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Varicose Vein Stripping with Perforator Ligation Combined With Skin Grafting For Treatment of Venous Ulcers

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Abstract | **Original Research Article**

Objective: To demonstrate the possibility of combining two procedures, GSV stripping with perforator ligation for varicose veins and skin grafting, to treat patients with venous ulcers related to reflux in saphenous vein. Combined procedure give early better disease free life and reduces ulcer related morbidity, socio economic burden, heath care burden. ***Methods:*** A total of 30 patients were treated during the study period of which of which 22 were male and 08 were females. Among 30 patients 26 had unilateral and 4 had bilateral ulcer. Ulcers were associated with concomitant reflux of the great saphenous vein. All 30 patients underwent GSV stripping with perforator ligation and split skin grafting in same sitting of surgery. The strategy employed began by harvesting skin from the donor area from the same limb. Great saphenous vein ligation with perforator ligation was done and skin graft placed over the varicose ulcer in the same sitting of surgery. ***Results*:** In all cases there was improvement of ulcer-related symptoms and healing of the lesion. In 28 cases we achieved full skin grafting viability. In 2 cases there was graft failure due to infection. ***Conclusion:*** This combination of procedures is a valid option, with the potential to provide quicker and less expensive treatment. Combined procedure give early better disease free life.
The two procedures, surgery for varicose vein and grafting for varicose ulcer can be performed during a single operation with no technical compromise or limitations to the subsequent recovery process.

Keywords: Leg ulcer; varicose ulcer; skin grafting; venous stripping; varicose veins.

INTRODUCTION

Varicose veins are common in the Western world, indicating both a genetic and environmental influence on their development. The prevalence of varicose veins in developed countries ranges from 10% to 64%, depending on the age and sex of the population. Conversely, in developing countries, the prevalence is much less, ranging from 1% to 10%.Varicose veins are two to eight times more common in women than in men. The contributing factors in the development of varicose vein include Vein wall weakness, Valvular incompetence (superficial and perforator), Hormonal (estrogen), Genetic, Environmental/dietary [3].

The spectrum of disease ranges from spider telangiectasia to chronic states and acute, potentially lethal, pulmonary embolism – generally described as chronic venous insufficiency (CVI). varicose disorder leading to symptoms such as oedema and lower leg ulcer should be treated surgically [4].

Clinical features

The patient with symptomatic varicose veins commonly reports heaviness, discomfort, and extremity fatigue [1]. The pain is characteristically dull, does not usually occur during recumbency or early in the morning, and is exacerbated in the afternoon, especially after periods of prolonged standing. The discomforts of aching, heaviness, and fatigue are usually relieved by leg elevation or elastic support [1]. Cutaneous burning, termed venous neuropathy, can also occur in patients with advanced venous insufficiency. Pruritus occurs from excess hemosiderin deposition and tends to be located at the distal calf or in areas of phlebitic varicose branch segments1.

The venous examination includes assessment of the patient in the standing and supine positions. Standing increases venous hypertension and dilates veins, thereby facilitating examination. Visual inspection is critical. Location of varicosities can commonly identify a "blown valve" or the axial vein from which the varicosities developed [1]. Signs of advanced venous insufficiency include hyperpigmentation in the distal calf or gaiter distribution, secondary to hemosiderindeposition, and lipodermatosclerosis1. Venous stasis ulcers exhibit pathognomonic features that distinguish them from their arterial or neuropathic counterparts. Venous ulcers are not generally painful and appear at the medial malleolus, not in the mid to distal foot. Venous stasis dermatitis is visualized at the distal ankle and can mimic eczema or dermatitis of another cause [1].

Investigations

Duplex scan with colour flow is the investigation of choice in venous pathology. It is non-invasive, gives valuable information regarding venous flow, thrombotic obstruction, patency and reflux, the effect of muscle contraction, proximal and distal compression and the Valsalva maneuver on each segment of the veins [9].

Plethysmography and venous pressure data are important in determining the need for surgical bypass or valve replacement. Quantitative data on venous obstruction, calf muscle pump ejection fraction and reflux are provided by air plethysmography, whereas venous pressure studies assess the physiological importance of anatomic obstruction because the collaterals may or may not provide adequate compensation for an obstructed pathway [9].

Treatment of venous insufficiency

Nonoperative management

Symptoms of primary venous insufficiency are manifestations of valvular incompetence. Therefore, the objective of conservative management is to improve the symptoms caused by venous hypertension.

The first measure is external compression using elastic hose, 20 to 30 mm Hg, to be worn during the daytime hours.

The second part of conservative therapy is to practice lower extremity elevation for two brief periods during the day.

Third, patients are encouraged to participate in activities that activate the calf musculovenous pump, thereby decreasing ambulatory venous hypertension. These activities include frequent ambulation and exercise.

Patients who exhibit venous stasis ulceration will require local wound care. A triple-layer compression dressing, with a zinc oxide paste gauze wrap in contact with the skin, is used most commonly, from the base of the toes to the anterior tibial tubercle with snug graded compression. The median time to healing for individual ulcers was 9 weeks.

Medications

Pentoxifylline (400 mg three-times daily) has been shown to be of additive beneficial effect to compression by its action on leucocyte metabolism, inhibition of platelet aggregation, reduction in viscosity of blood and consequent improvement in microcirculation. But, its effect as monotherapy has not been shown to be cost effective [9].

Aspirin (300 mg daily) is effective when used with compression therapy. It acts by reducing platelet adhesion.

Intravenously administered iloprost may be beneficial through vasodilatation and its effect on platelet aggregation, but supporting data are limited and it is expensive [9].

Micronised purified flavanoid fraction-Daflon 500 mg and prostaglandin E1 analogue-are used due to their action on leucocyte metabolism. These drugs are most effective when used in conjunction with compression [9].

a. Antibiotics are used in case of suspected cellulitis, and its routine use is not recommended [9].

Operative Management

Indications for interventional treatment are symptoms refractory to conservative therapy, recurrent superficial thrombophlebitis, variceal bleeding, and venous stasis ulceration [1].

Conventional surgery consists of saphenofemoral/saphenopopliteal flush ligation, disconnection of major tributaries, stripping/avulsion of varicose veins and perforator ligation through long incisions. This surgery aims at only the superficial venous system [9].

Sclerotherapy

Sodium tetradecylsulphate, polydocanol and 20% hypertonic saline are used to intentionally induce chemical phlebitis at the site of reflux and varicosities. Compression is to be ensured immediately after the injection, and this is an essential part for obliteration of the pathological vein. Mixing of sclerosant with air or carbon dioxide in various ratios to form a foam increases the efficacy of sclerotherapy

Radiofrequency ablation

Basically, this consists of delivery of infrared energy to the vein walls by directly heating the catheter tip with radiofrequency energy. Currently available

equipment can monitor the core temperature of the catheter tip to about 120°C. Heat delivered to the vein wall causes shrinkage, and the catheter is withdrawn gradually until the entire vein is treated. This is performed in 7-cm segments. Advanced technology has ensured destruction, specifically of the vein wall, without carbonization or destruction of the surrounding tissue.

Endovenous laser surgery

Under perivascular infiltration of dilute local anesthesia, laser fibre is inserted in the great or small saphenous veins through a small puncture and under ultrasonic guidance advanced to the groin or knee crease. The laser is activated while it is withdrawn, resulting in obliteration of the vein.

In a randomized trial comparing four modalities of treatments of great saphenous venous reflux viz. endovenous laser ablation, radiofrequency ablation, ultrasound-guided foam sclerotherapy and surgical stripping, technical failure was highest after sclerotherapy. The end point in this study however was ablation of great saphenous vein. Short-term recovery was best in the radiofrequency and foam sclerotherapy groups, but 1-year results were similar in each group [9].

METHODS AND RESULTS

A total of 30 patients were treated during the study period of which of which 22 were male and 08 were females. Among 30 patients 26 had unilateral and 4 had bilateral ulcer. Ulcers were associated with concomitant reflux of the great saphenous vein.

All 30 patients underwent GSV stripping with perforator ligation and split skin grafting in same sitting of surgery. The strategy employed began by harvesting skin from the donor area using a dermatome from the same limb. Skin segments were then subjected to an expansion procedure, which increases area by making fenestrations in the skin. The recipient area was then cleaned using a scalpel blade and a curette and the expanded skin was implanted and attached with staples. Great saphenous vein ligation with perforator ligation were also done in the same sitting. Post operatively patient was immobilized for 5 days and discharged on 7-10 th day.

The primary dressing applied to the recipient area was paraffin cotton gauze, which has anti-adherent properties, in order to reduce traction on the grafted areas when dressings were changed. These dressings were changed every 3 or 4 days, depending on the quantity of exudate and the need to clean the wound bed. The secondary dressing was changed every 24 or 12 hours, as wound exudation required. The donar area dressing was left in place for 21 days.

Table 1

30	Males	Females	
Unilateral			26
Bilateral	4		04
Total	22	08	30

Table 2

Ulcer size	No of patients
< 2 cms	08
cms	16
>5 cms	06

The painful symptoms improved in all cases, although we did not administer a scale specifically for measuring pain. Since all of patients were already taking analgesic and anti-inflammatory medication before surgery, prescription of analgesic medication was recorded as unnecessary at the 1month follow-up consultation. All of the 10 patients who had reported itching at reoperative consultations reported reduction or absence of this symptom in the postoperative period and at 1month follow-up.

All the 30 patients who under went procedure all patients had symptomatic relief. Among the 30 patients 28 patients had successful good graft uptake, 2 cases graft failure was noted due to infection (Figure 1, 2 & 3).

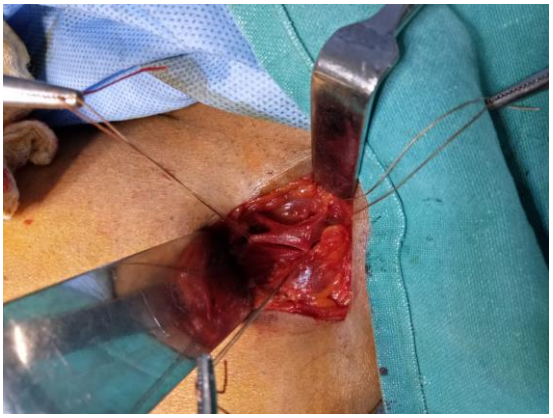

Figure 1

Figure 2: Venous ulcer around ankle

Figure 3: Split skin grafting done for the varicose ulcer

DISCUSSION

Lower limb varicose veins are a very well-known pathology with initial clinical presentation that generally includes painful symptoms caused by edema associated with stasis in varicose veins. The last stage of the disease comprises formation of skin lesions and, finally, ulcerations, which can be very extensive and unlikely to heal.

Ulcers related to varicose disease tend to be more common in populations who do not have access to adequate healthcare, since they are the result of failed or inadequate treatment of varicose veins [5].

Another factor that contributes to large ulcerations is the indolent behavior of ulcers, which, although they don't tend to cause intense pain, do provoke permanent discomfort. This discomfort is normally tolerable and relief from symptoms tends to be related to simple rest with lower limbs raised. As a result, many patients live with venous ulcers for months or years, using a variety of different "prescriptions" for dressings to achieve partial relief from their complaints when at rest and living through multiple episodes of exacerbation as ulcerations progress over the long term [5].

In order to enable the ulceration to heal, we must relieve the venous hypertension, which is related to reflux from varicose veins. This objective can easily be achieved by remaining at rest with the legs raised; however, this position must be maintained practically constantly for weeks or months, depending of the size of the lesion, making it unlikely that patients will comply with the treatment. Even if these long periods of rest are observed, allowing the ulceration to heal, the underlying cause that provoked the lesion will still be present and, if left untreated, can cause the lesion to recur [5].

Varicose disease can be treated clinically or with surgery. Clinical treatment tends to reduce symptoms and keep the disease under control, by wearing compression stockings daily. However, surgical treatment that is capable of acting on the cause of the ulcerations and tends to be more indicated for cases in which the reflux and varicose veins are severe enough to cause ulcerations. Over recent years, in addition to surgical resection, many different techniques for saphenous vein ablation have been used to treat reflux [5].

There are two approaches for treating saphenous veins without removing them: the first employs some type of device to induce photothermolysis of veins, such as laser or radio frequency ablation, while the second is to inject a sclerosant substance that provokes destruction of the endothelium and subsequent localized fibrosis, as occurs with tensoactive alcoholic substances, such as polidocanol [5].

There is varying evidence from comparisons of methods. However, in general, there is a certain degree of consensus that surgery tends to be the most lasting method over the long term, although it requires anesthetic blockade and causes some additional damage to fibrotic tissues adjacent to areas with ulcerations. Techniques that employ thermal ablation do not tend to need anesthetic blockade and are generally less traumatic, but they have a failure rate that is related to recanalization and they involve higher cost, related to the equipment needed. Foam sclerosis is also untraumatic, does not need anesthesia, and is associated with a non-negligible percentage of recanalization, but factors in its favor are its low cost and the possibility of repeating the procedure without harming the patient [5].

With regard to complications, one possible severe complication is thromboembolism, which in theory is more strongly associated with foam sclerotherapy than with the other techniques for treating varicose veins. However, it is now understood that this is a rare event, less than 1%, and is very rarely fatal. While there are reports of extremely uncommon complications such as myocardial infarction, several series that assessed complications have observed similar frequencies for the different techniques compared [5].

After treating the reflux, i.e. the cause of ulceration, the ulcerous lesions will still remain, and even though the causative agent has been removed, they are very difficult to cure because of chronic damage to tissues close to the ulcer. There are many different dressing strategies, ranging from the Unna boot to more recent systems employing vacuum. A variety of different skin grafting techniques can also be employed [5].

In this study, we see a possibility for taking a simultaneous approach that offers advantages for the patient, the physician, and the healthcare system. For the patient, it offers the option of treating not only the cause of the lesion, but the ulceration itself, since a skin graft reduces the pain associated with the lesion, from the first day after the operation, without the need for a direct dressing on the damaged area. Similarly, the

constant exudation of these ulcers reduces progressively over the following days. Although it is necessary to admit the patient for a long period of bed rest, after discharge, and particularly after about 45 days, patients can return to their normal routines at least partially and very often completely, with few precautions or without the need for any additional precautions, except wearing elastic stockings [5].

CONCLUSIONS

Use Surgery to treat saphenous veins with reflux associated with skin ulcerations is simple, low cost, and offers good results with few complications. Expanded skin grafts for venous stasis ulcers demonstrated good results and efficacy for lesion healing. Surgery tends to be the most lasting method over the long term treatment of varicose veins and the skin grafting reduces ulcer related morbidity, socio economic burden, heath care burden. Combined procedure give early better disease free life.

The two procedures, grafting and sclerosis, can be performed during a single operation, sequentially, with no technical compromise or limitations to the subsequent recovery process. We assume that this proposal will result in more rapid treatment to achieve the set of objectives and, therefore, reduce the expenditure needed for the treatment.

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