VENOUS ULCER - A NEW THERAPEUTIC APPROACH

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VENOUS ULCER-A NEW THERAPEUTIC APPROACH (Abstract): Trophic leg ulcer is a major health problem affecting approximately 1-2% of the population, the incidence being higher in the elderly (70-80 years). It is a multifactorial condition, but the most common cause is chronic venous insufficiency. This can be attributed to reflux in the saphenous system and calf perforator vein incompetence. These were first described by Linton, the first intervention designed to correct perforator vein incompetence bearing his name. Today Linton’s operation has been abandoned due to the large unaesthetic incision and great postoperative pain. Also, ulcer healing time is long (2 months) and recurrence rate is high. Currently a series of minimally invasive procedures are used to close these perforator veins, such as ultrasound-guided sclerotherapy. The advantages of these techniques are less discomfort to the patients, low rate of complications, short hospital stay. 

Keywords: LEG ULCER, PERFORATOR VEINS, SUBFASCIAL ENDOSCOPIC PERFORATOR SURGERY, ULTRASOUND GUIDED SCLEROTHERAPY, MINIMAL INVASIVE.

Trophic leg ulcer (TLU) is a major health problem affecting approximately 1-2% of the population at some point in time, the incidence being higher in the elderly population (70 to 80 years) (1). It is also associated with high financial costs, the treatment usually being of long duration. TLU is associated with reduced quality of life and high morbidity (2). Venous ulcers are known to have the highest rate of recurrence, 25% of cases relapsing within the first year (1). This condition is multifactorial, but the most common cause is venous insufficiency accounting for 70% of all leg ulcers. It was estimated that 4% of patients with chronic venous insufficiency develop venous stasis ulcers (1). Beside greater saphenous vein incompetence it is also associated with the presence of incompetent calf perforators, thus the treatment would be incomplete if it deals only with the greater saphenous vein neglecting the incompetent perforator veins, ulcer recurrence being therefore high (1,3). Not too long ago, the incompetent perforator veins were surgically corrected with the Linton operation (which requires a large unaesthetic incision and causes great postoperative pains) or sub fascial endoscopic perforator vein surgery. Currently, minimally invasive endovascular percutaneous methods are used. As these methods do not require anesthesia or sedation, patients experience little discomfort, the complication rate is low, and a hospital stay short (3).

Venous insufficiency of the great saphenous vein correlates with the number of incompetent perforator veins per leg as
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well as the diameter of the perforator veins (4). This implies that the presence of venous reflux through the perforators is an important factor in developing venous reflux in the greater saphenous vein. Chronic venous insufficiency is associated with perforator vein insufficiency in approximately 77% of patients with venous stasis leg ulcers and 57% of patients with trophic changes in the lower extremities. Interruption of the perforator veins with significant reflux (shown by Doppler ultrasound) must be done especially in cases associated with such trophic skin changes as dermatitis, hyperpigmentation, lipodermatosclerosis, and most importantly active stasis ulcers. Patients with recurrent varicose veins have a higher prevalence and a greater number of incompetent perforator veins (5,6).

The perforator veins go through the fascia connecting the superficial and deep venous systems. Most have bicuspid valves (1-3) which assure the one-way flow of blood from the superficial to the deep venous system. This is also favored by the oblique trajectory of the perforator veins.

The first classification of perforator veins was (fig. 1):
- Cockett perforators which connect the greater saphenous vein with the posterior tibial vein;
- Boyd perforators situated immediately under the knee, connecting the greater saphenous vein with the tibial and popliteal veins;
- Bassi perforators between the lesser saphenous veins and peroneal veins;
- Dodd (Hunterian) perforators between the greater saphenous vein and the popliteal and femoral veins.

The International Interdisciplinary Consensus Committee on Venous Anatomical Terminology recommends the classification of perforators into 6 groups depending on the anatomical position in the lower extremities: perforators of the foot, ankle, calf, knee, thigh, gluteus. One of the objectives of this classification is to allow topographic description of the perforator veins without relying on person’s names which are quite often historically inaccurate (7).

The incompetent perforator vein is identified as follows: depression in the muscular fascia, area in which at little digital pressure the reflux can be felt during the Valsalva maneuver or cough. On Doppler ultrasound these perforators have a diameter greater than 4mm and a reflux higher than 0.35 seconds (8).

Precise indications for perforator vein interruption are necessary in clinical practice in order to offer a basis for evaluating treatment outcome. These indications are:
- ulcer healing in extremities with Clinical-Etiology-Anatomy-Pathophysiology (CEAP) class C6;
- prevention of ulcer recurrence in ex-
tremities with classes C5 and C6;
- lowering of severity of chronic venous insufficiency and resolution of symptoms in stages C2 to C5;
- prevention of progression to more advanced stages in C2 to C4 extremities (9).

This first technique to close the perforator veins was the Linton operation (1938) which consists of a longitudinal incision followed by the dissection and subfascial ligation of the perforator veins (10).

The second method is sub fascial endoscopic perforator surgery (SEPS). It became the most accepted surgical method for advanced stages of chronic venous insufficiency. The results offered by the North American SEPS Registry show a rate of ulcer healing of 88% at 1 year following the procedure and a higher ulcer recurrence rate in the patients with postthrombotic syndrome compared to those with primary chronic venous insufficiency (11).

The new therapeutic standards is a minimally invasive procedure which does not require anesthesia or sedation (patients are usually old and have a history of other medical illnesses), causes little discomfort to the patients, low complication rate, and short hospital stay. This standard can be achieved through the ultrasound-guided sclerotherapy of perforator veins.

Sclerotherapy is used for the treatment of perforators with a diameter of 4-7 mm, the ones less than 4 mm in diameter being rarely incontinent and those greater than 7 mm requiring a larger amount of sclerosing substance and thus are at higher risk for complications. Under ultrasound guidance the vein is punctured with a 25 gauge needle, venous blood is aspirated to check needle placement into the vein, injection of 1-2 ml polidocamol foam, needle retraction, compression for a few minutes, and ultrasound control for persistent flow (fig. 3). Postoperatively, elastic compression is instituted for 24-48h followed by 5 days of daytime elastic compression (minimal period).

Post procedural ultrasound examination shows thickened venous wall, change in vein diameter, absent flow, and higher echogenicity. A significant decrease in echogenicity signifies the presence of thrombosis and it is associated with a high risk of thrombus propagation into the deep venous system or recanalization (9,12).

Immediate success rate is >98% and at 6 month > 90% perforators remained closed. Post procedurally, the venous ulcers heal quickly and if they are of great size a skin graft should be used. There is no evidence that ulcer recurrence is caused by the same perforator which underwent recanalization or by a new incompetent venous perforator (13,14) (fig 4).

Complications of ultrasound-guided sclerotherapy: multiple punctures can lead to vasospasm and hematoma which will make the procedure difficult, accidental injection of the substance into the artery, cutaneous necrosis, and anaphylactic shock (13).
CONCLUSIONS
Our experience with patients with stasis ulcer and trophic changes associating chronic venous insufficiency with perforator vein reflux should undergo perforator vein besides classical surgical treatment of venous insufficiency, otherwise ulcer healing time is longer and recurrence rate is...
In our clinic approximately 150 patients with venous leg ulcers and incompetent perforator veins were treated by sclerotherapy. The postoperative results showed that ultrasound-guided sclerotherapy of incompetent perforators is a minimally invasive method effective in the treatment of venous ulcers. The immediate favorable results in a high proportion of cases, low rate of complications, accessibility, and the fact that patients can resume their normal activities immediately after the procedure highly recommend it. Ulcer healing time is short and the incidence of leg ulcer recurrence is low.

REFERENCES