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Subfascial Endoscopic Perforator Surgery: A Comparison With Linton's Technique of Open Ligation of Perforators

KEYWORDS: Varicose veins, SEPS, Linton's open subfascial ligation of perforators.

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ABSTRACT *Varicose veins are a common problem in patients presenting to our outpatient department. This study was undertaken to compare the results of Subfascial Endoscopic Perforator Surgery i.e., endoscopic ligation of incompetent perforators, with the more popular Linton's open procedure. Ten patients with perforator insufficiency were taken up for surgery by S.E.P.S. and ten patients by Linton's procedure. The operating time, intra-operative blood loss, hospital stay, early and delayed complications, recurrence, time taken to resume normal activities, and patient satisfaction were recorded. The patients were followed up at 1, 2, 4 & 6 months after surgery. All of the variables showed significant superiority of SEPS over Linton's procedure, except for operating time, which was higher for SEPS, though it decreased over the period of study. As with all endoscopic procedures, SEPS has a longer learning curve as compared to the open technique.*

BACKGROUND/ INTRODUCTION:
Varicose veins are a common problem present in at least 10% of the general population, the major risk factor being standing for long hours every day. Various modalities of treatment have been in practice for the treatment of varicose veins, ranging from conservative methods like compression bandages and stockings, sclerotherapy, surgery- both open and endoscopic, and newer modalities like endovenous laser ablation of veins, radiofrequency ablation and Transluminal occlusion of perforators. With all of these treatment options, there have been many complications, including recurrence.

The aim of our study is to compare two surgical options, the open technique and endoscopic technique. Though endovenous ablation is being more widely practiced in private hospitals due to its superior results, in a tertiary government hospital like ours, surgery is the most feasible and economical treatment. Hence, we have undertaken this study to compare the results of these two surgical techniques.

PATIENTS AND METHODS:
Material: We conducted a prospective study in a single unit at Upgraded Department of General Surgery, Osmania General Hospital, Hyderabad. A total number of 20 patients were taken up for the study out of whom 10 underwent SEPS and 10 underwent Linton's method. Patients were randomly allocated to each group. The study was conducted over a period of 18 months from September 2013 to February 2015.

Methods:
- Written informed consent was obtained from all subjects and/or their guardians after full explanation of the procedure.
- All surgical interventions were performed with adequate pre-op preparation including surface marking of incompetent perforators by Colour Doppler scanning and pre-operative dose of antibiotic.

Inclusion Criteria:
- Age: 18 years and above
- Both sexes
- Patients who had perforator vein incompetence demonstrable by Colour Doppler irrespective of Saphe-no-femoral Junction incompetence
- Patients with Grade III and higher grade of Varicose veins at presentation[1]

Exclusion Criteria:
- Patients with concomitant arterial disease or Deep Vein Thrombosis
- Patients with significant cardiovascular disease
- Patients on anti-coagulants
- Patients with any hematological disorders

Results:
Parameters that were used for comparing SEPS with Linton's Open method are:

1. Duration of surgery
2. Mean hospital stay
3. Complications of surgery:
- Haemorrhage
- Surgical Site Infection
- Neuralgia
- Recurrence
- Deep Vein Thrombosis
4. Mean time for resumption of daily activities

Volume : 5 | Issue : 6 | June 2015 | ISSN - 2249-555X

SURGICAL TECHNIQUE:

SEPS:

In patients undergoing SEPS, under spinal anaesthesia, patient was placed in supine position with leg flexed at the knee, externally rotated, and placed at a slightly higher level using a sandbag. A 0^0 10mm camera port inserted about 8-10cm from the popliteal crease and about 4cm medial to the tibial shin, into the subfascial plane. Space was created in subfascial plane by blunt dissection with the 10mm scope and CO_2 insufflation with pressure kept at 20mm Hg. Another 5mm working port was inserted in the posterior compartment, about 5-10cm below the level of camera port. Subfascial perforators were identified and each perforator double clipped individually (using LT-200 clips with 5mm clip applicator). After all the perforators were clipped, gas was released and skin closed in a single layer.

FIGURE 1. INTRODUCTION OF PORTS INTO SUBFASCIAL PLANE OF LEG

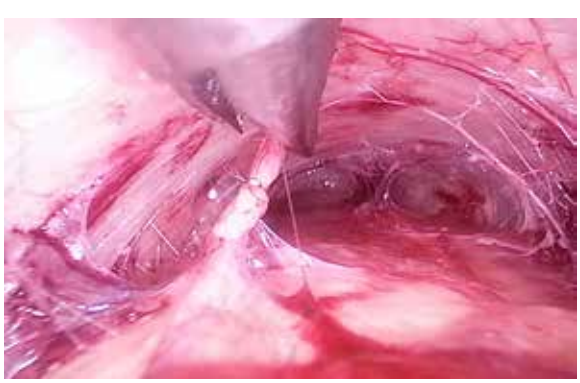

FIGURE 2. CLIPPING OF INCOMPETENT PERFORATOR IN SUBFASCIAL PLANE

Open Technique:

In patients undergoing open surgery, under spinal anaesthesia, patient was placed in supine position with leg flexed and externally rotated, placed flat on the table. A longitudinal skin incision was given about 4 cm medial and parallel to the tibial shin, from about 7-8 cm below popliteal crease to 5cm above the medial malleolus, in order to gain access to all marked perforators. Deep fascia is incised parallel to the skin incision. Subfascial perforators identified and double ligated. Skin closed in a single layer.

FIGURE 3. OPEN LIGATION OF PERFORATORS

In both groups, those patients with concomitant saphenofemoral junction insufficiency were subjected to stripping of GSV till the level of knee through a groin incision. Tourniquet was not used for any of the patients.

After Treatment Follow-up:

- All patients were given instructions for compression bandage application and foot end elevation at bedtime for 3 months post-surgery.

- Antibiotics were continued for 1 week after surgery

Patients were followed up regularly at 1 week, 1 month, 2 months, 4 months and 6 months after surgery and at 6 month intervals thereafter.

RESULTS:

In the 18 month period of study, we operated on a total of 10 patients by SEPS, and another 10 by Open technique. Among these, incidentally all patients were male. One patient had a venous ulcer, and another patient had presented with recurrent varicosities after previous open surgery.

The mean time taken for surgery, for SEPS was 74 minutes (Range: 45-90 min) and for open surgery was 46.2 min (Range: 35-65 min), excluding time taken for Trendelenberg's procedure where indicated.

The mean hospital stay for patients who underwent SEPS was 3.1 days (Range: 2-5 days), and for those who underwent Open procedure was 7.7 days (7-10 days).

The mean time taken for resumption of daily activities for patients who underwent SEPS was 5.4 days (Range: 4-7 days), and for patients who underwent open procedure was 11.6 days (Range: 8-15 days).

The incidence of post-op surgical site infection was 0% in patients who underwent SEPS whereas for patients who underwent open procedure incidence was 20%. (p value < 0.001)

Incidence of significant post-operative neuralgia post-SEPS was 10%, while it was 30% post-open surgery. (p value

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<0.001)

Incidence of recurrence was seen in one patient after SEPS, in whom post-op colour Doppler study showed incompetent perforators of Short Saphenous venous system.

There was no incidence of secondary hemorrhage or Deep Vein Thrombosis in either of the groups.

Patient satisfaction was better with SEPS, because of better cosmesis, faster recovery, shorter hospital stay and earlier return to daily activities.

FIGURES 4 & 5. POST-OPERATIVE PHOTOS AFTER 1

MONTH SHOWING APPEARANCE OF LIMB AFTER SEPS AND OPEN PROCEDURE RESPECTIVELY

DISCUSSION:

Varicose veins are abnormally enlarged and tortuous vessels that result when veins become incompetent, venous valve leaflets no longer meet in the midline, and this failure allows blood to flow in a retrograde direction (reflux). Varicose veins are most often noted on the back of the calf or on the inside of the leg between the groin and ankle, but can occur anywhere on the extremity[2]. To prevent this retrograde flow of blood from the deep venous system of the leg into the superficial system, the incompetent perforators need to be interrupted.

The treatment of incompetent perforators has come a long way since R.R.Linton who first described the technique of open ligation of perforators through a subfascial incision through the skin in 1938[3]. Several modifications of this procedure have been proposed thereafter[4,5].

Endoscopic subfascial ligation technique was first described in 1985 by the German surgeon Hauer[6], and popularized by Fischer[7,8]. The use of carbon dioxide for insufflation as in laparoscopy was independently demonstrated by Conrad in Australia[9] and Gloviczki[10] in the USA at the same time. A number of trials[10,11,12,13,14] have been conducted worldwide since then to compare the results of endoscopic and open procedures. With the advent of newer less invasive techniques like Endovenous Laser Ablation[15] and Endovenous Radiofrequency Ablation[15,16], SEPS has been losing its popularity recently. However in a tertiary government hospital like ours where surgery is the mainstay, it is beneficial in view of the patient to compare these two surgical techniques.

We have found that SEPS is superior to open procedure in both the surgeon and the patient-related variables. The only shortcoming was more operating time, which depends on the skills of the surgeon, and which has been shown to be shortened over time in our study.

There have been many modifications of the procedure for SEPS, with use of different endoscopes, single port surgery[17], using harmonic scalpel[14] or ultrasonic coagulation[18] instead of clipping the incompetent perforator veins. These techniques are surgeon-dependant and have shown comparable results, and in any technique, the main aim of interrupting all identified incompetent perforators is to be achieved.

CONCLUSIONS:

- This study has shown the superiority of SEPS over open technique because of shorter mean hospital stay, earlier resumption of daily activities, lesser post-operative pain and better cosmetic appeal.

- However, a relatively longer duration of surgery was required for SEPS along with a longer learning curve, as with all endoscopic procedures.

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