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Chronic venous ulcers with different approaches for treatment

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Abstract

Leg ulceration affects approximately one out of every five patients with chronic venous insufficiency at some point, and many people experience recurrent ulceration episodes. There are two classifications for venous disorders: The classification of CEAP & the revised venous clinical severity score (r-VCSS). The duplex ultrasound is the gold standard diagnostic tool for chronic venous ulcers. There are many treatment options for chronic venous ulcer including: Compression treatment, superficial vein surgery (stripping or ligation of GSV) in case of truncal reflux, injection of autologous platelet-rich plasma and Perforator vein (PV) interruption procedures either surgically (SEPS) or with foam sclerotherapy. Foam sclerotherapy with ultrasound guidance has been used extensively to treat primary and recurrent superficial venous conditions. Ineffective perforator veins can be treated with sclerotherapy. Platelet rich plasma is widely used on the wound surface or injected in wound edges in chronic ulcers.

Keywords: Diagnostic, sclerotherapy, superficial venous

Introduction

The definition of "chronic venous disorder" (CVD) refers to morphological changes and functional problems of the venous system, including venous ulcers and telangiectasia^[1]. An open skin lesion on the leg that doesn't reflect any signs of healing spontaneously is known as a venous leg ulcer (VLU) and arises from a region where ambulatory venous hypertension is present^[2].

They represent around 80% of all lower extremity ulcers, and between 1 and 2 percent of the population will get a chronic venous ulcer (CVU) at some point in their lives^[3]. Clinical symptoms, etiological variables, the anatomical spread of the disease, and the pathogenic mechanism underlying the disease are all used to classify CVDs in the Comprehensive Classification System for Chronic Venous Disorders (CEAP)^[4].

Chronic venous insufficiency (CVI) is a common cause of lower extremity ulcers in patients. Venous ulcer recurrence was shown to be common (72%), especially when deep venous infiltration was present. The "gaiter" zone (95%) was the typical location of venous ulcers^[5].

Risk factors

Female sex, Age, genetic predisposition, hormonal effects including menstruation, pregnancy, and lifestyle are some risk factors for the development of CVI. Still extensively taken into consideration are other characteristics including tight clothing, obesity, poor eating habits, posture when using the restroom, smoking, and inactivity^[6].

Theories of chronic venous insufficiency development include venous Stasis, the Fibrin Cuff, venous hypertension, water-hammer effect (perforating veins) and leukocyte trapping.

Classifications and scoring of chronic venous disease

- 1. The classification of CEAP:** A standard has been adopted for venous disorders classification by CEAP. In 4 domains: clinical (C), pathophysiology (P), anatomical (A), and etiological (E), CEAP enables thorough recording of the illness condition at a particular time point^[7].
- 2. The revised Venous Clinical Severity Score (r-VCSS):** It is intended to monitor status changes after venous intervention and is the most used clinical grading instrument^[8].

3. **The Villalta scale:** It is a tool which shares the rating of both patient and physician for evaluating and diagnosing the post-thrombotic syndrome severity (PTS) in the lower part [9].

Diagnosis of venous leg ulcer

History taking, clinical examinations and diagnostic tests are the basis of diagnosis of chronic venous condition, while duplex ultrasound is the gold standard tool for diagnosis.

Investigations

- **Wound culture:** There is no need to culture the wound if there is no clinical signs of infection [10].
- **Wound biopsy:** for leg ulcers that do not heal after 4 to 6 weeks of therapies with routine wound and compression therapy [11].
- **Laboratory Evaluation:** to thrombophilia for patients with a history of chronic recurrent venous leg ulcers.
- **Arterial Testing:** The standard procedure for people with

suspected PAD is a lower part Doppler examination and measurement of the ankle-brachial pressure index (ABPI).

Venous Duplex Ultrasound (DUS)

It is the preferred the primary diagnostic procedure for CVD patients. Regarding venous obstruction or DVT and venous reflux, it is essential to evaluate both the superficial and deep venous systems [12]. Compressibility, phasic venous flow with and without augmentation maneuvers, the refluxing perforator's diameter, documentation of venous reflux with measurement time of valve closure, and direct visualization of deep, superficial, and perforator venous anatomic segments are some of its components. Reflux has also been seen in perforator veins that are smaller in diameter than the normal range. Duplex ultrasonography should be used to assess the degree of reflux from the deep to the superficial system. Additionally, a quantitative assessment of reflux may be shown using pulsed-wave Doppler [13].

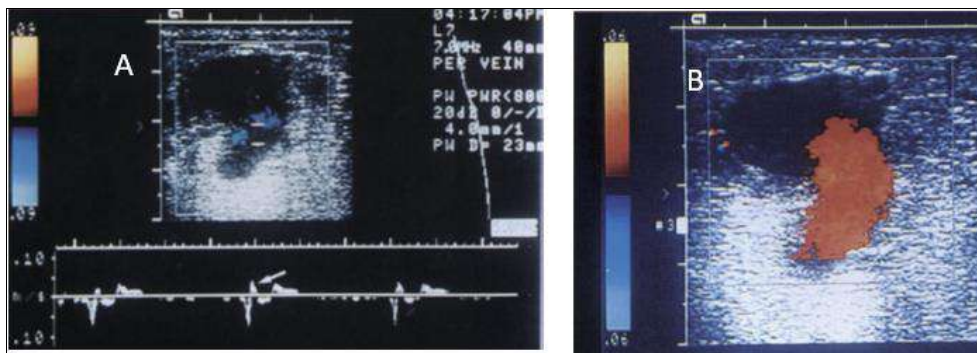


Fig 1: Examining a patient with a persistent venous ulcer using a duplex. A: An enlarged ineffective perforating vein using color Doppler and spectral tracing. Bidirectional flow is shown through spectral analysis (Arrow). Blue on the color Doppler picture indicates amplification of shallow to deep flow. B: When the augmentation is released, the color of the perforator valve changes to red, indicating incompetence.

- **Cross Sectional Venous Imaging:** Screening Through contrast venography and intravascular ultrasonography, CTV and MRV may provide more data [14].
- **Intravascular ultrasound (IVUS):** IVUS consistently determined the cross luminal diameter and surface area of the deep veins, just like CTV and MRV.
- **Plethysmography:** A further instrument to assess venous hemodynamics [15].

Treatment of venous leg ulcers

- Pain control [16].
- **Antibiotics and antiseptics:** have been established for clinical infection treatment in VLU [17].
- **Physical therapy:** by calf muscle pump activation by certain ankle joint exercises [18].
- **Wound debridement:** should come following wound cleaning [19].
- **Negative pressure wound therapy (NPWT):** When using NPWT devices or micro deformational wound therapy (MDWT), significant shrinkage of the wound can be observed [20].
- **Wound dressing:** It is suggested to protect ulcers and facilitate moist wound healing [21].
- **Compression:** venous insufficiency Patients need to wear compression equipment, such as stockings or bandages, for duration of their lives [22].
- **Superficial venous incompetence treatment:** In research of EVRA (Early Venous Reflux Ablation), Despite the fact

that the majority of people received ultrasound guided foam sclerotherapy (UGFS), no particular perforators procedures occurred [23].

- **Treatment of deep venous pathology:** Consists of correcting reflux or obstructions. Endovascular or open surgical procedures may be used to treat ilioacaval and iliofemoral obstruction [24].
- **Pharmacotherapy:** Venoactive drugs (VADs) reduce permeability of capillaries, decrease inflammatory mediators release, or reduce tone of veins [25, 26].
- Ultrasound-guided foam sclerotherapy (UGFS)

For the treatment of primary and repeated superficial venous diseases, UGFS has been utilized frequently.

Indications of foam sclerotherapy [27]

1. Insufficiency of the short saphenous vein, and the great saphenous vein, the tributary varicose veins, the anterior and posterior accessory saphenous veins,
2. Ulceration of Chronic venous with surrounding superficial vein reflux.
3. Residual/recurrent varicosities after previous treatments.
4. Pelvic varicosities.
5. Venous malformations.
6. Superficial varicosity Rupture or spontaneous bleeding.

Contraindications of foam sclerotherapy [27]

- **Relative contraindications:** High thromboembolic risk,

patient immobility, active superficial venous thrombosis a history of previous neurologic problems that were simultaneously with UGFS, symptomatic right-to-left heart shunt and (ankle-brachial index < 0.5) Severe peripheral arterial occlusive disease

- **Absolute contraindications:** Prior allergic response to sclerosant, active DVT or pulmonary embolism and pregnancy/breast feeding.

Types of sclerosing materials

Sclerotherapy may be performed using polidocanol, ethanolamine oleate or sodium tetradecyl sulphate (STS). Either foam or liquid materials are used, by or without the use of guidance of DUS [28].

Postprocedural management and follow-up

Compression intervention: to improve healing by reducing venous hypertension, restricting blood collection in the handled vein, and reducing the phlebo-sclerotic inflammatory response that results from this [29].

Follow-up DUS imaging: is a crucial element of the preoperative non-invasive assessment of the lower extremities venous anatomy and hemodynamics, as well as ought to incorporate evaluation of the possibility of targeting, non-targeting veins, and the corresponding deep and perforating veins [30].

Adverse events: Skin cosmesis, serious adverse effects, thrombotic events, and neurologic events.

Platelet rich plasma (PRP)

PRP is a whole blood-derived autologous process that produces plasma with a substantial number of platelets. Platelets growth factors' roles in various stages of wound healing: Cell proliferation, epithelization, angiogenesis, collagen regulation and granulation tissue formation [31].

PRP generation and activation

The individual's complete blood is centrifuged twice: once to separate the plasma from packed red blood cells and afterwards once to separate platelet-poor plasma from PRP in a two-step procedure. After that, calcium or thrombin are added to this concentration to trigger it, producing a gelatinous platelet gel. [32].

Contraindications

Absolute contraindications: Septicemia, thrombocytopenia, platelet dysfunctional syndrome, hypofibrinogenemia, and a Enterococcus, Pseudomonas, or Klebsiella infections that is active [33].

Relative contraindications: Anemia (Hgb < 10 gm/dL), history of malignancies or state of metastasis, rash or deteriorate of the skin at the injection site, history of systemic administration of corticosteroids during two weeks after the surgery, or administering steroids at the site of treatment, regular utilize of NSAIDs throughout 48 hours of the approach, recently infection or fever, skin breakdown or rash at the injection site [33].

Conflict of Interest

Not available

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