable alternative to traditional surgery but are plagued by limitations like cost of infrastructure, expertise and a greater learning curve, which makes these methods scarcely available in rural India. Thus, traditional surgical methods still form the mainstay of treatment in such parts of the country. This is a prospective comparative interventional study to evaluate and compare outcomes in patients who undergo Trendelenburg's procedure with and without stripping for varicose veins for a period of 12 months from June 2023 to May 2024 and follow up for 6 months up to December 2024.

AIMS AND OBJECTIVES :

The primary objective of this study is to compare the outcome of two surgical treatment modalities of varicose veins. One group undergoes the Trendelenburg procedure with subfascial ligation of incompetent perforators, while the other group undergoes the same procedure, but with the addition of long saphenous vein stripping from the groin to the knee. The two modalities are compared in terms of

1. Contusion formation in the thigh.
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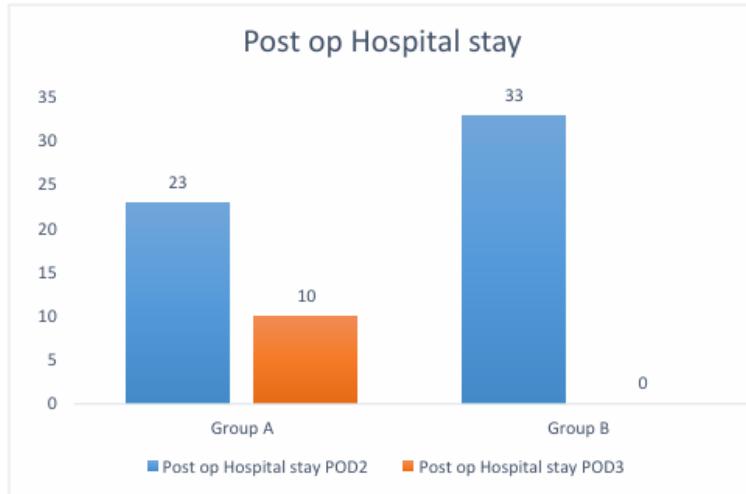
INCLUSION CRITERIA :

1. Varicose vein with saphenofemoral valve incompetence and perforators incompetence.
2. Age >18 years
3. Grade 3,4 SFJ incompetence

MATERIALS AND METHODS:

- **Study design :** Comparative prospective interventional study
- **Study period :** June 2023 to December 2024
- **Study venue :** Department of General Surgery, Hassan Institute of Medical Sciences , Hassan, Karnataka.
- **Sample size :** Sample size estimation was based on the incidence of recurrence requiring further surgical intervention, as reported by Löfgren et al. [3]. The study compared two independent groups with recurrence as a binary outcome.
- Sample size was calculated using the following formula : $n = (Z_{1-\alpha/2} + Z_{1-\beta})^2 \times (p_1q_1+p_2q_2)/(p_1-p_2)^2$, a sample size of **33 per group** was calculated, with **total sample of 66**.
- Ethical clearance was obtained from the Institutional Ethics Committee (IEC No: RR 427). Informed written consent taken.
- **Statistical analysis :** Statistical analysis was performed using SPSS version 25.0. Associations between categorical variables were analyzed using the Chi-square test, and a p -value <0.05 was considered statistically significant.

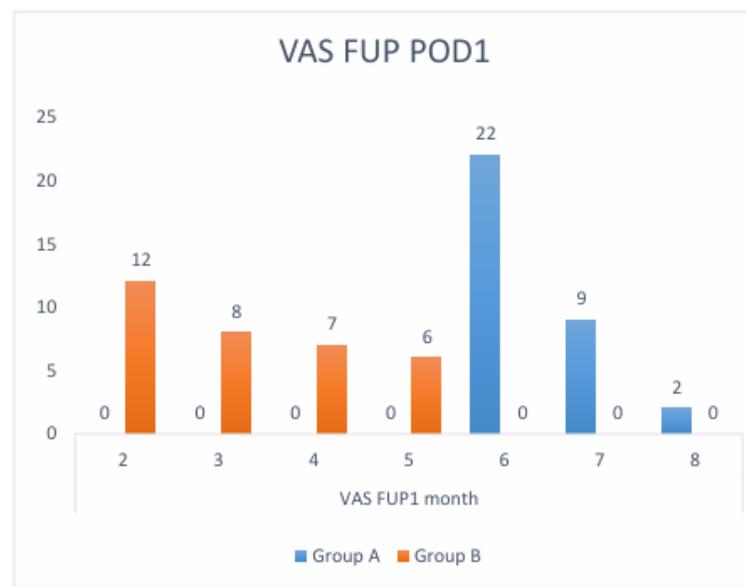
RESULTS



Males constitute majority in both groups. 78.8% population reported prolonged standing in group A and 60.6% in group B, with the highest incidence of disease found in daily wage workers, cooks and bakers. Both the groups were comparable in terms of clinical presentation, past medical history, family history, personal habits, age, and doppler findings.

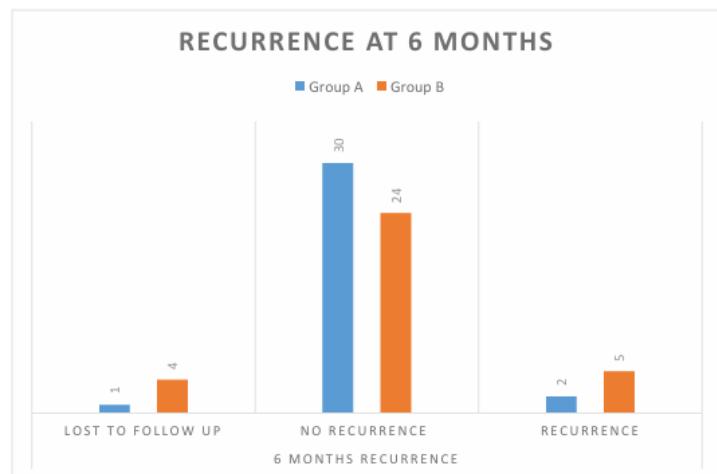
Group A had a higher percentage of short term complications, including infections (3.0%), paraesthesia (3.0%), and early surgical site infection (3.0%), while Group B had fewer complications¹

There is a highly significant difference in pain levels between the groups ($p < 0.001$). Group A had higher VAS scores, with most patients experiencing moderate to severe pain (66.7% reporting a score of 6 and 27.3% reporting a score of 7). In contrast, Group B had lower pain scores, with most patients reporting scores between 2 and 5. This suggests that the non-stripping technique used in Group B may be associated with better post-operative pain outcomes.



A statistically significant difference is noted in the duration of hospital stay ($p = 0.001$). All patients in Group B were discharged by POD2 (100%), while 30.3% of patients in Group A required an extended stay until POD3. This suggests that the treatment method used in Group A (stripping) may lead to longer hospitalization.

There is no statistically significant difference in recurrence rates between the groups ($p = 0.210$). However, Group B had a slightly higher recurrence rate (15.1%) compared to Group A (6.1%). A higher proportion of patients in Group B were lost to follow-up (12.1%), which may have influenced recurrence.



DISCUSSION

Varicose veins is one of the most common surgical entities in adults. In past 10 years, Trendelenburg operation is practiced as the gold standard for the treatment of patients with varicose veins. However, Trendelenburg operation with GSV stripping reduces the risk of recurrence but whether it adds to the morbidity or actually provides any advantage to the procedure is under question. The present study was carried out at Hassan Institute of Medical Sciences, Hassan.

Comparing these two procedures in various clinical scenarios and comparing the outcomes in immediate post-operative period and by following up these patients for 6 months. The results were analyzed and compared to various other studies done in this field.

Males constitute the majority in both groups (84.8% in Group A and 78.8% in Group B), while females make up a smaller proportion . This is comparable to the study by Kumar MS et al [4] in which also the sex was predominantly male. This study includes age above 18 years. The lowest age in our study is 20 and the highest is 75. In this study 41-70 yrs constitute the majority whereas according to study by Vashisht et al [5], the majority of the patients were of the age group 30 to 40 yrs. Lower limb dilated veins was the most common presentation with most patients. Ulcer was present in few patients and was also correlating well with other studies. Left lower limb was more commonly affected than right, which is comparable to the findings of study conducted by Afzal et al [6].

There is a highly significant difference in pain levels between the groups ($p < 0.001$). Group A had higher VAS scores on POD1, with most patients experiencing moderate to severe pain (66.7% reporting a score of 6 and 27.3% reporting a score of 7). In contrast, Group B had lower pain scores, with most patients reporting scores between 2 and 5. The outcomes are comparable with the findings of Lamani et al [7] who observed that mean post op ambulation was achieved on 2.16 days and recurrence at 6 months was seen in 20% (5 of 25) patients in the non stripping group. This suggests that the non-stripping technique used in Group B may be associated with better post-operative pain outcomes.

There is a statistically significant difference in post-operative complications ($p = 0.024$). Group A had a higher percentage of complications, including Contusion in the thigh (9.09%) , infections (3.0%), paraesthesia (3.0%), and early surgical site infection (3.0%), while Group B had fewer complications. Notably, a higher percentage of patients in Group A reported short term complications compared to Group B, which may be attributed to the different treatment approaches used. The contusion formation with venous stripping in this study (9%) is comparable to results of Afzal et al, with haematoma formation seen in 27.5% in stripping group and 5% in non stripping group. [6] The increased incidence of hematoma formation in the thigh in patients who undergo stripping was due to tissue trauma that occurs during venous stripping.

A statistically significant difference is noted in the duration of hospital stay ($p = 0.001$). All patients in Group B were discharged by POD2 (100%), while 30.3% of patients in Group A required an extended stay until POD3. This suggests that the treatment method used in Group A (stripping) may lead to longer hospitalization. Kumar MS et al noted similar findings of extended hospital stay in population undergoing GSV stripping. [4]

There is no statistically significant difference in recurrence rates between the groups ($p = 0.210$). However, Group B had a slightly higher recurrence rate (15.1%) compared to Group A (6.1%). In a similar study conducted by Lamani et al, recurrence at 6 months was seen in 12% (3 of 25) patients in the stripping group and 20% (5 of 25) patients in the non stripping group. [8], Hussain et al reported a rate of recurrence equal to 5% with GSV stripping versus 8% without GSV stripping [9] ,the results are consistent with our findings. Jones et al conducted a randomized controlled trial in the UK, in which 100 patients with primary long saphenous varicose veins (133 legs) were randomized and a Two year follow-up in 81 patients (113 legs) with questionnaire, clinical examination and Duplex scanning resulted in 89% patients remaining satisfied with the results of their surgery, though 35% had recurrent veins on clinical examination. Recurrence was reduced

from 43 to 25% in patients who had their long saphenous vein stripped ($p = 0.04$, X^2). They concluded that neovascularisation (serpentine tributaries arising from the ligated saphenofemoral junction) which was detected in 52% of limbs remained commonest cause of recurrence. [10]

As with any research, our study is not without its limitations. One notable constraint is the short follow-up period, which does not allow for an ideal assessment of the rate of recurrence. Additionally, a significant number of patients were lost to follow-up, which may have hindered the ability to achieve more refined and comprehensive results. However, it is important to highlight that the demographic characteristics of the study participants were comparable across groups, owing to the randomization process implemented during recruitment. This ensured that variability in patient profiles, including age, gender, and other relevant factors, did not bias the outcomes and strengthened the reliability of our comparative analysis. To address the aforementioned shortcomings and enhance the robustness of the findings, it is imperative that future investigations include multicenter collaborations, larger and more diverse cohorts, and extend the follow-up period. Such efforts would be essential to drawing more definitive conclusions, ensuring the study's broader applicability, and ultimately contributing to the advancement of evidence-based medical practices.

CONCLUSION

The present study comparing Trendelenburg operation with GSV stripping with perforator ligation with Trendelenburg operation without GSV stripping with perforator ligation for lower limb varicose veins came out with the following conclusions:

1. Stripping of GSV is associated with higher occurrence of Contusion in the thigh, when compared to Trendelenburg operation without stripping.
2. GSV stripping is associated with higher pain scores on POD1, and difficulty in early ambulation.
3. GSV stripping is associated with an extended hospital stay due to contusion and pain.
4. Early complications including superficial SSI, Contusion are more commonly associated with GSV stripping.
5. However, the long term outcome of GSV stripping in terms of recurrence is more promising, as there is a lesser incidence of recurrence in the GSV stripping arm.
6. Therefore, **GSV stripping appears to be associated with higher early morbidity but lower recurrence at 6 months in this cohort.**
7. More number of Randomized control trails and multicentre trials need to be undertaken to study the pros and cons of this procedure in future.

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