

Lower extremity ulcer surgical management; Overview

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Abstract:

Leg ulcers are debilitating and painful, greatly reducing patient's quality of life. We have reviewed the clinical assessment of leg ulcer and the guidelines for diagnosis, highlight the surgical management. A comprehensive search was conducted using several databases and the most important ones are; (PubMed, Scopus, Web of Science, Embase, Medline, and Cochrane databases). All studies discussing the surgical management of lower extremity ulcer, published up to November, 2017 was included. The search Mesh terms used to retrieve relevant articles were as follows: "Lower extremity ulcer, Surgical intervention". Lower extremity venous and arterial ulcers comprise a complex clinical and social issue. The conventional and/or operative management of venous ulcers is frequently inadequate. Common symptoms such as pain, reduced self-confidence and patient isolation are generally not recognized and therefore not properly managed. These ulcers are frequently difficult to deal with and the effective therapy of leg ulcers relies on the precise medical diagnosis and treatment of the underlying cause. The surgical management of incompetent venous perforator communications between the deep and superficial venous systems in the leg can be effectively taken on by a subfascial endoscopic technique, by laser ablation or foam sclerosant exclusion. Debridement of

the ulcer wound and addition of a skin graft to promote recovery was suggested as an effective therapy of leg ulcers resistant to compression treatment. Nonetheless the suitable surgical management of venous leg ulcers is complex and not completely specified.

Introduction:

Leg ulcers are a big trouble for both patients and health service sources [1], [2]. Most ulcers are connected with venous disease, yet other reasons or contributing aspects consist of immobility, weight problems, trauma, arterial disease, vasculitis, diabetes, and neoplasia. Much of this expense is represented by society nursing solutions; district nurses spend as much as half of their time taking care of patients with ulcers [3].

Most venous leg ulcers could be recovered if patients were admitted to health center for continuous leg elevation. Shortage of hospital beds, the high cost of inpatient care, and the need to preserve independence in this elderly population of patients indicate that this when preferred approach is now hardly ever functional [2]. Furthermore, ulcers commonly recur when the patient returns residence and resumes a lifestyle where most of the day is spent with the legs in dependence. Outpatient systems of care that preserve mobility and avoid the difficulties of bed rest are more affordable and appropriate. Outpatient and community based care also maintain independence and quality of life.

Take care of patients with leg ulcers has enhanced in the past two decades as research study based methods have been adopted. Community leg ulcer clinics utilizing compression bandaging have considerably improved recovery rates and reduced prices, however close supervision by leg ulcer nurse experts is important if standards are to be kept [1], [4].

Leg ulcers are debilitating and painful, greatly reducing patient's quality of life. We have reviewed the clinical assessment of leg ulcer and the guidelines for diagnosis, highlight the surgical management.

Methodology:

A comprehensive search was conducted using several databases and the most important ones are; (PubMed, Scopus, Web of Science, Embase, Medline, and Cochrane databases).

All studies discussing the surgical management of lower extremity ulcer, published up to November, 2017 was included. The search Mesh terms used to retrieve relevant articles were as follows: “Lower extremity ulcer, Surgical intervention”. Search was restricted to English language articles and human subjected studies. every type of study was included and mostly case reports studies discussing the treatment of lower extremity ulcer.

Discussion:

• Venous ulceration

Venous leg ulcer is because of sustained venous hypertension, which results from chronic venous insufficiency. In the regular venous system, pressure lowers with exercise as a result of the action of the calf muscle pump [5]. When the muscles relax, the valves in the piercing veins linking the superficial to the deep venous flow avoid reflux and the pressure remains low. The venous pressure stays high, however, in a system where the valves are incompetent.

Table 1. Risk factors for venous ulceration

Direct risk factors
• Varicose veins
• Deep vein thrombosis
• Chronic venous insufficiency
• Poor calf muscle function
• Arterio-venous fistulae
• Obesity
• History of leg fracture
Indirect risk factors
• All risk factors leading to deep vein thrombosis including protein-C, protein-S, and anti-thrombin III deficiency
• Family history of varicose veins
• A history of minor trauma prior to the development of ulceration may also be identified

As much as 10% of the populace in Europe and North America has valvular incompetence, with 0.2% establishing venous ulceration. Forty to fifty percent of venous ulcers are because of superficial venous insufficiency and/or boring vein incompetence alone with a normal deep venous system [7].

There are numerous danger elements for venous ulcer. Recurrent venous ulcer happens in as much as 70% of those at risk. Many venous ulcers are painful, so appropriate discomfort relief and suggestions should be provided.

- **Arterial ulceration**

Arterial ulceration is due to a decreased arterial blood supply to the lower limb. The most usual cause is atherosclerotic illness of the medium and large sized arteries. Other reasons consist of diabetes, thromboangiitis, vasculitis, pyoderma gangrenosum, thalassaemia, and sickle cell condition, a few of which may incline to the development of atheroma. Further damages to the arterial system occurs with simultaneous hypertension through damage of the intimal layer of the artery [6]. The reduction in arterial blood supply leads to tissue hypoxia and tissue damage. Thrombotic and atheroembolic episodes could add to tissue damages and ulcer development.

Peripheral vascular disease is most usual in men older than 45 and women older than 55, and patients might have a family history of early atherosclerotic illness. Modifiable risk factors for peripheral vascular disease include smoking, hyperlipidaemia, hypertension, diabetes, and excessive weight, with connected lowered task. Patients might additionally have a history of generalised vascular issues, such as myocardial infarction, angina, stroke, and intermittent claudication.

Table 2. Pain with arterial ulceration

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|---|
| • Pain may be present at rest and may be alleviated by hanging the foot over the side of the bed or sleeping in a chair |
| • Pain usually begins distal to the obstruction, moving proximally as ischaemia progresses |
| • The ulcer itself is often painful |

- **Clinical assessment**

Clinical history and examination of leg and ulcer

Clinical evaluation includes complete scientific background and physical exam of the patient of leg ulcer presenting either first time or with reoccurring leg ulcer. In history, the duration/recurrence of an ulcer, discomfort, injury, comorbid aspects, and linked medical causes should be taken into consideration. The comorbid aspects such as aging, poor nutrition, inadequate health, intravenous substance abuse, obesity, varicose veins, deep vein thrombosis, and existing together medical causes such as diabetes mellitus, peripheral arterial illness, rheumatoid arthritis, systemic vasculitis detrimentally impact both prognosis, and result of the treatment.

Exam of both legs need to be done, which includes palpation of peripheral pulses, edema if present whether it is pitting or nonpitting kind, indicators of venous hypertension such as varicose veins, hemosiderin pigmentation, varicose eczema, atrophie blanche, and lipodermatosclerosis must be noted. The variety of hip, knee, and ankle joint activity should be determined, and feeling needs to be evaluated to exclude peripheral neuropathy [9], [8].

Scientific evaluation of ulcer consists of the evaluation of site, dimension, deepness, side, margins, floor, base, and problem of the surrounding skin. The website of the ulcer median,

lateral, anterior, posterior, or mix should be noticed, this give hint to the underlying etiology of the ulcer. The dimension and surface area of the ulcer is determined by measuring both optimum perpendicular axis, mapping the margins, and clinical photography. The surface of the abscess should be serially gauged in time [10], [11]. A research compared the accuracy of ulcer dimension from digital photos with get in touch with mapping, and it was discovered that the two methods were equally precise and reproducible, yet that the digital picture dimension was dramatically quicker and provided a number advantages [12].

- **Vascular assessment**

In patients with lower extremity ulcers, the accurate assessment of the arterial and venous systems is necessary to establish the diagnosis and essential for adequate treatment selection [13],[14],[15].

Doppler measurement of ankle/brachial pressure index

All patients presenting with an ulcer should be screened for arterial illness by Doppler measurement of ankle/brachial pressure index (ABPI) [16], [17].

Ankle/brachial pressure index: Is an objective evidence to corroborate the presence or absence of considerable peripheral arterial disease (other than in greatly calcified vessels) is the ratio of the ankle to brachial systolic pressure and can be determined using a sphygmomanometer and hand held Doppler device. The significance of its assessment is highlighted by the truth that compression treatment can be safely applied to patients with ABPI > 0.8 [13]. Compression related to legs with arterial insufficiency might lead to pressure damages, limb ischemia, and even amputation. Doppler ultrasound to measure ABPI should also be performed when the ulcer is deteriorating, ulcer not healed totally by 12 weeks, unexpected increase in size of ulcer,

unexpected increase hurting, foot color or temperature modification, or there is reoccurrence of ulcer [16], [17].

Role of color flow Doppler imaging in arterial disease

Color flow Doppler imaging is advantageous over ABPI measurements in cases in which wounds and ulcers avoid the use of a cuff for gauging ABPI [19].

Color flow Doppler imaging measures any proximal arterial condition (aortoiliac) and the level of participation of distal vessels. And furthermore, may detect nonflow restricting lesions to nonaxial arteries such as the deep femoral artery or lesions restricted to a solitary tibial artery [19].

Role of venous color flow Doppler imaging

It is a gold basic investigation for the analysis of the venous system of lower limb [18], [19], [20].

This noninvasive modality has revolutionized the diagnostic method to venous problems. It examines the superficial, deep or perforating veins separately for the existence of blockage and reflux. Absence of circulation is taken into consideration as blockage and reflux is defined as the retrograde flow lasting greater than 0.5 s, which is the time needed for valve closure. It is extremely suggested in the setup of venous ulcers.

Biopsy

Referral to a specialist unit for biopsy should be considered if the appearance of the ulcer is atypical or if there is deterioration or failure to progress after 12 weeks of active treatment [21],[22].

- **Life-quality**

A multi-centre, cross-sectional research study assessed discomfort and quality of life in patients with chronic vascular leg ulcers using of a questionnaire that integrated the Short Form (SF)-12 health survey and a visual analogue scale (VAS) for the evaluation of pain during the day, night and at dressing adjustment [23]. Ladies experienced a lot more discomfort and had a worse quality of life than guys. Venous ulcers had high mean VAS values throughout the day and night (44.4 and 44.9, respectively). However, a greater mean value was recorded at dressing adjustment, which resembled the mean VAS value for vascular ulcers (57.5 vs 56.3, respectively). There was a straight relationship in between discomfort and lifestyle, which was worse for ulcers with a longer period and larger location. Ulcers of <3 months' duration had mean VAS values of 38.7, 36.9, 46.8 compared with 53.8, 53.9, 62.9 for ulcers of >3 months' duration had mean VAS worths of 38.7, 36.9, 46.8 compared to 53.8, 53.9, 62.9 for ulcers of > 12 months'duration. Mean SF-12 worths for the physical component of the questionnaire also showed that patients whose ulcers had a longer duration had a poorer lifestyle compared to patients whose ulcers were a lot more recent (35.9 vs 40.9, respectively). The conclusion got to was that vascular leg ulcers lead to a low quality of life, with a straight correlation with both ulcer duration and ulcer area [23].

Besides pain, lower extremity venous ulcers additionally have a result on patient self-esteem and social life. In a research study from the UK, a questionnaire was distributed to 196 individuals with chronic reduced extremity ulcers [24]. This questionnaire intended to identify the effect of odour and extreme exudate bring about leakage on patient quality of life. These signs had an adverse result on the psychological state, causing feelings of disgust, self-loathing and reduced selfesteem. The net outcome was social isolation and depression [24].

- **Surgical intervention**

The surgical management of incompetent venous perforator communications between the deep and superficial venous systems in the leg can be effectively undertaken by a subfascial endoscopic technique, by laser ablation or foam sclerosant exemption [25]. Nevertheless, there is insufficient proof to sustain that this enhances the rate of abscess recovery or reduces the rate of ulcer recurrence compared with external compression [25].

Debridement of the ulcer wound and addition of a skin graft to boost healing was recommended as an effective treatment of leg ulcers resistant to compression treatment [26]. Skin grafts are separated right into autografts (from the patient's own uninjured skin), allograft (bioengineered skin expanded from donor cells) and xenografts (preserved skin from various other animals, e.g. pigs). Although preliminary results appear appealing, there is yet inadequate evidence to identify which kinds of skin grafting must comprise the treatment-of-choice for leg ulcers resistant to compression therapy [26]

A research study was undertaken to evaluate the performance of skin grafting and the effect on the quality of life of patients with chronic venous abscess [27] Two groups of patients were involved in the research; one was treated by performing skin graft surgical procedure, while the other team was dealt with only by conservative means. Patients had to finish a set of questions that was made use of to assess the influence of chronic venous leg ulcers on their lifestyle. At the start of the research study all patients in both groups suffered from leg discomfort. At the end of the research study, the discomfort had lowered in patients undertaking skin graft surgical treatment, while in the group only receiving conservative treatment, the pain almost continued to be the same. In addition, at the beginning of the study, the ulcers denied several patients (37-41%) from both groups of sleep for most of the night. At the end of the study, abscess only deprived 2.5% of patients in the surgical team for most of the night, whereas in the traditional

team this percentage was minimized to only 20%. The conclusion got to was that skin grafting positively influences the lifestyle, reduces the restriction of function and improves the dysphoric mood. The protection of ulcers by autografts of skin density decreases leg discomfort within 6 months compared to conservative therapy alone ($p < 0.05$) [27].

An earlier study from the very same group compared the functionality of surgical therapy with conventional procedures for the management of venous leg ulcers [28]. A total amount of 44 patients with large trophic leg abscess (mean size = 254 cm²) were handled for ≥ 6 months; 10 patients were treated cautiously and 34 patients were treated by skin grafting. Each of them were interviewed after 3-6 months. Ulcer discomfort had actually reduced for the patients dealt with surgically whereas it remained the same for those treated conservatively. Originally, all patients ($n=44$) had sleep problems due to the abscess. In the group of surgically-treated patients, ulcers did not interrupt rest 3 months adhering to surgical treatment, whereas the issue continued the team treated cautiously. A considerable renovation in the patients' emotional condition was additionally noted [28].

Conclusion:

Lower extremity venous and arterial ulcers comprise a complex clinical and social issue. The conventional and/or operative management of venous ulcers is frequently inadequate. In addition, the psychosocial feature of the illness is often neglected and most often undertreated. Common symptoms such as pain, reduced self-confidence and patient isolation are generally not recognized and therefore not properly managed. Venous ulcers have a significant impact on patients' well-being and adversely impact their lifestyle. Besides the establishment of the

treatment-of-choice for this disease, it is equally important to deal with the psychosocial problems that generally come with the development of lower extremity venous ulcers. These ulcers are frequently difficult to deal with and the effective therapy of leg ulcers relies on the precise medical diagnosis and treatment of the underlying cause. Patient with chronic venous leg ulcer and superficial venous reflux need to be taken into consideration for surgery to promote ulcer recovery and to prevent reoccurrence of the ulcer. The surgical management of incompetent venous perforator communications between the deep and superficial venous systems in the leg can be effectively taken on by a subfascial endoscopic technique, by laser ablation or foam sclerosant exclusion. Debridement of the ulcer wound and addition of a skin graft to promote recovery was suggested as an effective therapy of leg ulcers resistant to compression treatment. Nonetheless the suitable surgical management of venous leg ulcers is complex and not completely specified.

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