

Treatment outcomes in the management of lower extremity venous stasis ulcers

Alt ekstremitte venöz ülserlerinde tedavi yaklaşımımız ve sonuçlarımız

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Abstract

The aim of the study is to present the treatment outcomes in patients with venous stasis ulcer and summarize results with a brief review of the literature. Thirty patients with venous leg ulcers referred to a single chronic wound care unit with a minimum one year follow-up were included. Demographic features, co-morbidities, localization and characteristics of the ulcerated lesions, symptoms, arterial and venous Doppler ultrasound examination results, wound culture results, and outcomes of medical and surgical treatments were summarized. The treatment approach includes treating superficial and deep infections, obtaining tissue revascularization, compression, daily wound care, oral pentoxifylline, reconstruction of the major skin defects with split thickness skin grafts and hyperbaric oxygen therapy in refractory lesions. Mean age was 54 (32-85). Male to female ratio was 87%. Most common symptom was edema (83%). Mean size of ulcers were 20 cm² (4-45). Seven (23%) patients were hospitalized. Eighty % of patients had venous insufficiency. Most common isolated pathogen was *P. aeruginosa* (23%). Most common complication was osteomyelitis (5%). Hyperbaric oxygen therapy was applied to 3 patients. Split thickness grafts were used for the treatment of the skin defects in six (%20) patients. There was no recurrence of lesion in any patients at one year follow-up. Despite chronic lower extremity venous stasis ulcers are difficult to treat and related with a high risk of recurrence, it is possible to obtain good results with patient education and a systematic treatment approach.

Keywords: Chronic wound treatment; compression; varices; venous leg ulcers

Özet

Venöz bacak ülserleri, hastalar ve sağlık sistemleri açısından önemli külfetler oluşturmaktadır. Çalışmamızda, yara bakım polikliniğine 6 aylık bir zaman diliminde venöz bacak ülseri tanısı ile başvuran hastaların değerlendirilmesi, hastalığın tanı, takip ve tedavisindeki önemin vurgulanması ve literatür eşliğinde tartışılması amaçlanmaktadır. Tek merkeze bağlı kronik yara tedavi polikliniğine başvuran, 30 venöz ülserli hasta çalışmaya dahil edildi. Hastaların; demografik özellikleri, aile hikayesi, yandaş hastalık, ülser sayısı ve ortalama boyutu, ülser lokalizasyonu ve özellikleri, osteomyelit varlığı, geçirilmiş venöz hastalık cerrahisi, arter ve venöz Doppler ultrason sonuçları, yara kültür sonuçları, uygulanan medikal ve cerrahi tedaviler ve tedavi sonuçları değerlendirilmiştir. Hastaların 26'sı (%87) erkek, ortalama yaş 54 idi. On altı hastada (%53) ağrı genel şikâyet olup 21 hastada (%70) kaşıntı vardı. Ortalama ülser boyutu 20 cm² olarak hesaplandı. On sekiz (%60) hastada dörtlü kompresyon bandajı kullanıldı. Yedi (%23) hasta yatırılarak takip edildi. Yatan hastalarda bacak elevasyonu, oral pentoksifilin, düşük molekül ağırlıklı heparin tedavisi, hyalogran ile pansuman, kültür sonucuna göre sistemik antibiyotik tedavisi yapıldı. Eksüda kontrolü sonrasında kompresyon tedavisi, taburculuk sonrası ise varis çorabı kullanıldı. Yatan 3 hastaya hiperbarik oksijen tedavisi verildi. Altı hastada (%20) bacadaki ülser alanları, tedavi sonrası kısmi kalınlıktaki deri greftleriyle onarıldı. Venöz bacak ülserlerinin tedavisi güç, nüks oranı yüksek olmakla birlikte; hasta eğitimi ve sistematik bir tedavi yaklaşımı ile başarılı sonuç elde etmek mümkündür.

Anahtar kelimeler: Kronik yara tedavisi; kompresyon; varis; venöz bacak ülserleri

Introduction

Prevalence studies indicate that approximately one percent of the population is under significant risk for development of lower extremity chronic ulcerated lesions (1). Risk factors are female gender, older age, immobility, obesity, trauma, arterial and venous diseases, diabetes, vasculitis and neoplasia (2,3).

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Approximately 80 percent of leg ulcers have venous origin and venous stasis ulcers have a high tendency of chronicity and recurrence (4,5). Because of the recalcitrant nature of the disease, severe complications such as cellulitis, osteomyelitis and malignant degeneration increase morbidity and mortality risks. Also, lower extremity venous ulcers significantly deteriorate quality of life and also have a financially negative impact on the health economy (6,7). So, early diagnosis and proper management

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becomes imperative to prevent the possible complications for the patients and the financial burden for the community.

The aim of the study is to analyze the results of our treatment approach on the management of the lower extremity venous ulcers and to compare our results with the literature.

Materials and Methods

Approval from the Local Ethics Committee and informed consent from the patients were taken for this study. In between December 2011-May 2012, 30 patients who admitted to our chronic wound care institution with chronic venous stasis ulcers were

included in the study. Minimum follow-up was one year. The patients were evaluated for demographic characteristics, medical history, the size and localization of the ulcerated lesions, complications, arterial/venous Doppler ultrasound results and treatment modalities. Our management strategy included to treat superficial and deep infections, obtain tissue revascularization, compression, daily wound care, oral pentoxifylline (Trental® 400, Sanofi Aventis) 1200 miligrams/day, reconstruction of the major skin defects with split thickness skin grafts and hyperbaric oxygen therapy in refractory lesions. Treatment approach is summarized in Figure 1. The outcome of the treatment approach was summarized with a brief review of the literature.

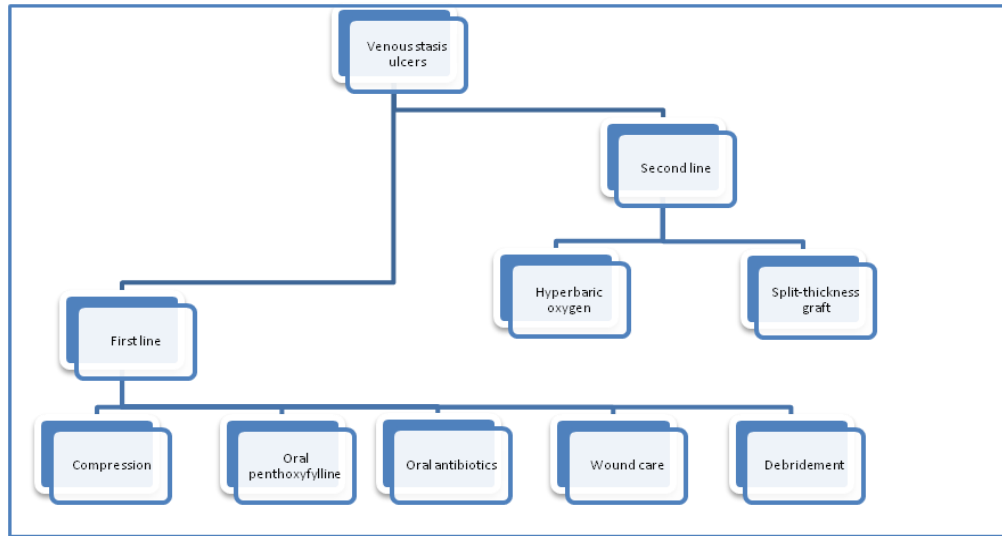


Figure 1. Step by step treatment approach

Results

Mean age was 54 years (32-85). Male to female ratio was 87 percent (26 to 4). Mean ulcer size was 20 cm² (4-45). The characteristics of the lesion were summarized in Table 1.

Table 1. Ulcer characteristics

Side	Right (13) Left (15)
Localization	Bilateral (2) Lateral malleolus (11) Medial malleolus (16) Anterior tibia (3)
Hyperpigmentation	Positive (20) Negative (10)
Edema	Positive (25) Negative (5)
Varices	Positive (25) Negative (5)

Table 2. Symptoms of the patients

Edema	83 %
Varices	83%
Itchiness	70 %
Pain	53%

Twenty five (83%) of the 30 patients had a history of failed treatment attempt in an out-center clinic.

Remaining 5 (17%) of the 30 patients initially admitted to our chronic wound care unit. The mean duration of ulcers in admission was 5.5 months (2-14). The most common symptom was edema (83%). The symptoms were summarized in Table 2. Fifty % of the patients had co-morbidities. Co-morbidities were summarized in Table 3. There was wound-culture positivity in 36 percent of cases. The wound culture results were summarized in Table 4. According to venous Doppler ultrasound, 24 patients had venous insufficiency (80%) and 6 patients had deep venous thrombosis (20%). There was no reported arterial pathology in arterial Doppler ultrasound evaluation.

Table 3. Co-morbidities of the patients

Venous insufficiency	80 %
Deep venous thrombosis	20 %
Diabetes mellitus	13 %
Hypertension	13%
Prostate adenocarcinoma	3%

Table 4. Wound culture results

<i>Pseudomonas aeruginosa</i>	23%
Methicilline-sensitive <i>Staphylococcus aureus</i>	7%
<i>Escherichia coli</i>	3%
Coagulase negative <i>Staphylococcus</i>	3%



Figure 2. 57 years old male with a venous stasis ulcer on his medial malleolus treated with debridement and split thickness skin grafting.

Complications were osteomyelitis (16.6%), acute deep venous thrombosis (3.3%), death related to pulmonary thromboembolism in a different patient (3.3%). Six patients were surgically treated with debridement and split thickness grafts (20%) (Figure 2). Remaining patients were managed with daily wound care. Three patients with refractory ulcers were successfully treated with hyperbaric oxygen therapy. There was no recurrence of lesion in any patients at one year follow-up.

Discussion

Venous stasis ulcers are the most common lower extremity ulcerated lesions (8). Prevalence studies indicate that there are approximately 3 to 6 million patients in United States with lower extremity venous ulcers (1). Leg ulcers usually have a chronic nature and associated with a high risk of recurrence (9). So, it is a debilitating condition that not only impairs the patient's quality of life, but also have negative financial impacts on the health economics (1,3).

There are several theories describing the etiology. Reflux is caused by alterations in the valve mechanism of the lower extremity veins and pumping function of the skeletal muscles is attributed in the pathophysiology of venous stasis ulcers. The stasis and venous hypertension leads extravasations and perivascular inflammation (10). The combination of inflammation, lymphatic dysfunction and tissue hypoxia results with skin ulcerations (11).

Epidemiologic studies indicate a female predominance and a peak incidence on seventh decade (12). Furthermore, low socio-economic level has been indicated as a risk factor because of being susceptible to malnutrition, sedative lifestyle and heavy- working on standing position. The study population was also in low socio-economic level. However, there was male predominance with mean age was 54.

The localization and the characteristics of the ulcerated lesion is an important hallmark of the differential diagnosis. Venous stasis ulcers are usually shallow and have irregular orders. There is also a high incidence of concomitant lower extremity varices in patients with venous ulcers. A granulation tissue covers the floor of the lesion. The lesion is

painful and rapidly progresses. On the other hand, arterial ulcers are deeper and have more circumferential borders. Venous hypertension causes cutaneous protein and hemosiderin accumulation looks like hyperpigmentations around the ulcerated lesion. Most common localization of a venous stasis ulcer is between ankle and upper calf, especially medial malleolus is a classical localization (13). However, diabetic ulcers are usually on the plantar area. In this study, venous ulcers were on the classical localization in all patients, and hyperpigmented in the 66 percent of the patients.

Arterial and venous Doppler ultrasound evaluations are routinely used diagnostic tools for lower extremity venous ulcers. Arterial Doppler demonstrates any arterial pathology that should be ruled out in the differential diagnosis which compression is contraindicated. Venous Doppler examination indicates underlying venous insufficiency. Moreover, several studies suggest that ultrasound application promotes healing in resistant venous ulcerated lesions (14). In this study, arterial and venous Doppler examinations were routinely performed. Venous insufficiency in 93 percent and deep venous thrombosis in 7% of patients were the predisposing factors.

Superficial wound culture is a non-specific tool for the diagnosis. Positive results were detected only in 36% of the patients. *Pseudomonas aeruginosa* was the most commonly isolated pathogen (23%). Proper systemic antibiotic treatment was obtained for the culture-positive patients in this study.

The management strategy of the venous stasis ulcers intends to treat underlying infection and to provide revascularization. Therefore, debridement of the infected and necrotic tissues followed by proper parenteral antibiotic treatment according to the positive deep cultures and daily wound care are indicated. Five patients had concomitant tibial osteomyelitis. Daily wound care was performed with special wound dressing materials that efficacy on pain relief and wound healing had been proved (15). Debridement and parenteral antibiotic treatment were admitted in these cases.

Underlying venous hypertension causes a moderate to severe exudation from the wound. So wound coverage products and mechanical compression

become very critical for the wound healing in venous stasis ulcers (9,16). Mechanical compression can be achieved by pneumatic compression devices or varix socks. However, there is no evidence indicating superiority between them. In this study, 83 % of the patients had severe wound drainage and varix socks were used in all patients to maintain mechanic compression.

Fibrinolytic agents such as stanazolol and pentoxifylline and oral zinc can be considered in pharmacologic therapy in venous stasis lesions. Oral pentoxifylline has been introduced to facilitate blood flow to the ulcerated lesions (17). Because of this, oral pentoxifylline was a constant part of our treatment approach. Although oral zinc has favorable effects on wound healing, any positive effect could not been demonstrated on venous stasis ulcers (18).

Artificial treatment modalities facilitating wound oxygenation such as hyperbaric oxygen and topical wound oxygen therapies has a role in the management of chronic venous ulcers (19). A study demonstrated that topical wound oxygenation therapy is a safe and efficient method to decrease the pain, healing times and recurrence (20). The positive effects of hyperbaric oxygen therapy were observed on wound healing in three patients.

Spontaneous healing of minor skin defects can be obtained with a combination of daily wound care, interventions increasing tissue perfusion and compression therapy. On the other hand, there are several alternatives for reconstruction of the major tissue defects. Split or full-thickness skin grafts are gold-standard methods for this purpose. Also, artificial skin products have been shown to promote healing in venous stasis ulcers (21). In this study, six patients with major skin defects were successfully treated with split thickness skin grafts. Coverage of the skin defects with skin grafts cannot correct the etiology of the disease. Therefore, there is a significant risk of a recurrent ulcerated lesion in this area.

In summary, our treatment approach consists of treating superficial and deep infections, obtaining tissue revascularization, compression, daily wound care, oral pentoxifylline, reconstruction of the major skin defects with split thickness skin autografts and hyperbaric oxygen therapy in refractory lesions.

In conclusion, despite chronic lower extremity venous stasis ulcers are difficult to treat and related with a high risk of recurrence, it is possible to obtain good results with patient education and a systematic treatment approach.

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