

## A CASE STUDY OF MODIFICATION OF LINTONS PROCEDURE COMPARED TO CLASSICAL PROCEDURES FOR VARICOSE VEINS SURGERY



### General Surgery

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### ABSTRACT

Varicose veins are caused by poorly functioning valves in the veins and decreased elasticity of the vein wall, allowing pooling of blood within the veins and their subsequent enlargement. It is the common pathology affecting between 25% and 40% of general population. Sapheno-Femoral junction flush ligation and stripping of Great Saphenous vein remains the standard of surgical care in many centres. For incompetent perforators, Lintons procedure was done previously with long posterior incision, which is obsolete due to its complications. Duplex Ultrasound marked perforator ligation is standard technique followed nowadays. Although it is a superior procedure and has low recurrence rates it is still radiologist dependent. Our procedure is similar to Lintons but less invasive, thus avoiding complications of classical Lintons procedure. With the advent of many minimally invasive procedures surgery for varicose veins is less encouraged. But in a tertiary centre like ours surgery is the most cost effective and affordable treatment. This is a prospective case study of 50 cases to compare the superiority of our technique (Modification of Lintons procedure) with the usually performed duplex ultrasound marked subfascial ligation of perforators procedure for perforator incompetence.

### 1. 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.

With all of these treatment options, there have been many complications, including recurrence. Though endovenous laser ablation is being more widely practiced in corporate hospitals due to its superior results, in a tertiary 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.

### 2. Aims & objectives

The aim of our study is to compare the superiority of our technique with the usually performed duplex ultrasound marked subfascial ligation of perforators procedure for perforator incompetence.

### 3. Materials

We conducted a prospective study at Department of General Surgery, ASRAMS Hospital, Eluru. A total number of 50 patients were taken up for the study out of whom 25 patients (study group) underwent our technique and 25 patients underwent duplex ultrasound marked subfascial ligation of perforators (control group). Patients were randomly allocated to each group. The study was conducted over a period of 12 months from January 2015 to January 2016.

### 4. Criteria for evaluation:

#### Inclusion Criteria

- Age: Any age
- Both sexes
- Patients who had perforator vein incompetence demonstrable by Colour Doppler irrespective of Sapheno-femoral Junction incompetence.
- Patients with Grade III and higher grade of Varicose veins at presentation.

#### Exclusion Criteria:

- Patients who did not consent for the study
- Patients with Pregnancy.
- Patients with concomitant arterial disease or Deep Vein Thrombosis
- Patients with significant cardiovascular disease
- Patients on anti-coagulants
- Patients with any hematological disorders

### 4. Methods:

Parameters that were used for comparing our technique with subfascial ligation of perforators are:

- Duration of surgery
- Mean hospital stay
- Mean time for resumption of daily activities
- Post-operative pain.
- Post-operative Doppler study
- Complications of surgery:
  - Haemorrhage
  - Surgical Site Infection
  - Recurrence
  - Deep Vein Thrombosis

### 5. Surgical Technique:

#### Our Surgical technique (Modification of Lintons):

- Under spinal anaesthesia flush ligation and stripping of GSV done till just below knee joint.
- 3 small 2-3 cms horizontal incisions were given along the course of GSV on the medial aspect of lower limb with the lowest incision 5cms above medial malleolus, upper incision 3-4cms below and medial to tibial tuberosity and the third incision placed between these two incisions.
- Incisions are deepened through subcutaneous tissue deep fascia is identified and incised and index finger is introduced into the deep fascial plane and all the perforators are slashed out bluntly by sweeping movements of the finger in all directions.
- Similar technique is followed at other incisions.
- Skin incisions are closed and compression bandaging done.



Figure showing 3 incisions and index finger in the subfascial plane of upper incision.



Figure showing both index fingers in the subfascial plane and slashing of the perforators by sweeping movements.

#### Subfascial ligation of perforators marked by ultrasound:

- Pre-operative marking of perforators is done by duplex ultrasound. If SFJ incompetence is present flush ligation and stripping of GSV done under spinal anaesthesia.
- Multiple small incisions were given over the marked perforators, T junction is identified ligated and cut.
- Skin incisions are sutured and compression bandaging done.

#### 6. 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. At discharge colour Doppler(venous) was repeated to identify any leftover perforators. Patients were followed up regularly at 1 week, 1 month, 2 months, 4 months, 6 months and 1 year after surgery.



Post-operative picture (our technique):

#### 7. Results

The study was being conducted and results of study for a period of one year were presented here.

Results were assessed with the following parameters:

Duration of surgery: Mean time for our technique is 30.5 (24-42) minutes and subfascial ligation was 44.5 (24-60) minutes excluding the time taken for trendelenberg's procedure (Stripping of Great Saphenous vein).

Mean hospital stay: Similar in both techniques 4.6 (4-7) days in study group and 4.8 (4-7) days in control group.

- The mean time taken for resumption of daily activities for patients who underwent sub fascial ligation of perforators (control group) was 10.6 days, and for patients who underwent our procedure (study group) was 10.4 days.
- Post-operative pain - it is almost the same moderate pain in both the cases (visual analog scale - 3) at 3 hrs post op & VAS-2 at 12 hrs post-surgery.

#### COMPLICATIONS

- Haemorrhage: No cases of haemorrhage noted during or post operative period in both groups.
- Surgical site infection: 1 case of surgical site infection noted in both groups.
- Recurrence:
  - In sub fascial ligation procedure - 4
  - In our procedure----- 1
- Deep vein thrombosis
  - NO cases reported in both groups.
- Post-operative Doppler study showed
  - Left over perforators in subfascial ligation in 6 cases.
  - No left over perforators in our technique.

#### 8. 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. 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 long posterior leg incision through the skin in 1938<sup>3</sup>. Several modifications of this procedure have been proposed thereafter<sup>4,5</sup>. Though the procedure was effective for perforator incompetence it was abandoned due to high post-operative complications.

Later perforator ligation was done individually by marking the incompetent perforators by duplex ultrasound and ligating them. This procedure is widely accepted but has its own limitations like it was dependent on the radiologist. Errors by the radiologist and failure of identification of perforators can lead to recurrence.

Endoscopic subfascial ligation technique(SEPS) was first described in 1985 by the German surgeon Hauer<sup>6</sup>, and popularized by Fischer.<sup>7,8</sup> Several trials<sup>10,11,12,13,14</sup> 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<sup>15</sup> and Endovenous Radiofrequency Ablation<sup>15,16</sup>, SEPS has been losing its popularity recently and has its own disadvantages like high learning curve, costly equipment, longer duration of surgery.

However, in a tertiary hospital like ours where surgery is the mainstay, it is beneficial in view of the patient economically (cost effective) with similar results like that of SEPS. Our technique is a hybrid of Linton's procedure and SEPS. Our procedure is beneficial to both the patient (economically, less pain & hospital stay) and doctor (low learning curve, less surgery duration and less complication and lower rate of recurrence).

### Conclusion

In view of above results, which show superiority of our procedure in decreased rates of recurrence we conclude this new procedure to be superior to sub fascial ligation of perforators.

### References

1. CEAP classification, American Venous Forum, 1994
2. Harvard Pilgrim Healthcare. Medical Review Criteria. Varicose Vein Procedures
3. Linton RR. The operative treatment of varicose veins and ulcers, based upon a classification of these lesions. *Ann Surg* 1938; 107: 582–93.
4. DePalma RG. Surgical therapy for venous stasis: results of a modified Linton operation. *Am J Surg* 1979; 137: 810–13
5. Dodd H, Cockett FR (eds). The management of venous ulcers. In: *The pathology and surgery of the veins of the lower limbs*. New York: Churchill-Livingstone, 1976: 269–96.
6. Hauer G. Endoscopic subfascial discussion of perforating veins—preliminary report. (In German.) *Vasa* 1985; 14: 59–61.
7. Fischer R. Experience with endoscopic perforator interruption. (In German.) *Phlebologie* 1992; 21: 224–29.
8. Fischer R, Sattler G, Vanderpuye R. The current status of endoscopic treatment of perforators. (In French.) *Phlebologie* 1993; 46: 701–707.
9. Conrad P. Endoscopic exploration of the subfascial space of the lower leg with perforator vein interruption using laparoscopic equipment: a preliminary report. *Phlebology* 1994; 9: 154–57
10. Gloviczki P, Bergan JJ, Menawat SS et al. Safety, feasibility, and early efficacy of subfascial endoscopic perforator surgery: a preliminary report from the North American registry. *J Vasc Surg* 1997; 25: 94–105.
11. Gloviczki P, Bergan JJ, Rhodes JM et al. Mid-term results of endoscopic perforator vein interruption for chronic venous insufficiency: lessons learned from the North American Subfascial Endoscopic Perforator Surgery (NASEPS) Registry. *J Vasc Surg* 1999; 29: 489–502.
12. MG Vashist et al. Role of Subfascial Endoscopic Perforator Surgery (SEPS) in Management of Perforator Incompetence in Varicose Veins: A Prospective Randomised Study. *Indian J Surg* (March-April 2014) 76(2): 117-123
13. Ali Jafarian MD et al. Subfascial Endoscopic Perforator Vein Surgery: The first report from Iran. *Arch Iranian Med* 2006; 9 (1): 16-19
14. Anjay Kumar et al. Evaluation of subfascial endoscopic perforator surgery (SEPS) using harmonic scalpel in varicose veins: An observational study. *International Journal of Surgery* 7 (2009) 253-256.
15. Parente EJ, Rosenblatt M (2003). "Endovenous laser treatment to promote venous occlusion". *Lasers Surg Med* 33 (2): 115–8
16. Puggioni A, Kalra M, Carmo M, Mozes G, Gloviczki P (September 2005). "Endovenous laser therapy and radiofrequency ablation of the great saphenous vein: analysis of early efficacy and complications". *J. Vasc. Surg.* 42 (3): 488–93
17. Elias SM. Single port SEPS: less is more. In: Presented at the American Venous Forum Annual Meeting, February 2004.
18. Naoki Haruta et al. Technical Procedure of Two-Port System Subfascial Endoscopic Perforator Vein Surgery (TPS-SEPS). *International Journal of Angiology*. Winter 2002, Volume 11, Issue 1: 17-22.