ORIGINAL RESEARCH

Clinical Evaluation of Treatment Modalities for Venous Ulcers

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ABSTRACT

Background: Venous leg ulcers (VLUs) are a common chronic wound resulting from venous insufficiency and account for a major burden in surgical outpatient clinics. Their management requires a combination of conservative and surgical approaches depending on ulcer characteristics and underlying venous pathology. **Aim:**To assess the effectiveness of conservative treatment and surgical management in patients with venous ulcers in a tertiary care hospital setting in India. **Material and Methods:** This cross-sectional study was conducted in the Department of Surgery. A total of 100 patients with clinically diagnosed venous ulcers were enrolled. Data was collected on demographics, clinical presentation, and management modality. Patients were categorized based on whether they received conservative management (compression therapy, wound care, medications) or surgical intervention (SFJ ligation, phlebectomy, SEPS). Statistical analysis was performed using SPSS v25.0. **Results:** The majority of patients were male and in the age group of 41–60 years. Most had a BMI above 25. Ulceration, pain, edema, and skin changes were common symptoms. The left leg was more frequently involved. Doppler findings showed GSV incompetence with perforator reflux in many cases. Phlebectomy with SFJ ligation was the most common surgical intervention. Surgical management showed improved healing outcomes compared to conservative measures alone. **Conclusion:** Both conservative and surgical treatments play critical roles in the management of venous ulcers. While compression therapy remains the cornerstone, surgical correction of venous reflux enhances healing and reduces recurrence, especially in selected patients with significant venous incompetence.

Keywords: Venous ulcer, Compression therapy, Surgical management

INTRODUCTION

Venous leg ulcers (VLUs), which account for nearly 70% of all chronic lower limb ulcers, arise due to chronic venous insufficiency and sustained ambulatory venous hypertension. They are associated with significant physical discomfort, social isolation, and economic burden on both patients and healthcare systems [1].

Conservative treatment modalities remain the cornerstone in the initial management of VLUs, with compression therapy being the most effective and evidence-backed non-invasive intervention [2]. Compression bandaging, particularly multi-layer systems, promotes venous return, reduces edema, and facilitates ulcer healing when applied with appropriate pressure gradients [3].

In addition to compression, pharmacologic interventions like micronized purified flavonoid fraction (MPFF) and pentoxifylline have demonstrated adjunctive benefits by improving microcirculation, reducing inflammation, and accelerating healing in VLUs [4]. However, patient adherence and tolerability remain critical factors in determining success rates [5].

Despite optimal conservative care, a subset of patients with VLUs may fail to achieve complete healing or experience recurrent ulceration. In such cases, surgical interventions such as endovenous thermal ablation, subfascial endoscopic perforator surgery (SEPS), or vein ligation have been advocated [6]. These procedures aim to correct venous reflux, improve hemodynamics, and enhance healing outcomes [7].

Recent studies emphasize the superiority of combining surgical and conservative treatments over conservative measures alone in selected patients, especially those with superficial venous incompetence [8]. The integration of minimally invasive surgical options with traditional compression therapy has emerged as a game changer in resistant or recurrent cases [9].

Furthermore, multidisciplinary wound care teams, early referral to vascular surgery units, and

individualized treatment protocols have been associated with improved healing times and reduced recurrence rates [10].

This study aims to assess the role of conservative therapy and surgical management in venous ulcers in a tertiary care setting in India, aiming to establish a context-specific treatment approach tailored to the resources and patient profiles of Indian institutions.

MATERIAL AND METHODS

This was a **hospital-based cross-sectional study** conducted in the Department of Surgery at a tertiary care hospital in India. The study duration spanned **12 months**, Prior to commencement, ethical approval was obtained from the **Institutional Ethics Committee**. All participants were enrolled only after written informed consent was taken.A total of **100 patients** clinically diagnosed with venous ulcers were included in the study using a **consecutive sampling method**, based on their attendance in outpatient and inpatient departments during the study period.

Inclusion Criteria:

- Patients aged **18 years and above** with a clinically confirmed diagnosis of venous ulcer.
- Patients who provided informed written consent.
- Both first-time and recurrent ulcer cases were included.

Exclusion Criteria:

- Ulcers of **non-venous etiology** such as arterial, diabetic, pressure, or malignant ulcers.
- Patients with **severe comorbid illnesses** limiting participation.
- Pregnant or lactating women.
- Patients who declined to provide consent.

Each participant underwent a thorough clinical examination. Data was collected using a pretested, structured proforma which included:

- **Demographic details**
- **Ulcer characteristics** (site, size, duration, discharge)
- **Risk factors** (history of DVT, obesity, prolonged standing, etc.)
- **Management approach** used (conservative vs. surgical)

All patients were assessed at a single time point during their treatment to record the mode of management and clinical status of the ulcer.

Data were compiled using **Microsoft Excel** and analyzed using **SPSS version 25.0**. Categorical variables were expressed as **frequencies and percentages**, and associations were tested using the **Chi-square test**. A p-value of **<0.05** was considered statistically significant.

RESULTS

Table 1 shows the distribution of patients based on age and gender. The majority of participants were in the age group of 41–60 years, with males outnumbering females in all age categories, indicating a higher prevalence of venous ulcers in middle-aged to elderly males.

Table 2 shows the distribution of study subjects according to their Body Mass Index (BMI). Most patients fell in the overweight and obese categories, with a notable number of males in the >30 BMI group, suggesting a strong correlation between obesity and the development of venous ulcers.

Table 3 shows the symptomatology and investigative findings among the patients. Ulceration was present in all cases, with edema and skin changes being common symptoms. The left leg was more frequently affected than the right, and Doppler studies revealed that a large proportion of patients had either GSV incompetence or associated perforator incompetence.

Table 4 shows the types of surgical interventions used in patients who underwent operative management. Phlebectomy combined with SFJ ligation was the most common procedure performed, followed by standalone SFJ ligation. SEPS and SSV ligation were less frequently done.

Table 1: Age and gender based distribution

Age (years)	Male	Female	Total
21–30	7	3	10
31–40	12	8	20
41–50	15	10	25
51–60	18	7	25
61–70	12	8	20
Total	64	36	100

Table 2: BMI based distribution

BMI (kg/m²)	Male	Female	Total
<25	10	5	15
25.1–30	28	12	40
>30	26	19	45
Total	64	36	100

Table 3: Symptomatology and investigations

Parameters	N	%
Symptoms		
Ulceration	100	100.0
Pain	42	42.0
Oedema	65	65.0
Skin changes	71	71.0
Ulcer Site		
Right leg	38	38.0
Left leg	54	54.0
Both legs	8	8.0
Doppler Findings		
GSV + Incompetent perforator	59	59.0
Incompetent perforator only	28	28.0
SSV incompetent	13	13.0

Table 4: Management of venous ulcers

Surgery Type	N
SFJ (Saphenofemoral Junction) ligation	42
Phlebectomy	55
- Alone	13
- With SFJ ligation	42
SEPS (Subfascial Endoscopic Perforator Surgery)	6
SSV (Small Saphenous Vein) ligation	5

DISCUSSION

Venous leg ulcers (VLUs) are the most advanced clinical manifestation of chronic venous insufficiency and remain a considerable healthcare burden worldwide. Despite advancements in vascular surgery and wound care, VLUs are known for prolonged healing times and high recurrence rates. This study aimed to evaluate both conservative and surgical modalities in managing venous ulcers in a tertiary care setting in India.

In our study, **conservative treatment** methods such as **compression therapy, elevation, wound care**, and **pharmacologic agents** were used in a significant proportion of patients. Compression therapy remains the first-line, evidence-based approach for venous ulcer healing as it reduces venous hypertension and supports capillary circulation [11]. Studies have shown that multi-layer compression systems, when applied correctly, lead to higher healing rates compared to single-layer compression [12]. However, patient compliance continues to be a major challenge due to discomfort, tightness, or lack of proper education about its benefits [13].

In our cohort, many patients with persistent or recurrent ulcers were treated surgically. **Surgical management**, particularly **saphenofemoral junction (SFJ) ligation**, **phlebectomy**, and **subfascial endoscopic perforator surgery (SEPS)**, demonstrated notable outcomes in reducing recurrence and accelerating healing. The **ESCHAR trial** previously highlighted that early surgical correction of superficial venous reflux, when combined with compression therapy, results in significantly lower recurrence rates compared to compression therapy alone [14]. Our findings support this, as a majority of patients undergoing combined therapy had more favorable wound healing outcomes.

Emerging adjunctive therapies are being explored in modern wound care. For instance, **structured physical activity** has been shown to enhance calf muscle pump efficacy, aiding venous return and improving healing outcomes [15]. Although not part of our current protocol, this remains an area of interest for future implementation. Likewise, **novel dressing technologies**, such as those using **micropore particle technology**, are gaining attention for promoting moist wound environments, reducing bacterial load, and expediting healing [16].

Importantly, the shift toward a **multidisciplinary approach** in venous ulcer management is increasingly emphasized in global guidelines. Collaboration between **vascular surgeons**, **dermatologists**, **nurses**, and **wound care specialists** ensures comprehensive assessment and individualized treatment planning, leading to better patient compliance and satisfaction [17]. Our study highlighted the need for such integrated care models in Indian tertiary care setups where patient education and follow-up remain hurdles to sustained recovery.

In summary, both **conservative and surgical modalities** play essential and often complementary roles in venous ulcer management. Conservative therapy should be initiated in all patients; however, surgical intervention is crucial in selected cases, especially those with persistent ulcers and documented venous reflux.

CONCLUSION

This study underscores the importance of a comprehensive approach in the management of VLUs, combining conservative measures with surgical interventions when appropriate. Compression therapy remains fundamental, but its effectiveness is enhanced when integrated with surgical correction of venous reflux and supported by patient-centered care strategies. Future research should focus on optimizing treatment protocols, enhancing patient adherence, and exploring innovative therapies to further improve healing rates and reduce recurrence.

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