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Comparative study of outcomes and complications of open (OSPS) versus endoscopic subfascial perforator surgery (SEPS) for treatment of chronic venous insufficiency

S Shivakumar, Gopi Tupkar, N Ravishankar and Divakar

Abstract

Introduction: Varicose veins are defined as dilated palpable subcutaneous veins, generally larger than 4mm in the upright position. Severity of the disease may vary from telangiectatic veins to venous ulceration. Subfascial endoscopic perforator surgery (SEPS) is a new, minimally invasive technique performed in patients with advanced chronic venous insufficiency, enables surgeons to address perforator vein incompetence less invasively, with small upper calf incisions remote from severely diseased skin in the distal leg, with less surgical complications compared to open subfascial perforator ligation.

Aim: The aim of the study is to compare the outcomes and complications of open subfascial perforator ligation versus endoscopic perforator surgery (SEPS) for treatment of varicose veins in terms of postoperative recovery by studying factors such as stay duration, postoperative pain, hematoma formation, wound site infection, Post-Operative edema, ulcer healing individually.

Materials and Methods: Data is collected from patients satisfying the inclusion and exclusion criteria, chosen from the in-patients of Surgery Department, J.S.S. Hospital, Mysuru during the study period of August 2013 to September 2015. 40 diagnosed cases of perforator incompetence with or without long saphenous vein varicosity were included in the study. 20 patients were included in SEPS and 20 patients were included in open subfascial perforator surgery group.

Treatment Protocol and Methodology: All patients irrespective of treatment group underwent Trendelenburg procedure (flush ligation of Sapheno femoral junction) with stripping of GSV up to knee. For below knee varicose veins alternate patient has been selected for subfascial endoscopic perforator ligation, fulfilling the inclusion and exclusion criteria and willing to undergo surgical intervention. During Post-Operative recovery period study factors were compared among two groups like pain, hematoma formation, wound site infection, Post-Operative edema, and ulcer healing time was compared during follow up period.

Results: In the present study, mean age distribution among the two groups was comparable with open group having mean age of 44.3 +/-15.8 SD, and in SEPS group having mean age of 41.5 +/- 14.6 SD. Among the open group 2 patients had 2 incompetent perforators (10%), three perforators in 16 patients (80%), and four perforators in 2 patients (10%) and in SEPS group 12 patients had 2 incompetent perforators on Doppler study, additional one perforator was identified during the surgery and was ligated, 8 patients had 3 incompetent on Doppler study, additional one perforator was identified and ligated during surgery. Therefore total number of perforators ligated in SEPS group were more compared to open group which was statistically significant with p value 0.046. The mean duration of stay in hospital in open group is 7.3 +/- 0.6 days and 5.2 +/- 0.9 days in SEPS group which is statistically significant with p value <0.0001. Comparison of pain Post-Operatively was done using VAS scale, VAS scoring was 3 +/- 0.7 on Post-Operative day 1 in open group and 2 in SEPS group which is statistically significant with p value <0.0001, on Post-Operative day 3 VAS scoring was 2.2 +/- 0.5 and 1.2 +/- 0.4 in SEPS group in open group which is statistically significant with p value <0.0001 and on Post-Operative day 7 was 1.0 +/- 0.4 in open group and 0.4 +/- 0.5 in SEPS group which is statistically significant with p value <0.0001. Post-Operatively wound site hematoma was seen in 2 patients in open group on Post-Operative day 1 which disappeared after Post-Operative day 5 and no patient developed wound site hematoma in SEPS group. In our study, 12 patients had ulcers in open surgery group, among them 1 patient had complete ulcer healing by 2 weeks Post-Operatively, 9 patients had complete ulcer healing by 1 month Post-Operatively, 2 patient had complete ulcer healing by 3 months Post-Operatively and 7 patients had ulcers in SEPS group, 5 patients had complete ulcer healing by 1 month Post-Operatively, and 2 patients had complete ulcer by 3 months Post-Operatively. In our study mean preoperative ulcer size in open group was 8.15±5.48 cm², on postoperatively 2 weeks ulcer size decreased to 5.78±1.32 cm², and on postoperatively 1 month ulcer size decreased to 3.28±0.1 cm² and complete ulcer healing was observed by Post-Operatively 3 months, in SEPS group, mean preoperative ulcer size was 8.75± 5.70 cm², on postoperatively 2 weeks, ulcer size decreased to 3.45±1.49 cm², on Post-Operatively 1 month ulcer size

was 2.86 ± 0.31 cm², and complete ulcer healing was observed by postoperatively 3 months, however this observation was not significant statistically. No patients in both groups had wound site infection, saphenous nerve injury, ulcer recurrence during follow up period.

Conclusion: This study has shown the superiority of SEPS over open technique because of shorter mean hospital stay, lesser post-operative pain, the number of perforators ligated in SEPS was more as compared to the open subfascial ligation group as some perforators missed on Doppler localization were identified during surgery and ligated, which may be a cause of future recurrence in varicose veins in the open surgery. Early relief of symptoms in terms of ulcer healing was better in the SEPS group, however both groups had no wound complications except for 2 patients in open group had hematoma formation.

Keywords: Chronic venous, subcutaneous veins, subfascial endoscopic perforator surgery

Introduction

Varicose veins are elongated, dilated and tortuous veins. They are defined as dilated palpable subcutaneous veins, generally larger than 4mm in the upright position. The word 'varicose' is derived from the Latin word 'varix', which means twisted. The adoption of the erect position by man is thought to have greatly influenced the development of venous diseases of the lower limbs. Impairment of return of venous blood to the heart against gravity as a result of the erect position, results in the development of acute venous thrombosis, varicose veins, and chronic venous insufficiency. Subfascial endoscopic perforator surgery (SEPS) is a new, minimally invasive technique performed in patients with advanced chronic venous insufficiency.

Subfascial endoscopic perforator surgery (SEPS) enables surgeons to address perforator vein incompetence less invasively, with small upper calf incisions remote from severely diseased skin in the distal leg. SEPS is performed in many centers as a component of a comprehensive treatment program for venous insufficiency, but few studies have compared SEPS with the open subfascial perforator ligation. In the only randomized trial, Pierik *et al* found similar ulcer healing and recurrence rates and lower surgical complication rates with SEPS, but the study was too small to enable definitive conclusions about the efficacy of SEPS. The rest of the studies incorporating SEPS, have had an observational study design, often without comparison treatment groups, so the usefulness of SEPS in patients with venous disease remains uncertain. The purpose of the study is to compare the outcomes and complications of open subfascial perforator ligation surgery versus endoscopic perforator surgery (SEPS) for treatment of varicose veins in terms of postoperative recovery by studying factors such as stay duration, postoperative pain, hematoma formation, wound site infection, Post-Operative edema, ulcer healing individually.

Aim of the Study

The aim of the study is to compare the outcomes and complications of open subfascial perforator ligation versus endoscopic perforator surgery (SEPS) for treatment of varicose veins in terms of postoperative recovery by studying factors such as stay duration, postoperative pain, hematoma formation, wound site infection, post-operative edema, ulcer healing individually.

Materials and Methods

Source of Data

Data is collected from patients satisfying the inclusion and exclusion criteria, chosen from the in-patients of Surgery Department, J.S.S. Hospital, Mysore during the study period of August 2013 to September 2015.

Sample Size

40 Cases Of varicose veins were chosen from the in-patients of Surgery Department, J.S.S. Hospital, Mysore during the study period August 2013 to September 2015. 20 patients in SEPS group in 20 patients in open subfascial perforator surgery group.

Inclusion Criteria

Diagnosed cases of perforator incompetence with or without long saphenous vein varicosity.

Exclusion Criteria

- Secondary varicose veins due to deep vein thrombosis, AV malformation,
- Arteriovenous fistula, pelvic tumors
- Recurrent varicose veins
- Isolated short saphenous varicosity
- Pregnancy

Grouping of Patient

Patient were randomly selected and grouped to avoid and minimise bias as much as possible. Alternate patient has been selected for subfascial endoscopic perforator surgery from whole group of patients who came to study centre within study period, fulfilling the inclusion and exclusion criteria and willing to undergo surgical intervention.

Method of Collection of Data

- Type of study – comparative
- Sampling – purposive sampling technique
- 40 patients who present with varicose vein in JSS hospital from August 2013
- to September 2015 will be included in the study.
- A standard Proforma was used during the initial evaluation of the patient.

Statistical Methods

Statistical methods

The descriptive statistics was used to summarize the data by measuring mean, median, standard deviation and proportions. Inferential statistics was done using independent t test, chi-square test, independent t test and Mann Whitney test. All $p < 0.05$ is considered significant. All the measurements are done using SPSS version 21.0. The graphs were made using Microsoft Excel.

Chi-square test

This is used to compare two or more mutually exclusive proportions. This is most widely used statistical test. This is a non-parametric test.

Independent test

This is used to measure statistical significance of mean difference between two independent groups, where the continuous variable is normally distributed.

Mann Whitney test

This is used to measure statistical significance of median difference between two Independent groups, where the continuous variable is not normally distributed. This is an non-parametric test.

Pre-Operative Evaluation

1. Detailed history of patient
2. Detailed examination of patient as mentioned in proforma
3. Investigations: routine and special both investigations are done
4. Special investigations -Doppler/ Duplex scanning of venous system
5. Consent for procedure
6. Pre-operative scoring
7. Pre-operative preparation
8. Antibiotic Inj. Ceftriaxone 1g I.V. stat given on table
9. 67

Treatment Protocol and Methodology

Anaesthesia: Regional anaesthesia

Above knee varicose veins: All patients irrespective of treatment group underwent Trendelenburg procedure (flush ligation of Sapheno femoral junction) with stripping of GSV up to knee.

Below knee varicose veins: Alternate patient has been selected for subfascial endoscopic perforator ligation, who came to study centre with in study period, fulfilling the inclusion and exclusion criteria and willing to undergo surgical intervention.

Subfascial Endoscopic Perforator Surgery

Materials Required and Methods

Basic facility: Operation theatre

Equipment: Laparoscopic instruments, which are routinely used for performing minimally invasive abdominal procedures

Method: Since the original description of procedure by Hauer in 1985, the technique of SEPS has undergone many modifications [Hauer G (1985). The endoscopic subfascial division of the perforating veins-preliminary report (in German). Vasa 14:59-61]. In the present study, SEPS was done by two or three port method. No tourniquet was used in the present study. The knee was flexed at 90° and the hip was

flexed and abducted, and limb was elevated and was made horizontal to the OT table by tying the limb to stand. A 10 mm endoscopic port was placed on the medial side of the calf, 7-10cm distal to tibial tuberosity, under direct vision by incising the fascia. A pocket was created and carbon dioxide insufflation was used to widen the space and facilitate access after port placement. The distal 5 or 10 mm port was placed postero medially and slightly inferior to the first port under direct visualization with the camera, additional 3rd port was introduced as and when required by the surgeon at a preferred site for dissection and perforator ligation. Carbon dioxide was insufflated in the subfascial space and the pressure was maintained at 16-20 mm Hg to create a space in the subfascial plane to visualize the perforators. The subfascial space was explored using blunt and sharp dissection and all the big perforators were clipped and small perforators were coagulated with electro cautery. By rotating the ports, whole of the leg was explored and all the perforators were ligated or coagulated. After completing the procedure, the instruments and ports were removed and carbon dioxide was expressed out manually. The wounds were closed and the limb was elevated and wrapped in an elastic bandage.

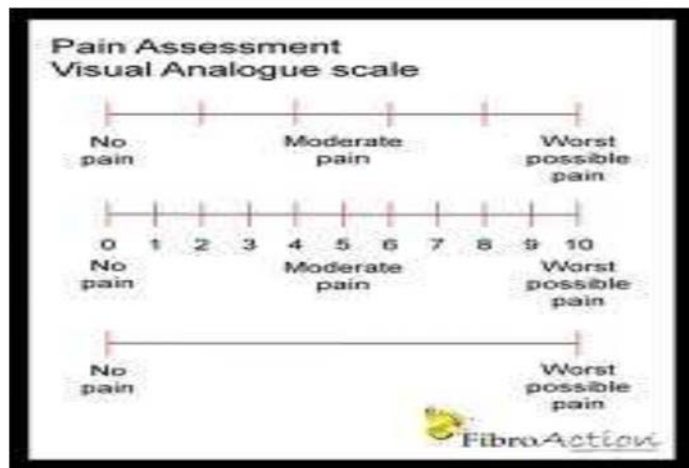
Post procedure: Crape bandage application is done for 6 weeks.

Open subfascial perforator ligation surgery

Post-Operative Evaluation and Care

1. Inj. Ceftriaxone 1gm I.V. stat single dose Post-Operatively.
2. Inj. Paracetamol 1gm I.V. BD given for first 3 days.
3. Patients were observed for any complications like pain, hematoma formation, wound site infection, post-operative edema, ulcer healing time. Pain intensity had been assessed by a Visual Analogue Scale – VAS [0 (no pain) to 10(worst pain)].

The Visual Analogue Scale (VAS) is a subjective measure of pain. It consists of a 10cm line with two end-points representing ‘no pain’ and ‘worst pain imaginable’. Patients are asked to rate their pain by placing a mark on the line corresponding to their current level of pain. The distance along the line from the ‘no pain’ marker is then measured with a ruler giving a pain score out of 10. The score can be used as a baseline assessment of pain with follow-up measures providing an indication of whether pain is reducing or not.



(No pain) 0-----10cm (Worst pain)

Visual Analogue Scale

- 4. Initial dressing is opened after 24 hours Post-Operatively.
- 5. Crape bandage application for 6 weeks.
- 6. Suture removal was done after 10 days.
- 7. Follow up of patient every week initially for 2 weeks and then monthly.



Position of limb during SEPS procedure



Sites of ports insertion



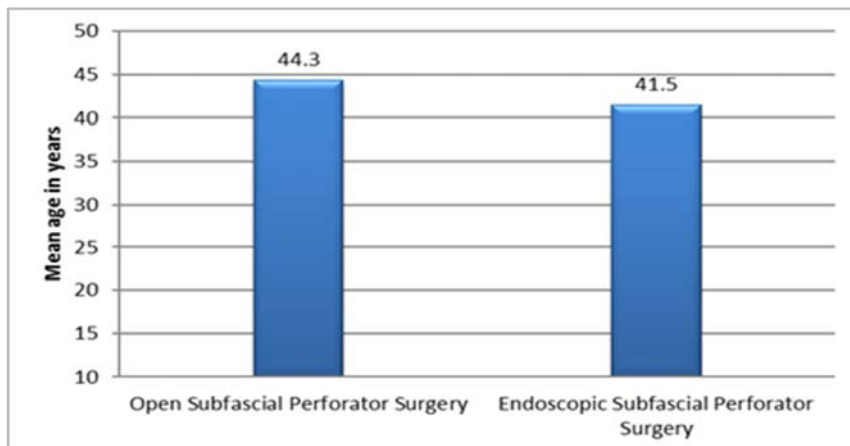
Clipping of incompetent leg perforator

Observation and Results

The following observations were made in the present study

1. Age Distribution: Among the open group(n=20) maximum

age was 65 years and minimum age was 21 years with mean age of 44.3 ± 15.8 SD, and among the SEPS group(n=20) maximum age was 65 years and minimum age was 20 years with mean age of 41.5 ± 14.6 SD



Graph 1: Comparison of age between two groups

2. Number of Incompetent Perforators Ligated

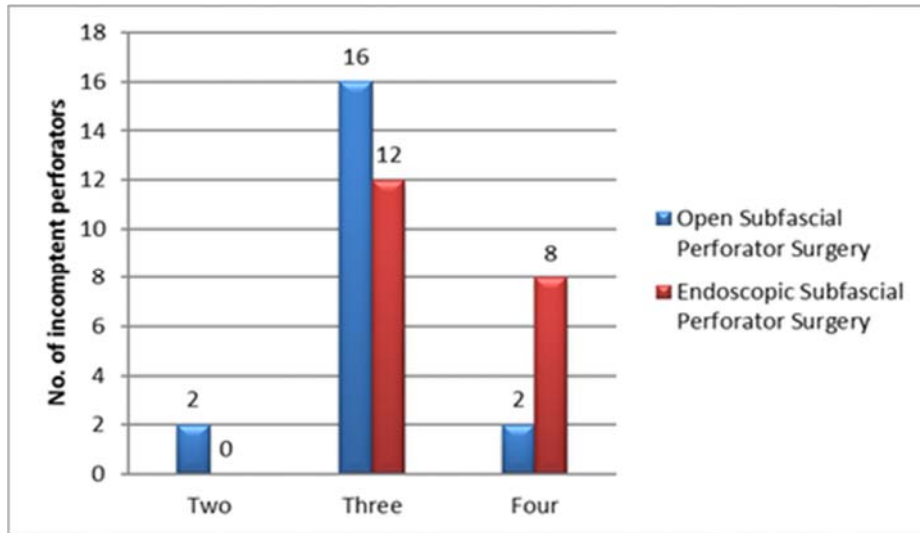
Among the open group 2 patients had 2 incompetent perforators (10%), three perforators in 16 patients (80%), and four perforators in 2 patients (10%) and in SEPS group 12 patients had 2 incompetent perforators on Doppler study, additional one perforator was identified during the surgery

and was ligated, 8 patients had 3 incompetent on Doppler study, additional one perforator was identified and ligated during surgery. Therefore total number of perforators ligated in SEPS group were more compared to open group which was statistically significant with p value 0.046.

Table 2: Comparison of no. of incompetent perforators between two methods

| | Procedure | | | | |
|--------------------------------------|------------------------------------|----|--|----|------|
| | Open Subfascial Perforator Surgery | | Endoscopic Subfascial Perforator Surgery | | |
| | n | % | N | % | |
| No Of Incompetent Perforator Ligated | 2 | 2 | 10.0 | 0 | .0 |
| | 3 | 16 | 80.0 | 12 | 60.0 |
| | 4 | 2 | 10.0 | 8 | 40.0 |

P=0.046, chi-square test



Graph 2: Comparison of no. of incompetent perforators between two methods

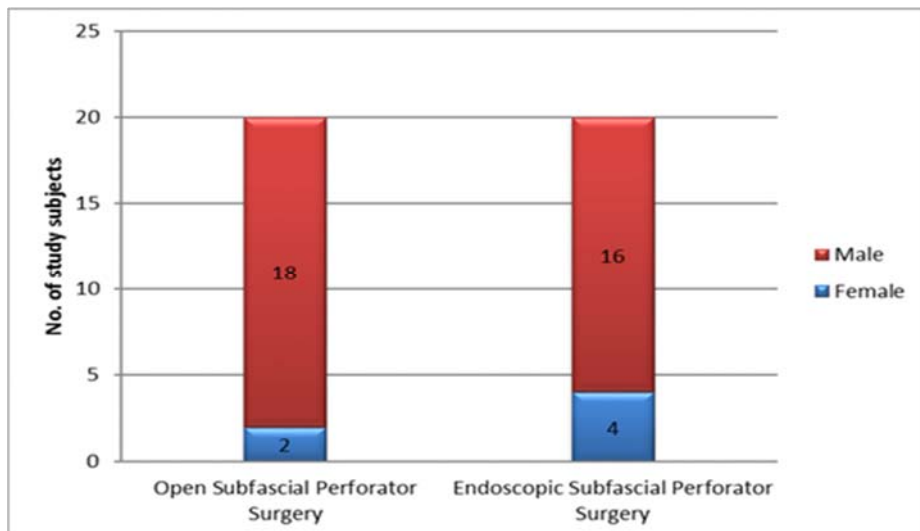
3. Comparison of Age Groups

Age groups of patients are ranging from 20 – 65 years and people were divided in different age groups:
 20 – 39 years age group having 16 patients (8 patients in open group and 8 patients in SEPS group)
 40 – 59 years age group having 18 patients (9 patients in open group and 9 patients in SEPS group)

Above 60 years age group having 6 patients (3 patients on open group and 3 patients in SEPS group)

4. Comparison of Gender

Of the 40 patients 6 were females (2 patients in open group and 4 in SEPS group) and 34 were males (18 patients in open group and 16 in SEPS group).



Graph 3: Comparison of gender between two methods

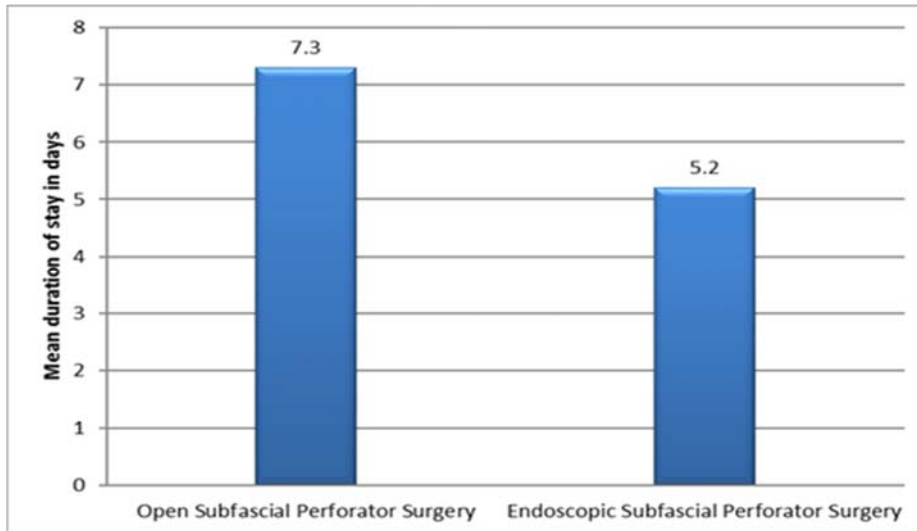
5. Comparison of Duration of Stay between Two Groups
 Mean duration of stay in hospital in open group is 7.3 ± 0.6

days and 5.2 ± 0.9 days in SEPS group which is statistically significant with p value <0.0001

Table 5: Comparison of duration of stay between two groups

| | Procedure | | | | | |
|--------------------|-----------------------------------|--------|-----|---|--------|-----|
| | Open Subfacial Perforator Surgery | | | Endoscopic Subfacial Perforator Surgery | | |
| | Mean | Median | SD | Mean | Median | SD |
| Stay Duration Days | 7.3 | 7.0 | 0.6 | 5.2 | 5.0 | 0.9 |

$P < 0.0001$, independent t test



Graph 4: Comparison of duration of stay between two groups

6. Comparison of Pain between Two Methods at Different Post-Operative Time Interval

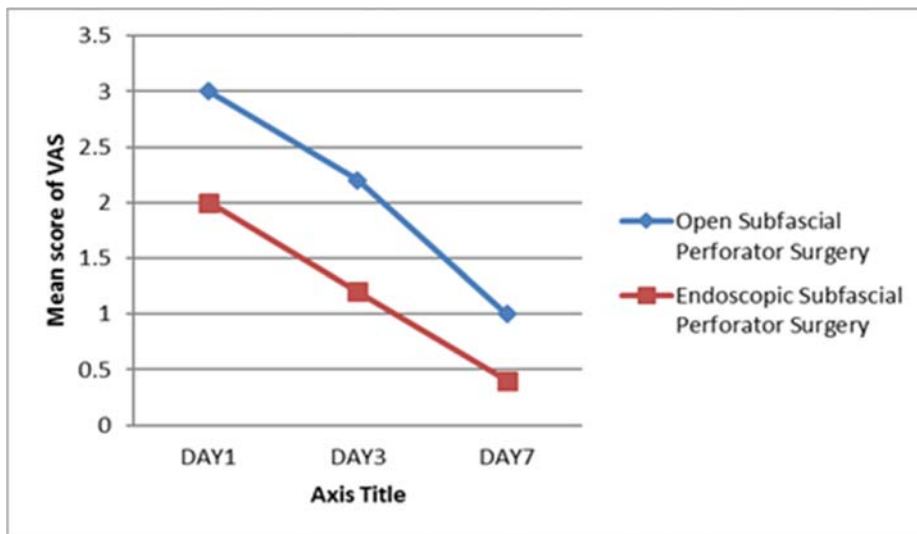
Comparison of pain Post-Operatively using VAS scale, was 3 ± 0.7 on post-operative day 1 in open group and 2 in SEPS group which is statistically significant with p value <0.0001 ,

on post-operative day 3 was 2.2 ± 0.5 in open group which is statistically significant with p value <0.0001 and 1.2 ± 0.4 in SEPS group and on post-operative day 7 was 1.0 ± 0.4 in open group and 0.4 ± 0.5 in SEPS group which is statistically significant with p value <0.0001 .

Table 6: Comparison of pain between two methods at different post-operative time interval

| | Procedure | | | | | | p |
|------------|-----------------------------------|--------|----|---|--------|----|-----------|
| | Open Subfacial Perforator Surgery | | | Endoscopic Subfacial Perforator Surgery | | | |
| | Mean | Median | SD | Mean | Median | SD | |
| DAY1 pain | 3.0 | 3.0 | .7 | 2.0 | 2.0 | .0 | <0.0001 |
| DAY 3 pain | 2.2 | 2.0 | .5 | 1.2 | 1.0 | .4 | <0.0001 |
| DAY 7 pain | 1.0 | 1.0 | .0 | .4 | .0 | .5 | <0.0001 |

$P < 0.0001$, independent t test



Graph 6: Comparison of pain between two methods at different Post-Operative time interval

7. Comparison of Post-Operative Hematoma

Post-Operatively wound site hematoma was seen in 2 patients in open group on post-operative day 1 which disappeared after post-operative day 5 and no patient developed wound site hematoma in SEPS group.

8. Comparison of post-operative edema between two groups

No patients in both groups developed Post-Operative edema

9. Comparison of Post-Operative Infection

No patients in both group had Post-Operative wound site infection.

10. Comparison of Regression of Venous Edema Post-Operatively

Preoperatively 4 patients in open group had venous edema, which regressed by Post-Operative day 7 in all the 4 patients, and preoperatively 3 patients had venous edema in SEPS group, all 3 patients had regression of venous edema by 5 Post-Operative day.

Table 10: Comparison of Post-Operative venous edema between two methods

| Venous Edema | PROCEDURE | | | | p |
|----------------------------|------------------------------------|----|--|----|-----|
| | Open Subfascial Perforator Surgery | | Endoscopic Subfascial Perforator Surgery | | |
| | N | % | n | % | |
| Venous edema pre operative | 4 | 20 | 3 | 15 | 0.8 |
| DAY 3 venous edema | 4 | 20 | 3 | 15 | 0.3 |
| DAY 5 venous edema | 4 | 20 | 0 | .0 | 0.1 |
| DAY 7 venous edema | 0 | .0 | 0 | .0 | NA |

NS

11. Comparison of Post-Operative Saphenous Nerve Injury between Two Groups

In our study no patients had Post-Operative saphenous nerve injury.

12. Comparison of Decrease in Ulcer Size Post-Operatively

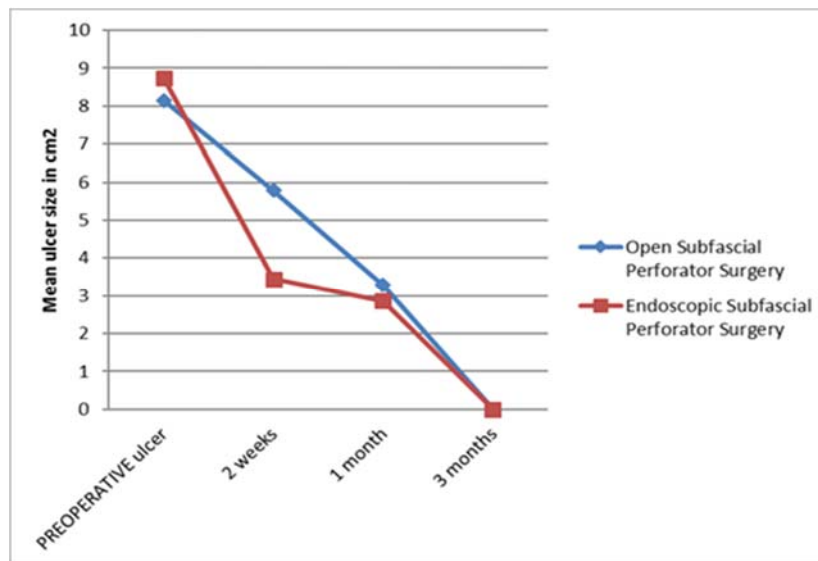
In our study preoperative ulcer size in open group was $8.15 \pm 5.48 \text{ cm}^2$, on postoperatively 2 weeks ulcer size

decreased to $5.78 \pm 1.32 \text{ cm}^2$, and on postoperatively 1 month ulcer size decreased to $3.28 \pm 0.1 \text{ cm}^2$ and complete ulcer healing was observed by Post-Operatively 3 months, in SEPS group, preoperative ulcer size was $8.75 \pm 5.70 \text{ cm}^2$, on postoperatively 2 weeks, ulcer size decreased to $3.45 \pm 1.49 \text{ cm}^2$, on Post-Operatively 1 month ulcer size was $2.86 \pm 0.31 \text{ cm}^2$, and complete ulcer healing was observed by postoperatively 3 months, however this observation was not significant statistically.

Table 12: Comparison of ulcer size changes between two methods

| Ulcer size | Procedure | | | | | | p |
|--------------------|------------------------------------|--------|------|--|--------|------|-----|
| | Open Subfascial Perforator Surgery | | | Endoscopic Subfascial Perforator Surgery | | | |
| | Mean | Median | SD | Mean | Median | SD | |
| PREOPERATIVE ulcer | 8.15 | 6.00 | 5.48 | 8.75 | 7 | 5.70 | 0.2 |
| 2 weeks | 5.78 | 4.00 | 1.32 | 3.45 | 3 | 1.49 | 0.3 |
| 1 month | 3.28 | 3.00 | .23 | 2.86 | 2 | .31 | 0.9 |
| 3 months | .00 | .00 | .00 | .00 | .00 | .00 | NA |

Mann Whitney test



Graph 9: Comparison of ulcer size changes between two methods

13. Comparison of Complete Ulcer Healing Between Two Groups

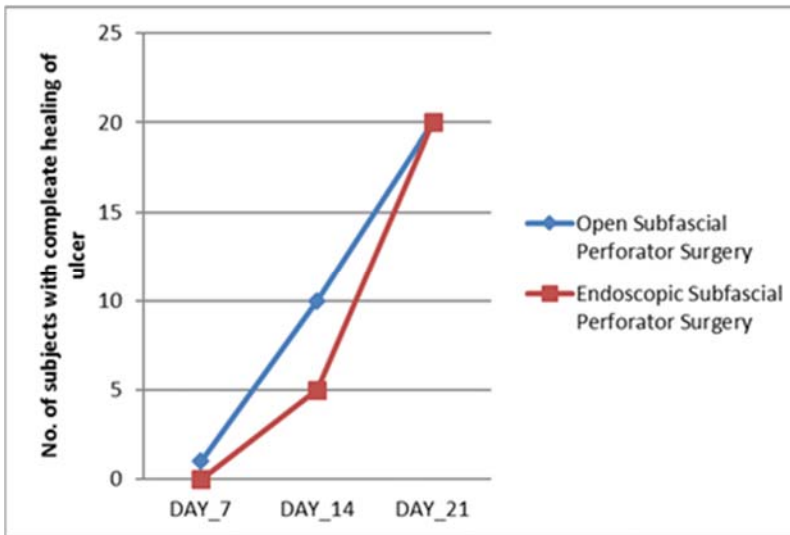
In our study, 12 patients had ulcers in open surgery group, among them 1 patient had complete ulcer healing by 2 weeks Post-Operatively, 9 patients had complete ulcer healing by 1

month Post-Operatively, 2 patient had complete ulcer healing by 3 months Post-Operatively and 7 patients had ulcers in SEPS group, 5 patients had complete ulcer healing by 1 month Post-Operatively, and 2 patients had complete ulcer by 3 months Post-Operatively.

Table 13: Comparison of complete ulcer healing between two methods

| | | PROCEDURE | | | | P |
|---------------|----------|-----------------------------------|-------|---|-------|-----|
| | | Open Subfacial Perforator Surgery | | Endoscopic Sub fascial Perforator Surgery | | |
| | | n | % | n | % | |
| Ulcer healing | 2 weeks | 1 | 8.3 | 0 | .0 | 0.1 |
| | 1month | 10 | 83.3 | 5 | 71.4 | 0.6 |
| | 3 months | 12 | 100.0 | 7 | 100.0 | NA |

Chi-square test



Graph 10: Comparison of complete ulcer healing between two methods

14. Comparison of Post-Operative Ulcer Recurrence

No patients in both groups had ulcer recurrence over a period of follow up of 1 year

Discussion

This is a prospective comparative study, comparing 40 patients who had undergone surgical treatment for incompetent leg perforators for varicose veins, of which 20 had undergone SEPS and the other 20 patients had under gone open subfascial perforator ligation surgery. In the present study age distribution among the open group(n=20) maximum age was 65 years and minimum age was 21 years with mean age of 44.3 +/-15.8 SD, and among the SEPS group(n=20) maximum age was 65 years and minimum age was 20 years with mean age of 41.5 +/- 14.6 SD. In the present study, age groups of patients are ranging from 20 – 65 years and people were divided in different age groups: 20 – 39 years age group having 16 patients (8 patients in open group and 8 patients in SEPS group), 40 – 59 years age group having 18 patients (9 patients in open group and 9 patients in SEPS group), Above 60 years age group having 6 patients (3 patients on open group and 3 patients in SEPS group). Out of the 40 patients 6 were females (2 patients in open group and 4 in SEPS group) and 34 were males (18 patients in open group and 16 in SEPS group).In the present study Among the open group 2 patients had 2 incompetent perforators (10%), three perforators in 16 patients (80%),and four perforators in 2 patients(10%) and in SEPS group 12 patients had 2 incompetent perforators on

Doppler study, additional one perforator was identified during the surgery and was ligated, 8 patients had 3 incompetent on Doppler study, additional one perforator was identified and ligated during surgery. Therefore total number of perforators ligated in SEPS group were more compared to open group which was statistically significant with p value 0.046. Mean duration of stay in hospital in open group is 7.3 +/- 0.6 days and 5.2 +/- 0.9 days in SEPS group which is statistically significant with p value <0.0001, similarly study conducted by E.G.J.M. Pierik, *et al* conducted randomized trail on Endoscopic versus open subfascial division of incompetent perforating veins in the treatment of venous leg ulceration, where patients in the open group needed longer hospital stays (mean, 7 days; range, 3 to 39 days) than patients in the endoscopic group (mean, 4 days; range, 2 to 6 days; p = 0.001). Comparison of pain Post-Operatively was done using VAS scale, VAS scoring was 3 +/-0.7 on Post-Operative day 1 in open group and 2 in SEPS group which is statistically significant with p value <0.0001, on Post-Operative day 3 VAS scoring was 2.2 +/-0.5 in open group and 1.2 +/-0.4 in SEPS group which is statistically significant with p value <0.0001 and on Post-Operative day 7 VAS scoring was 1.0 +/- 0.4 in open group and 0.4 +/-0.5 in SEPS group which is statistically significant with p value <0.0001, no study was found comparing Post-Operative pain using VAS scoring for patients under going open subfascial perforator ligation surgery and SEPS. Post-Operatively wound site hematoma was seen in 2 patients in open group on Post-Operative day 1

which disappeared after Post-Operative day 5 and no patient developed wound site hematoma in SEPS group, in contrast study conducted by Mark J. Kulbaski, *et al.* have done a prospective study on Subfascial Endoscopic Perforator Surgery where 20 cases of subfascial endoscopic perforator surgery (SEPS) was done in 19 patients, one patient required re-exploration for a subfascial hematoma. No patients in both groups had Post-Operative wound site infection, in contrast study similar conducted by Nelzén, O, et. al. on prospective study of safety, patient satisfaction and leg ulcer healing following saphenous and subfascial endoscopic perforator surgery, 107 patients underwent the procedure, in which wound site infection was found in 7% of the patients. No patients in both groups had ulcer recurrence over a period of follow up of 1 year, similarly study conducted by E.G.J.M. Pierik, *et al.* have done a randomized trial on Endoscopic versus open subfascial division of incompetent perforating veins in the treatment of venous leg ulceration, no recurrences were noticed in either group, for follow up period of 21 months. Preoperatively 4 patients in open group had venous edema, which regressed by Post-Operative day 5 in all the 4 patients, and preoperatively 3 patients had venous edema in SEPS group, all 3 patients had regression of venous edema by 3rd Post-Operative day, no studies were found on regression on venous edema after open subfascial perforator ligation surgery and SEPS. No patients had Post-Operative saphenous nerve injury, in contrast study conducted by Peter Gloviczki, *et al.* a retrospective study on Safety, feasibility, and early efficacy of subfascial endoscopic perforator surgery has observed that saphenous neuralgia in 10 patients, out of 155 SEPS procedures done. Preoperative ulcer size in open group was 8.15 ± 5.48 cm², on postoperatively 2 weeks ulcer size decreased to 5.78 ± 1.32 cm², and on postoperatively 1 month ulcer size decreased to 3.28 ± 0.1 cm² and complete ulcer healing was observed by Post-Operatively 3 months, in SEPS group, preoperative ulcer size was 8.75 ± 5.70 cm², on postoperatively 2 weeks, ulcer size decreased to 3.45 ± 1.49 cm², on Post-Operatively 1 month ulcer size was 2.86 ± 0.31 cm², and complete ulcer healing was observed by postoperatively 3 months, however this observation was not significant statistically. In our study, 12 patients had ulcers in open surgery group, among them 1 patient had complete ulcer healing by 2 weeks Post-Operatively, 9 patients had complete ulcer healing by 1 month Post-Operatively, 2 patient had complete ulcer healing by 3 months Post-Operatively and 7 patients had ulcers in SEPS group, 5 patients had complete ulcer healing by 1 month Post-Operatively, and 2 patients had complete ulcer by 3 months Post-Operatively.

Conclusion

This study has shown the superiority of SEPS over open technique because of shorter mean hospital stay, lesser Post-Operative pain, the number of perforators ligated in SEPS was more as compared to the open subfascial ligation group. Possibly some perforators may be missed on Doppler localization, which may be a cause of future recurrence in varicose veins in the open surgery patients. Early relief of symptoms in terms of ulcer healing was better in the SEPS group, however both groups had no wound complications except for 2 patients in open group had hematoma formation.

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