Section: General Surgery

Original Research Article

A COMPARATIVE STUDY OF CONSERVATIVE AND SURGICAL MANAGEMENT OF VARICOSE VEINS

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ABSTRACT

Background: Varicose veins in the lower limb present as numerous elongated, dilated, and tortuous vessels. This condition is characterized by a gradual decline that intensifies throughout the day. The available treatment options include conservative approaches, surgical interventions, and endovenous therapies. The primary objective of this study is to compare the effectiveness of conservative management and surgical management in treating varicose veins, with a focus on the complications and recurrence rates associated with each treatment modality. **Materials and Methods:** This prospective comparative study involved a total of 100 patients with clinically diagnosed lower limb varicose veins who met the inclusion criteria. The participants were enrolled and randomly assigned to two groups: one receiving surgical management (n = 50) and the other undergoing conservative management (n = 50). Conservative management involved elevating the affected limb, utilizing compression stockings, and minimizing prolonged standing, whereas the surgical cohort received the necessary operative interventions. Patients underwent follow-up evaluations at 2, 4, 6, 8, and 12 weeks to monitor for complications including hematoma, ulcer formation, lipodermatosclerosis, wound infection, and recurrence. The analysis of data was conducted utilizing SPSS version 26.0. **Results:** The average age of patients in both cohorts was around 55 years, with a higher representation of males (66% in the surgical cohort and 70% in the conservative cohort). In the cohort of patients who underwent surgical treatment, a hematoma was noted in 4% of cases. Conversely, in the conservative management group, ulcer formation and lipodermatosclerosis were each observed in 4% and 2% of patients, respectively. Wound infection was observed in 2% of the surgical cohort. The recurrence rate was notably elevated in the conservative group at 10%, while the surgical group exhibited no recurrences ($p = 0.022$). The incidence of overall complications was greater in the conservative group, recorded at 16%, compared to the surgical group, which had a rate of 6%. **Conclusion:** Surgical management showed a reduced recurrence rate in comparison to conservative management throughout the follow-up period. Consequently, surgical intervention seems to be a more effective definitive approach for addressing varicose veins.

INTRODUCTION

Varicose veins are defined as subcutaneous veins that are dilated and tortuous, measuring three millimeters or more in diameter. These veins may include the saphenous veins, their tributaries, or other non-saphenous superficial veins in the leg.[1] The dysfunction of the deep, superficial, and/or perforating veins results in elevated venous pressure within the lower leg. This condition can lead to various skin alterations, including hyperpigmentation and induration, ultimately culminating in ulceration.[2] The alterations observed in the skin and subcutaneous tissues of the lower leg are commonly classified in clinical practice as chronic venous insufficiency (CVI).[3] Significant risk factors for

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varicose vein development include advancing age and a family history of the condition.[3] The risk factors associated with the development of varicose veins include prolonged standing, obesity, smoking, heavy lifting, and pregnancy in females. The likelihood of developing varicose veins is worsened by factors such as increased straining during bowel movements, insufficient dietary fiber, genetic predisposition affecting venous wall integrity, advancing age, and menopause.[4] The prevalence of varicose veins in the lower extremities ranges from 10 to 30 percent around the globe.[5]

Conservative treatment options include avoiding prolonged standing and straining, elevating the affected leg, engaging in exercise, applying external compression, loosening restrictive clothing, utilizing medical therapy, modifying cardiovascular risk factors, reducing peripheral edema, and achieving weight loss.[6] High ligation and stripping represent the standard surgical approach for addressing varicose veins. However, in recent decades, numerous alternative techniques have emerged, including endovenous laser ablation (EVLA), endovenous radiofrequency ablation (RFA), foam sclerotherapy (FS), and TriVex.[7] There is a paucity of evidence to favor any particular treatment modality, and comparative treatment data remain limited. Patients with varicose veins and symptoms or signs have a significant advantage in having treatment over conservative treatment with compression stockings or venotropic drugs.[8] The selection of therapeutic interventions is influenced by various factors, including the presenting symptoms, patient preferences, financial considerations, the risk of iatrogenic complications, the availability of medical resources, insurance reimbursement policies, and the level of training of the healthcare provider.[9] The primary objective of this study is to compare the effectiveness of conservative management and surgical management in treating varicose veins, with a focus on the complications and recurrence rates associated with each treatment modality.

MATERIALS AND METHODS

This prospective comparative study was carried out in the Department of General Surgery at Trichy SRM Medical College Hospital and Research Centre over the span of two years. The primary objective was to evaluate the effectiveness of conservative management compared to surgical management in treating lower limb varicose veins, focusing particularly on the complications and recurrence rates linked to each treatment approach. The study population consisted of individuals who were clinically diagnosed with lower limb varicose veins and presented to the General Surgery outpatient and inpatient departments throughout the duration of the study. Individuals aged 18 and older who gave informed written consent were considered eligible for participation. Individuals presenting with concurrent peripheral vascular disease, current lower limb ulcerations due to varicose veins, thrombophlebitis, history of deep vein thrombosis (DVT), bleeding disorders, poorly managed diabetes mellitus, or those not willing to engage were not included. Individuals under the age of 18 were also excluded from the study.

The estimation of sample size was derived from a prior investigation by Ahmed Mousa et al. (2019), which indicated a recurrence rate of 8.5% among patients who underwent surgical treatment and 31% among those who received conservative management at the two-month follow-up. With an assumption of comparable proportions, utilizing 80% statistical power and a 5% significance level, the determined sample size amounted to 50 patients in each group. Consequently, a total of 100 patients were enrolled and assigned randomly in a 1:1 ratio to two groups through a computer-generated randomization sequence. The integrity of allocation concealment was maintained through the use of sealed opaque envelopes.

A standardized semi-structured proforma was used to record comprehensive baseline data upon enrollment. The information regarding the patient represented age, gender, occupation, and pertinent medical history. The clinical history should emphasize the duration of symptoms and the presenting complaints, which may include pain, swelling, a sensation of heaviness in the leg, visible dilated veins, skin changes, and the presence of ulceration. Factors contributing to the condition were noted, including a familial background of varicose veins, a history of extended periods of standing, smoking habits, and any previous occurrences of deep vein thrombosis. Documentation of current medications and comorbidities was also undertaken. Every patient received a thorough physical examination, which involved inspecting and palpating the lower limbs for any visible varicosities, edema, pigmentation, lipodermatosclerosis, tenderness, and induration. The evaluation of peripheral pulses was conducted to exclude the possibility of arterial insufficiency. A Doppler ultrasound examination of the lower limbs was conducted in all patients to verify venous reflux, determine the affected venous system (superficial, perforator, or deep veins), and rule out deep vein thrombosis.

Individuals assigned to the conservative management group were provided with limb elevation, elastic compression stockings, guidance on intermittent bed rest, and recommendations to avoid prolonged standing. Emphasis was placed on lifestyle modifications and the management of symptoms. Adherence to compression therapy was emphasized during subsequent follow-up appointments. Individuals assigned to the surgical management cohort received suitable surgical interventions informed by Doppler results and clinical evaluations. The procedures performed encompassed ligation and stripping of the great saphenous vein, perforator ligation, along with other standard operative

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techniques as deemed necessary. All surgical procedures were conducted with strict aseptic measures by skilled and knowledgeable surgeons. Postoperative management involved elevating the limb, applying compression bandages, administering analgesics, and encouraging early ambulation.

Subsequent assessments were carried out at 2, 4, 6, 8, and 12 weeks following the commencement of treatment, which included either conservative management or surgical procedures. Throughout each appointment, patients underwent evaluations for complications, including hematoma, ulcer formation, lipodermatosclerosis, wound infection, delayed wound healing, and the recurrence of varicosities. The definition of recurrence involved the reemergence of dilated tortuous veins in the limb that had previously undergone treatment, confirmed through clinical assessment and, when required, by Doppler examination. Patient-reported outcomes were assessed to determine the symptomatic improvement in pain, heaviness, and limb swelling. All collected data were loaded into a structured database and analyzed with IBM SPSS software (version 26.0). The Shapiro–Wilk test was employed to assess the normality of continuous variables. Data that followed a normal distribution were reported as mean ± standard deviation, whereas data that did not conform to this distribution were presented as median and interquartile range. Frequencies and percentages were used to express categorical variables. Approval from the Institutional Ethics Committee was secured, and informed written consent was acquired from all participants before enrollment.

RESULTS

This study comprised 100 patients with varicose veins, evenly divided into two groups: conservative care (Group 1) and surgical management (Group 2), with 50 patients in each group. The average age of patients in the conservative management group was 55.42 ± 7.65 years, with ages ranging from 34 to 68 years. The surgical management group had a mean age of 55.66 ± 6.83 years, with ages that ranged from 41 to 68 years. The age distribution of the two groups was analogous, suggesting that both groups were alike in terms of baseline age attributes. In the surgical management cohort, 33 patients (66%) were male, and 17 patients (34%) were female. In the conservative management cohort, 35 patients (70%) were male, and 15 patients (30%) were female. The gender distribution between the two groups remained notably similar.

Table 1: Descriptive data of participants (n = 75)

S No	Variables		Surgical	Conservative
1	Age	30 – 50 years	10 (20%)	8 (16%)
		51 – 60 years	26 (52%)	29 (58%)
		> 60 years	14 (28%)	13 (26%)
2	Gender	Male	33 (66%)	35 (70%)
		Female	17 (34%)	15 (30%)

In the surgical management cohort, hematoma was noted in 2 patients (4%), whereas 48 patients (96%) did not experience hematoma. Conversely, the conservative management group reported no instances of hematoma, with all 50 patients (100%) remaining unaffected by this consequence. In the surgical management cohort, no patients experienced ulceration during the follow-up period, and all 50 patients (100%) remained devoid of this complication. Conversely, in the conservative therapy cohort, 2 patients (4%) experienced ulceration, whilst the remaining 48 patients (96%) exhibited no signs of ulcer formation. In the surgical management cohort, no patients experienced delayed healing, and all 50 patients (100%) exhibited normal healing without any delay. In the conservative management group, no instances of delayed healing were noted, as all 50 patients (100%) exhibited acceptable healing throughout the follow-up period. In the surgical care cohort, none of the patients experienced lipodermatosclerosis, and all 50 patients (100%) remained devoid of this complication during the follow-up period. In the conservative care cohort, 1 patient (2%) experienced lipodermatosclerosis, whereas 49 individuals (98%) did not exhibit this consequence. In the surgical management cohort, no patients reported varicose vein recurrence, and all 50 patients (100%) remained recurrence-free throughout the follow-up period. Conversely, in the conservative care cohort, 5 patients (10%) experienced recurrence of varicosity, whereas 45 patients (90%) did not exhibit recurrence.

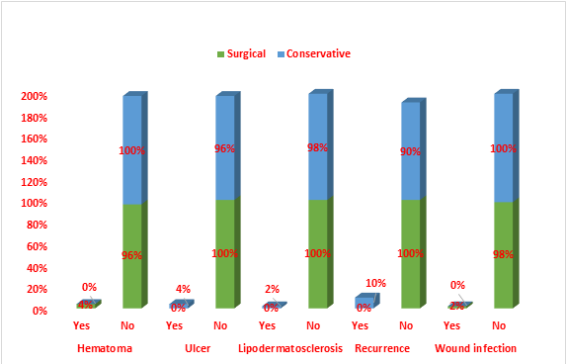

Figure 1: Proportion of Complications among groups

In the surgical group, a hematoma was noted in 2 patients (4%), while there were none in the conservative group. Nevertheless, this difference did not reach statistical significance (p = 0.153). In the conservative group, ulcer formation was observed in

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2 patients (4%), whereas the surgical group reported no cases. This difference was not statistically significant (p = 0.153). Lipodermatosclerosis was observed in one patient (2%) within the conservative treatment group, while there were no occurrences in the surgical group, a difference that did not reach statistical significance (p = 0.315). In the surgical group, wound infection occurred in 1 patient (2%), while the conservative group reported no cases, demonstrating no statistical significance (p = 0.315). In the conservative group, 5 patients (10%) experienced a recurrence of varicosity, while there were no recurrences in the surgical group. This difference was statistically significant (p = 0.022), suggesting that surgical management offers superior prevention of recurrence.

Table 2: Postoperative Complications among groups

S No	Complications		Surgical (n = 50)	Conservative (n = 50)	p value
1	Hematoma	Yes	2	0	0.153
		No	48	50	
2	Ulcer	Yes	0	2	0.153
		No	50	48	
3	Lipodermatosclerosis	Yes	0	1	0.315
		No	50	49	
4	Wound infection	Yes	1	0	0.315
		No	49	50	
5	Recurrence	Yes	0	5	0.022
		No	50	45	

In the surgical cohort, complications were noted in 6% of patients, while a greater incidence of 16% was observed in the conservative cohort during the follow-up period. In contrast, 94% of individuals in the surgical cohort and 84% of those in the conservative cohort reported no complications whatsoever.

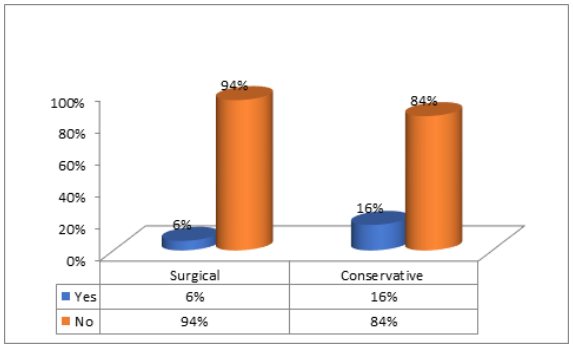

Figure 2: Complications among groups

While the conservative group exhibited a greater number of complications relative to the surgical group, the statistical analysis conducted via the Pearson Chi-square test indicated that this disparity did not reach statistical significance ($\chi^2 = 2.554$, df = 1, p = 0.110).

DISCUSSION

Varicose veins frequently occur as a result of chronic venous insufficiency and can result in symptoms including pain, swelling, a feeling of heaviness in the limb, and alterations in the skin. Management strategies consist of conservative approaches like the use of compression stockings and elevating the limbs, in addition to surgical interventions designed to address venous reflux. This current prospective comparative study assessed the incidence of complications and recurrence in patients receiving surgical versus conservative management. The results demonstrated that the majority of complications showed no significant differences between the two groups; however, there was a notable increase in the recurrence of varicosity among patients who were managed conservatively.

The present study revealed that the average age of participants was around 55 years in both cohorts, suggesting a higher prevalence of varicose veins in middle-aged and older populations. This observation aligns with earlier research findings. Balasubramaniam V et al. observed that a significant portion of the patients fell within the 41–70 year age range, representing 58% of the study population. In a similar vein, Murali U et al. noted that the predominant age group affected was 50–69 years, whereas Parmer et al. found the highest incidence among individuals aged 50–70 years. The current study revealed a distinct male predominance in gender distribution, with males comprising 66% of the surgical cohort and 70% of the conservative cohort. Similar observations were noted by Murali U et al. and Parmer et al., indicating that males represented the predominant group in the cases examined. The observed male predominance can be linked to certain occupational factors, including a long duration of standing and physical exertion.

In this study, hematoma formation was noted in 4% of patients within the surgical group, whereas no instances were recorded in the conservative group. The observed difference did not reach statistical significance (p = 0.153). A hematoma is a recognized complication that can occur after surgery, often due to the dissection and manipulation of veins during the procedure. Comparable results were noted by Balasubramaniam V et al,[10] who found that hematoma formation occurred in 28% of patients undergoing venous stripping, in contrast to just 4% in those who received the Trendelenburg procedure alone. In a comparable study, Subramanian et al.[11]

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observed a hematoma occurrence of 25.7% in patients who underwent stripping, in contrast to just 2.9% in those who received ligation alone. Similarly, Gouraj S. et al,[12] studied 60 patients in Telangana who were split into two groups and had either the Trendelenburg operation alone or flush ligation with stripping. The incidence of hematoma formation was observed in 23.33% of patients who underwent venous stripping, in contrast to a mere 3.33% in those who received ligation alone. In contrast to the aforementioned studies, our findings indicate a relatively low incidence of hematoma, potentially attributable to meticulous surgical techniques and enhanced perioperative management practices.

In the conservative group, ulcer formation was noted in 4% of patients, whereas no patients in the surgical group experienced ulcers. While this difference did not reach statistical significance ($p = 0.153$), it indicates that ongoing venous hypertension in patients receiving conservative treatment could make them more susceptible to skin complications. Comparable observations were noted by Parmer et al,[13] who similarly recorded instances of ulcer development in patients treated with conservative management. Conservative therapy may alleviate symptoms; however, it fails to tackle the root cause of venous reflux, potentially resulting in the advancement of the disease. Lipodermatosclerosis was observed in 2% of patients within the conservative group, while it was absent in the surgical group ($p = 0.315$). This condition reflects persistent inflammatory alterations in the skin due to prolonged venous hypertension. Murali U et al,[14] documented lipodermatosclerosis as a complication noted during the follow-up phase of their research. Their analysis also showed no significant link between treatment modality and the incidence of complications, suggesting that both treatment methods may result in minor complications during follow-up. In the surgical group, wound infection was observed in 2% of patients, whereas the conservative group reported no cases ($p = 0.315$). Inherently, surgical procedures present a risk of wound infection stemming from the incision and manipulation of tissue. Nonetheless, the minimal infection rate noted in this investigation indicates a strong commitment to maintaining aseptic surgical practices and ensuring appropriate postoperative management. Similar findings were noted by Parmar et al,[13] who identified just one instance of wound infection among patients who underwent surgical treatment. The most significant observation from the current research was the markedly elevated recurrence rate in patients who were treated conservatively. In the conservative group, recurrence was noted in 10% of patients, while the surgical group showed no instances of recurrence ($p = 0.022$). This highlights the efficacy of surgical intervention in eradicating venous reflux and averting recurrence. While conservative management can provide symptomatic relief, it fails to address the fundamental issue of venous incompetence, leading to a higher rate of recurrence.

Earlier research has highlighted the advantages of surgical procedures in enhancing patient outcomes. Michael J A et al,[15] found that surgical intervention led to notable enhancements in symptoms and overall quality of life when contrasted with conservative management in the initial two years post-treatment. Furthermore, Murad et al,[16] indicated in a meta-analysis that surgical intervention was linked to a lower risk of recurrence in comparison to alternative treatment options like liquid sclerotherapy and endoluminal procedures. Recent investigations have investigated alternative surgical techniques and minimally invasive methodologies. Guo et al,[17] from China performed a quantitative analysis to compare various surgical techniques, revealing that the CHIVA procedure exhibited the most favorable long-term efficacy, achieving the highest treatment success rate and the lowest likelihood of recurrence. These findings reinforce the idea that carefully chosen surgical methods can lead to lasting results and reduce the likelihood of recurrence.

In this study, the overall complication rate was observed to be 6% in the surgical cohort, while it was 16% in the conservative cohort. While the number of complications was greater in patients receiving conservative management, this difference did not reach statistical significance ($\chi^2 = 2.554$, $p = 0.110$). Comparable findings were noted by Murali U et al,[14] and Parmar et al,[13] who similarly identified no significant correlation between the treatment method and the incidence of complications. Recent advancements in minimally invasive procedures have significantly enhanced the management of varicose veins. Research conducted by Abdelmawla et al,[18] comparing CHIVA and endovenous laser ablation (EVLA) has shown positive results, including reduced recurrence rates and enhanced patient satisfaction. Moreover, systematic reviews, including the one conducted by Kheirelseid et al,[19] have indicated that the recurrence rates associated with conventional surgery and endovenous techniques may not show significant differences. This suggests that various treatment options can be effective when chosen judiciously.

CONCLUSION

The findings of this study suggest that surgical management offers superior control of varicose veins and results in lower recurrence rates when compared to conservative treatment. While minor complications like hematoma or wound infection can arise after surgery, their occurrence is infrequent and might be managed successfully. Conservative therapy continues to be beneficial for alleviating symptoms, particularly in individuals who are not ideal candidates for surgery; nonetheless, it may not achieve a permanent resolution of venous reflux. Consequently, surgical intervention continues to be a proven and dependable treatment option for

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individuals experiencing symptomatic varicose veins.

Limitations

This study represents some limitations, such as single centre experience, shorter follow-up time, and variations in compliance with conservative management.

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