

## Original Article

# Is chronic venous ulcer curable? A sample survey of a plastic surgeon

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### ABSTRACT

**Introduction:** Venous ulcers of lower limbs are often chronic and non-healing, many a time neglected by patients and their treating physicians as these ulcers mostly do not lead to amputation as in gangrenous arterial ulcer and also cost much to complete the course of treatment and prevention of recurrence. **Materials and Methods:** One hundred and twenty two lower limb venous ulcers came up for treatment between May 2006 and April 2009. Only twenty nine cases completed the treatment. The main tool of investigation was the non invasive Duplex scan venography. Biopsy of the ulcer was done for staging the disease. Patients' choice of treatment was always conservative and as out-patient instead of hospitalisation and surgery, which required a lot of motivation by the treating unit. **Results:** Out of twenty nine cases, ten cases were treated conservatively and seven (24.13%) healed well. Remaining nineteen cases were given surgical modality in which fifteen cases (51.74%) were successful. Only seven cases (24.13%) failed to heal. Compression stockings were advised to control oedema, varices and pain. Foot care, regular exercises and follow-up were stressed effectively.

### KEY WORDS

CEAP classification; venous valve damage; venous hypertension; venous ulcers; compression

### INTRODUCTION

Venous ulcers are full thickness defects of skin in lower limb mostly in ankle region, due to venous hypertension, also known as chronic venous disease

(CVD) of lower limb. It is five to seven times more common than arterial ulcer. Its overall prevalence was given as 0.18%.<sup>[1]</sup> Chronic venous disease is mainly reported in women in Western countries. The incidence may be more in our country as here patients do not seek early medical advice because of limb covering apparel, scanty financial resources, and disregard for disfigurement of the limb.<sup>[2]</sup> It is often ignored and poorly managed as many wound centres treat the problem and not the cause.<sup>[3]</sup> The plastic surgeon's help is sought only when the ulcer becomes complicated with deeper infection, foul smell and intractable pain. A hospital based observational study of leg venous ulcer patients has been performed to assess the efficacy of our management protocol in these patients.

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## MATERIALS AND METHODS

One hundred and twenty two chronic lower limb venous ulcers were treated between May 2006 and April 2009. The number of cases who took complete treatment and formed our study, was only 29 (23.7%) consisting of 25 males (86.2%) and 4 females (13.8%) as others dropped out due to financial crunch or fear of hospitalisation. The presenting features of all the patients have been summarised in Table 1. Average duration of the symptoms was 2 years and 6 months. The coexisting diseases, past treatment and examination findings have been summarised in Tables 2 and 3. Nine patients were medically treated in the past and one patient had small saphenous vein ligation in the left leg 3 years before [Tables 1-3].

Investigations for basic vital parameters and specific ones in only severe thrombotic ulcers, like prothrombin time, platelet count, international ratio (PT, PC, INR values) were done. X-ray of the leg and foot, wound culture and sensitivity and abdominal ultrasonogram were also done routinely. Doppler study showed normal Ankle Brachial Index (ABI) between 0.8 and 1.1, ruling out arterial insufficiency in these ulcers.<sup>[4,5]</sup> Duplex scan venography was done in all cases as it is the gold standard to evaluate both anatomical and functional changes of the venous system [Figure 1].<sup>[6,7]</sup> Valveless major and perforator veins were seen with reflux. An analysis of scan findings revealed mostly post thrombotic features as depicted in Table 4. Biopsy of the ulcer was done from the edge and scrapings. Histopathological findings showed typical large venous sinuses with pericapillary inflammation, showing macrophages with plenty of neutrophils near the vessel wall, with non healing granuloma. Destruction of normal subcutaneous tissue and replacement with thick fibrosis was also detected with severe skin destruction and ulcer crater [Figure 2].<sup>[8]</sup>

All the 29 cases (25 males and 4 females) were initially treated with thorough cleaning and dressing. They were analysed as per Clinical findings, aetiology, anatomical site and pathological picture (CEAP classification)<sup>[9]</sup> for further

management by either conservative or surgical modality. Ten cases (34.5%) with shallow, spreading ulcers having only superficial vein thrombosis were treated conservatively with saline or skin substitutes. We used locally available dressings like collagen sheet<sup>[10]</sup> in three patients [Figure 3], Quinidochlor cream with polyurethane foam dressing in three cases and nanocrystalline silver coated dressing<sup>[11,12]</sup> in four cases. Out of these ten cases, seven cases (24.1% of total 29 cases) healed within 3 months of conservative treatment [Figure 3]. Compression stockings were given concurrently to the affected limb to reduce oedema, lymphostasis, pain and to enhance venous flow. Three cases failed to show healing.

Surgical treatment was required for nineteen patients (65.5%) as their ulcers were deep and recalcitrant. Split thickness skin grafting of varying thickness<sup>[13]</sup> was done for eleven superficial ulcers out of which ten were successful and there was one failure [Figure 4]. Full thickness skin grafting<sup>[14]</sup> was done for four cases with deep ulcers. There were three failures and one successful healing [Figure 5]. Pedicled flap cover<sup>[15]</sup> was done for two deep ulcers exposing muscle as they were able to provide good vascularised tissue to reduce the ongoing ulceration. One patient was treated with reverse sural artery flap and the other with local fasciocutaneous flap after good debridement. Both the ulcers healed satisfactorily. No recurrence has been encountered in a follow up of 2 years [Figure 6]. Free flaps<sup>[16,17,18]</sup> were used in two patients with deep ulcers having skin changes with lipodermatosclerosis (LDS). Latissimus dorsi free muscle flap in the one and a free anterolateral thigh flap [Figure 7] in the other patient were done. Both flaps settled well (6.89% of total cases) and the patients are ulcer free on follow up. In our study, we did not use V.A.C therapy<sup>[19]</sup> due to prohibitive cost of the commercial unit. In summary, surgically good results were obtained in fifteen out of twenty nine cases (51.72%). Four cases failed to heal. The outcome of the procedures is summarised in the Table 5.

The healed ulcer cases were followed up with class 2 compression stockings<sup>[20]</sup> and physiotherapy to further

**Table 1: Summary of clinical features on presentation**

<b>Symptoms</b>	<b>No. of patients (n=29)</b>	<b>Duration</b>	<b>Average duration</b>
Swelling of leg with non-healing, painful ulcer in lower leg with hyperpigmented,eczematous changes	10	6 months to 2 years	9 months
Swelling of ankle with pain and ulcer in lateral malleolus, discolouration and prominent dilated veins	18	8 months to 3 years	1.25 years
Swelling and ulcer over the dorsum of foot with pain, discoloration and pruritus	01	3 years	3 years

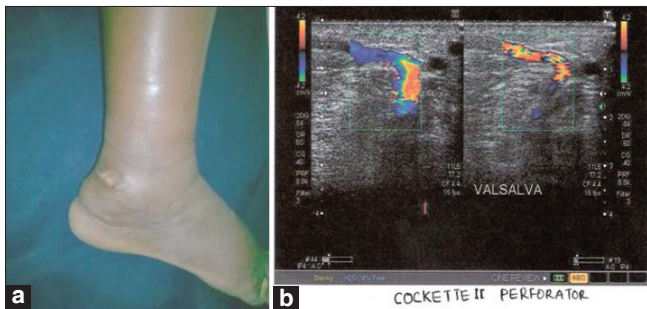
**Table 2: Associated diseases/co-morbidities**

Disease	Number of patients (29)	Male (25)	Female (4)
Diabetes	5	5	0
Hypertension	4	4	0
Smoking and alcoholism	12	12	0
Post traumatic venous ulcers with fracture tibia and fibula	3	3	0
Varicosities during pregnancy, obesity with superficial vein thrombosis	4	0	4
Deep vein thrombosis with past vein ligation surgery	1	1	0

**Table 3: Summary of clinical findings**

Signs	No. of patients (n=29)
Ankle flare, discharging ulcer in ankle or dorsum of foot, (one case) with varicosities of long or short saphenous system hyper pigmentation, and oedema	14 (48.3%)
Familial varicose veins with ulcers and skin changes in the ankle with obesity and stiff ankle with tenderness	04 (13.7%)
Thrombotic cord like veins in leg with pain in calf	11 (38%)

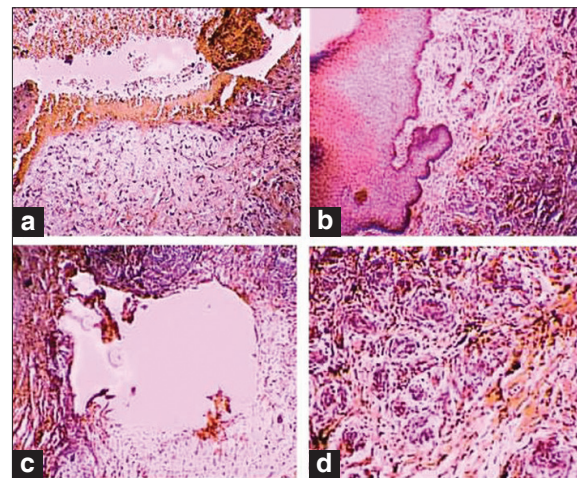
SSG = Split skin graft, FTSG = Full thickness skin graft



**Figure 1:** Chronic superficial venous ulcer lateral malleolus and duplex scan picture with reflux, (a) Chronic venous ulcer-lateral malleolus, (b) Incompetent perforators with damage to valves. Blood flows towards probe. subcutaneous edema seen



**Figure 3:** Healing by collagen dressing



**Figure 2:** Histopathological picture showing (a) unhealthy granuloma (b) hyperplastic epithelium with fibrosis of skin (c) large venous channels with dilated veins (d) dense infiltration with macrophages and lymphocytes



**Figure 4:** Ulcer treated by thick split thickness skin graft

reduce the raised pressure in ankle veins. Limb elevation and exercises along with avoidance of prolonged standing were advised. Till the end of study period, they did not show recurrence. Education about preventive methods and information on lifestyle<sup>[21]</sup> modification were given.

## DISCUSSION

Though the venous ulcers are notorious for their non-healing nature, we achieved 75.87% success by offering treatment according to the CEAP classification. Ten ulcers, which were

classified by CEAP method<sup>[9,22,23]</sup> as of C0,C1,C2,C6-En,Ep,-Ac.Ap-Pr group-[Group 1], with only refluxing saphenous perforators and superficial, ulcers with early cellulitis, were offered conservative treatment of debridement, dressing and limb elevation. Various cost-effective skin substitutes like collagen sheets, hydroquinoline cream with polyurethane foam dressing and nano silver coated polyurethane dressings were used for dressing, after thorough debridement. Allografts, bioengineered bilayered



**Table 4: Analysis of duplex scan venography findings**

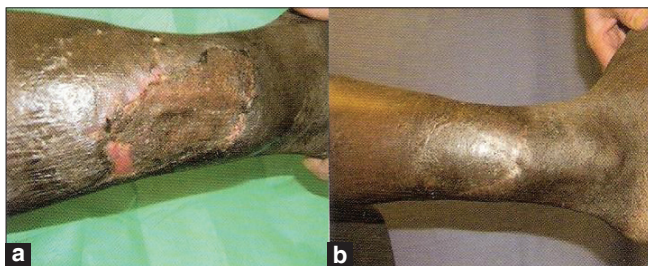
Findings	No of patients (n=29)
Deep vein thrombosis with partial recanalisation, subcutaneous fibrosis, oedema with ulcer crater and thrombotic ankle perforators	17 (58.6)
Superficial vein thrombosis in great saphenous vein with varicosities and irregularities in vein walls	8 (27.5)
Incompetent perforators in ankle with reflux towards probe mainly in Cockette 1 and 2 perforators and sub dermal thickening	3 (10.4)
Thrombosis in both deep and superficial saphenous systems.	1 (3.5)

Figures in parenthesis are in percentage

**Table 5: Summary of results**

Treatment	No. of patients (n=29)	Successful	Failed
Conservative modality	10 (34.5)	7 (24.13)	3 (10.34)
Surgical- SSG= 11 FTSG=4 FLAP=4	19 (65.5)	15 (51.74) SSG-10 FTSG-1 FLAP-4	4 (13.79)
Total	29	22 (75.87)	7 (24.13)

Figures in parenthesis are in percentage



**Figure 5:** Ulcer treated by full thickness skin graft, (a) Closed skin grafted wound (b) Closed wound at one year follow up



**Figure 7:** Ulcer treated by free anterolateral thigh flap



**Figure 6:** Complicated venous ulcer for which sural artery flap was done and it healed

dressings like Apligraph,<sup>[24]</sup> and Integra can also be tried if finances of the patient permit. All these prevent infection, enhance autolytic debridement, reduce discharge, potentiate growth factors and reduce pain. The use of connective tissue matrix, expanded epidermal stem cells or growth factors and cytokines are also being tried.<sup>[25]</sup> in some centres.

Nineteen post thrombotic and discharging ulcers in our study belonged to C3, C4, C5, C6 S- Ep, Es-Ap, Ad-Poc, group [Group 2]. These were deep, infected ulcers with larger area of damaged skin, with gross oedema. Reflux with or without partial obstruction of deep or superficial veins, and valveless

veins were noted in Duplex scan. Resurfacing the raw area had to be done. Medium thickness split skin grafting or thick split thickness skin grafting and skin flaps were carried out after complete debridement of the ulcer area including the liposclerotic skin all round. Full thickness skin graft was a failure as three out of four cases did not show remission of the ulcers. Out of 19 operated cases, 15 (79%) healed well. Vascular surgery like ligation, stripping, endosurgery, etc., may address haemodynamic disturbances but not the ulcers and was not attempted in our study though one case had prior saphenofemoral ligation. In summary, surgical skin grafting, pedicled or free flaps are the answers, provided the recipient and donor vessels have adequate lumen. Prognosis is good if the patient adheres to the strict protocol of treatment.

In complicated multifactorial, deep recurrent ulcers belonging to CEAP type of C4a, b, C6s-Ep, Es-Ad-Proc

group [Group 3] in both superficial and deep veins, (None came under this group in our study), repeated surgical debridement and skin reconstructive surgeries to vascularise the ulcer site with stable skin cover, foot elevation, rest and antithrombotic measures with sterile dressing, pedicled or free flaps are to be done after careful assessment. Sometimes repeated surgical procedures along with assistance of vascular surgeons and ortho-surgeons are needed in cases with bony stiffness or deformities. Modern concepts of vascular surgery are under study worldwide like endovenous operations, radiofrequency ablation of veins, laser endocoagulation of veins or foam sclerotherapy.<sup>[26]</sup>

We advocate in all cases stockings for compression to decrease blood vessel diameter and pressure inside the veins and prevent the reflux. They lower the amount of fluid leak from capillaries and prevent clotting by decreasing action of thrombin. Specifically designed class 2 stockings are superior to elastocrepe or diver's bandages.<sup>[27]</sup> Synthetically woven class 2 compression stockings are very useful before and after surgery for ulcer healing. Optimal, sustained compression is achieved also with multilayered bandage. Compression is contraindicated if ABI is less than 0.7 as it may aggravate arterial compromise.

Education and advice to perform regular venous exercises, to avoid prolonged standing, sitting or smoking and to carry out proper foot care are given to patients to prevent recurrence. Obesity control is advised as it induces vessel thrombosis and varices in leg.<sup>[28]</sup> Clothing must be non-constrictive. Associated metabolic diseases like diabetes or hypertension or uraemia must be controlled. A well-balanced protein diet is essential.<sup>[29]</sup> Repeated review with surgeons is mandatory to prevent complications like osteomyelitis, ankle contracture, stiff joints or carcinomatous changes.<sup>[30]</sup> In our survey, we had not come across malignancy as a complication.

## CONCLUSION

The problem of non healing, recurrent, painful venous ulcer was analysed and its special features made us do this survey and we were able to achieve 75% success. As many physicians tend to consider these ulcers as just chronic non-healing ulcers, they deprive them of meticulous attention to its origin from venous hypertension caused by Post Deep Vein Thrombosis (DVT) syndrome, varicose veins and venous reflux. But as plastic surgeons, if we really understand the uniqueness<sup>[31]</sup> of this ulcer in presentation and pathology

and classify as above, intervene timely with debridement and skin substitutes, carry out surgical reconstruction, sometimes along with vascular surgeon's help, then we can bring about a satisfactory cure and limb salvage to normalcy.

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