

Original Article

EXPERIENCE OF SUBFASCIAL ENDOSCOPIC PERFORATOR SURGERY (SEPS) FOR TREATING VENOUS ULCERS AT TERTIARY CARE HOSPITAL, LAHORE

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Objective: To evaluate the outcome and post-operative complications of subfascial endoscopic perforator surgery (SEPS) for treating venous ulcers and skin changes associated with chronic venous insufficiency.

Methods: This was a prospective cross sectional survey which was conducted at surgical department of Sir Ganga Ram Hospital Lahore from September 2014 to March 2017. A total of 63 subfascial endoscopic perforator ligations were performed on 63 limbs of the patients. Quantitative data was presented using mean \pm SD. Qualitative data was presented using frequency table and percentages. Patient follow-up was scheduled at 2 weeks, 1 month, 6 months, 12 months and 24 months.

Results: Mean age of patients was 40.7 years. Male female ratio was 6:1. The most frequent symptom at presentation was pain in the leg (66.7%) and the most frequent sign was skin changes with active ulcer (61.9%). 39 patients had incompetent saphenofemoral junction with incompetent perforating veins while 24 patients had incompetent perforating veins alone. Mean operative time for the SEPS was 66.9 minutes. Average postoperative pain score was 5. Early postoperative complications included hematoma in 14.2% of patients, edema in 28.7%, surgical emphysema in 28.6%, and saphenous neuralgia in 4.76% and wound infection in 1.6% of patients. There were no early deaths, and there was no clinical evidence of thromboembolism within 1 month of the procedure. At 6 months follow up skin changes were improved in 95% of patients, active ulcers were healed in 100 % of patients and there was no recurrence of ulcers at 24 months postoperatively.

Conclusions: SEPS is minimally invasive technique for management of venous ulcers leading to early patient mobility, early return to work, better ulcer healing and no ulcer recurrence.

Keywords: subfascial endoscopic perforator surgery (SEPS), venous ulcers, post-operative complications.

Introduction

Venous stasis ulcers which is sequelae and complication of chronic venous insufficiency always required proper management ranging from life style modification, compression stockings to surgical approach. It has long been noted that incompetent perforating veins contribute to the development of chronic venous insufficiency that are complicated by skin ulcerations or liposclerosis. For these conditions, severing of incompetent perforating veins is an effective surgical treatment. However, severing of incompetent perforating veins by open surgical approach has become less commonly performed because of the excessive invasiveness of the procedure.¹ Endoscopic ligation of perforating veins, or subfascial endoscopic perforating vein surgery (SEPS), is valuable in treatment of venous ulcer on the medial aspect of the lower leg.² The procedure can be performed quickly, with fewer

complications and better results than with subcutaneous or subfascial open surgical exploration.³

Perforating vein insufficiency can lead to varicosities, various skin changes, and ulceration. These ulcers are notoriously slow to heal, and generally recur if the underlying cause of venous hypertension is not removed. Therefore the primary goal should be to relieve high venous pressure in the skin, with ligation of the insufficient perforating veins at subfascial endoscopy. Subfascial endoscopic interruption of perforating veins (SEPS) alone or combined with ablation of superficial venous reflux has emerged as a potentially useful therapeutic option in patients with severe forms of CVI, particularly CEAP clinical class 5 and 6 disease.⁴ The CEAP classification (Clinical-Etiology-Anatomy-Pathophysiology) was adopted worldwide to facilitate meaningful communication about CVD and serve as a basis for more scientific analysis of management. CEAP classification includes 7 categories. Category 0:

No visible or palpable signs of venous disease;

Category-1: Reticular veins or telangiectasia;

Category-2: Visible and palpable Varicose veins;

Category-3: Venous edema without trophic changes.

Category-4: Skin changes (pigmentation, venous eczema, lipodermatosclerosis).

Category-5: Skin changes with healed ulcers;

Category-6: Skin changes with active ulcers.^{5,6}

SEPS involves the introduction of endoscope into the subfascial compartment below the knee via a small medial incision. Perforating veins are clipped and divided under direct vision through the endoscope. Furthermore, randomized clinical trials have demonstrated that when SEPS is compared with open perforator vein ligation, ulcer healing and recurrence rates are similar but there is significantly less morbidity with SEPS.^{7,8} Our experience with SEPS emphasizes that SEPS either alone or combined with flush ligation of greater saphenous vein (GSV) reflux aids venous ulcer healing. The objective of this study was to see the outcome and post-operative complication of subfascial endoscopic perforator surgery (SEPS) for treating venous ulcers and skin changes associated with chronic venous insufficiency.

Methods

This was a prospective cross sectional survey which was conducted at Surgical department of Sir GangaRam Hospital Lahore from September 2014 to March 2017. First patient was recruited in September 2014 and last patient was recruited in March 2017. A total of 63 patients were included in the study. Ethical approval was obtained from the Hospital ethical committee. Written informed consent was taken from all patients. A total of 63 subfascial endoscopic perforator ligations were performed on 63 limbs of the patients. Patients with previous varicose veins surgery, previous limb surgery and complex tortuous varicosities and patients with previous history of DVT were excluded from the study. Non probability purposive sampling technique was used for sample selection. Demographic, physical and vascular laboratory data collected for all patients. Clinical severity score^{9,10} pre operatively was 5.73. Preoperative evaluation with detailed history and physical examination including trendelenburg test along with color ultrasound scanning was performed. Data was entered and analyzed by using SPSS 20. Quantitative data was presented using mean \pm SD. Qualitative data

was presented using frequency table and percentages. After establishing general (=27) or spinal anesthesia (n=36), the affected limb was prepared from groin to ankle in a sterile fashion. A single dose of antibiotics administered before surgery. The leg was then positioned with the knee and ankle elevated on padded stands so that the lower leg was elevated and parallel to the table, allowing unencumbered movement of instrument handles. Two incisions were placed in the upper calf. The first incision was placed 2 cm from the edge of the tibia and at least 10 cm distal to the tibial tuberosity. A 10 mm port was then placed in the initial incision, and the subfascial tunnel was expanded and maintained with CO₂ insufflation to 15 mm Hg. A 10 mm scope was used for surgery. A 5 mm port was then placed approximately 5cm lateral and distal to the first incision for tissue dissection and clipping. Connective tissue bridging the subfascial plane was taken down by blunt or sharp dissection.

The perforating veins were clipped with endo clip applicator. The incisions were closed and the leg wrapped with an ace bandage. All patients with greater saphenous vein incompetence underwent concomitant flush ligation of GSV. Patients were followed at 2 weeks, 1 month, 3 month, 6 month and 24 month and complications like wound infection, bleeding, surgical emphysema and edema (assessed by physical examination) and recurrence of varicose veins were noted. Post-operative duplex scanning was performed at one month to determine that the perforators were ablated. In active ulcers, saline soaked daily dressing was applied postoperatively.

Results

A total of 63 subfascial endoscopic perforator ligations were performed on 63 limbs of the patients. Among them 54 were male and 9 were females. Occupation wise 12 were traffic wardens, 15 were farmers, 17 were laborers, 5 were shopkeepers, 5 electrician and all the female were house wives. Mean age of patient was 40.7 years and ranged from 27 to 65 years. The most frequent symptom at presentation was pain in the leg (66.7%) and the most frequent sign was skin changes with active ulcer (61.9%). Among them 39 had active ulcers (C6), 18 patients had healed ulcers (C 5) and 6 patients had skin changes of chronic venous insufficiency (pain, edema, lipodermatosclerosis without ulceration) (C 4). 24 patients had incompetent saphenofemoral junction with incompetent perforating veins while 39 patients had incompetent perforating veins alone (**Table-1**). 33 patients had SEPS on the right leg and 30 on the left

leg. Mean operative time for the SEPS was 66.9 Minutes (range 50 min to 80 min). Average number of perforators clipped were 4 with 4 perforators clipped in 39 patients, 9 perforators in 6 patients and 5 perforators in 15 patients. Average postoperative pain score was 5 (measured at 6 to 8 hrs). 45 patients (pain score >5) required one dose of analgesia (intravenous toradol) within 6-8 hrs of surgery while 18 patients required additional dose of analgesic within 8-12 hrs. Early postoperative complications included hematoma in 9 patients (14.2%), edema in 15 cases (28.7%) surgical emphysema at portal site in 18 patients (28.6%), saphenous neuralgia in 3 patients (4.76%) and only 1(1.6%) patient had wound infection (Table-2). There were no early deaths and there was no clinical evidence of thromboembolism within 1 month of the procedure. Clinical severity score was 1.7 post operatively after 1 month of SEPS. 45 patients (71%) patients become mobile within 8-12 hrs of surgery while 18 (28.57%) patients become mobile after 24 hrs. 51 patients (85.3%) patients had early return to work within a week after surgery mean hospital stay(1.5days). At 3 month and 6 month follow up skin changes were improved in 87% and 95% of patients and active ulcers were healed in 92% and 100% of patients respectively. There was no recurrence of ulcers at 24 months postoperatively (Table-3).

Table-1: Preoperative evaluation of patients.

Parameters	No. of Patients (n)	%Age
Presenting Complaint	Skin changes with healed ulcers	18 28.6
	Skin chages with active venous uker pain	39 61.9
	Pain	42 66.7
CEAP Clasification	Skin Changes C4	06 9.5
	Healed ulcers C5	18 28.6
	Active ulcers C6	39 61.9
SF Function	Competent	39 61.9
	Non comotent	24 38.1
Type of procedure	SEPS+Flush ligation of GSV	24 38.1
	Seps alone	39 61.9

Table-2: Complication of surgery.

Complications	No. of Patients (n)	%Age
Pain (score >5)	18	28.6
Hematoma	09	14.3

Wound infection	01	1.6
Surgical emphysema	18	28.6
Edema	15	23.6
Saphenous nerve injury	03	4.8

Table-3: Follow up.

Parameters	No. of Patients (n)	%Age
Pain	After 2 weeks	12 28.6
	After 1 month	03 7.1
	After 3 months	01 2.4
Skin Healing	After 1 months	16 41
	After 3 months	36 92.3
Skin charges improvement	After 6 months	39 100
	After 1 months	03 14.3
Ulcer Recurrence	After 3 months	18 85.7
	After 6 months	20 95.2
Ulcer Recurrence	After 6 months	0 0.0
	After 12 months	0 0.0
	After 24 months	0 0.0

Discussion

The pathophysiology of CVI suggests that venous hypertension is linked to severe skin changes and ulceration. Furthermore, these changes can be favorably modified with ablation of superficial venous reflux^{11,12} Our early favorable observations of rapid ulcer healing, improvement in lipodermatosclerosis, and fading of hyperpigmentation appeared directly related to correction of perforating and superficial venous reflux by aggressive surgical intervention. Although conventional open surgical techniques like stab avulsion or open ligation of perforators are effective surgical techniques but these techniques multiple incisions with greater postoperative pain and increased risk of infections. So, SEPS was the only reliable way to correct pathologic outward flow in the perforating veins when there was persistent superficial reflux or coexistent deep venous reflux.¹³ This was a prospective cross sectional study which showed that skin changes were improved to near normal in 95% of patients and active ulcer was healed in all patients at 6 months follow up while there was no recurrence at 24 months follow up.

In this study 9 patients (14.2%) developed hematoma, 3 patients (4.76%) had saphenous neuralgia in and only 1(1.6%) patient had wound infection. There were no early deaths and there was no clinical evidence of thromboembolism within 1 month of the procedure. Vashist et al.,¹⁴ in his study demonstrated hematoma in 2% of cases but no wound infection or paresthesia. However, Tenbrook et al.¹⁵ reported wound infection in 6% of patients, hematoma 9%, neuralgia 7%, and deep venous thrombosis 1% in patients after SEPS. Kumar et al.,¹⁶ showed wound infection in 4.7% of cases and neuralgia in 4.7% of cases after SEPS. Nelzen reported a wound complication rate of 16% in his study.¹⁷ In this study, SEPS either alone or combined with flush ligation of GSV (great saphenous vein) as part of a comprehensive treatment plan for CVI, yielded good results in terms of ulcer healing and symptom relief. Ulcer healing was 41% after 2 weeks and 92% after 1 month and 100% after 3 months. Skin changes alone(C4)or with healed ulcers(C5) at the time of operation were improved in 95% of patients at 3 months. There was no new or recurrent ulcer

formation or recurrent varices during follow-up at 3 months. Tenbrook et al.¹⁵ reported ulcer healing in 88% of patients while other researchers reported 100% ulcer healing rate.^{14,16-19} One limitation of study was that this study could have been done as randomized controlled trail by taking open surgery as a standard. So that results could have better implication and applicability. This study showed that chronic pain was present in only 2.4% of patients at a follow up of 6 months period and there was no recurrence at 24 months period follow up so it can be proposed that this minimally invasive technique is the need of the hour and more and more young surgeons should be trained and provided facilities to learn and implement this technique.

Conclusion

SEPS is minimally invasive technique for the treatment of venous ulcers leading to early patient mobility, early return to work, better ulcer healing and no ulcer recurrence.

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