

Endovenous Laser Ablation for Varicose Veins of Lower Limb as a Tool

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Abstract: Varicose veins are abnormally dilated, tortuous, elongated veins of the superficial venous system of the lower limb. Varicose Vein(VV) are a substantial clinical problem because they actually signify underlying chronic venous insufficiency with venous hypertension. This venous hypertension comprises the following manifestations like symptoms to skin changes like VV, reticular veins, telangiectasia, swelling, skin discoloration, and ulcerations. Once venous hypertension begins, the venous system dysfunction survives to worsen. When there is more local dilatation, other nearby valves consecutively fail and the entire superficial venous system becomes a failure. Endovenous Laser Ablation (EVLA) is one of the most promising new techniques. EVLA is emerging as an established treatment option for Great Saphenous Vein (GSV) and Short Saphenous Vein (SSV) incompetence, with success rates similar to conventional surgery. Surgical procedures such as stripping and high ligation of the Saphenous Femoral Junction (SFJ) which include principles to ligate the point of junctional incompetence and to remove the refluxing segment of the vein and dilated tributaries. Other modalities such as phlebectomies, perforator ligation, TRIVEX etc. are carried out as per the venous pathology. But EVLA reduces the post-operative morbidity of the patients and has less anesthesia related complications. Because it is carried out with Tumescence Anesthesia (TA), EVLA can be performed on a day care basis as well. Post procedure patient returns back to normal activity in lesser duration and hence decreases the financial liability on the patient as he can return back to his work early. The complications of EVLA were minor complications like ecchymosis and paresthesia which were noted in our study. But the extreme cost of laser and various optical fibers used in EVLA limits its use for the normal masses.

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I. Introduction

Varicose veins (VV) are abnormal, dilated, tortuous, elongated veins of the superficial venous system of the lower limb. Varicosity of the lower limbs being a common surgical problem accounts for about 15-20% total population⁽¹⁾. The Great saphenous vein (GSV) of the superficial venous system is longest vein in the human body. In patients with VV, the GSV is incompetent in 70–80%. The saphenous-femoral junction (SFJ) incompetence results into GSV reflux. The Short saphenous vein (SSV) is affected in about 10% of patients with VV⁽²⁾. When GSV reflux is the main underlying problem therefore it should be eliminating this source of reflux with EVLA of any incompetent venous pathology or segment. Neovascularization is responsible for the main cause of recurrence⁽³⁾. Surgical modalities for SSV are difficult to deal with and has more complications and higher recurrence rates than former⁽³⁾. Stripping of the SSV causes injury to the sural nerve and causes neurological manifestations. Recurrence rates of SSV varicosities after surgery are about 30–50% at 5 years⁽⁴⁻⁵⁾. In the last few years, minimally invasive techniques such as Endovenous Laser Ablation (EVLA) have been developed in an attempt to reduce morbidity and improve recovery time. EVLA is one of the most promising new techniques. EVLA is becoming a mainstream treatment in today's era for GSV and SSV incompetence⁽⁶⁻⁷⁾.

II. Material And Methods

This prospective study was carried out on patients of Department of General Surgery at MGM Medical College & Hospital, Navi Mumbai from May 2017 to JUNE 2018. A total 30 adult subjects were included in this study.

Study Design: Prospective study

Study Location: This was a tertiary care teaching hospital based study done in Department of General Surgery at MGM Medical College & Hospital, Navi Mumbai.

Study Duration: May 2017 to JUNE 2018.

Sample size: 30 patients.

Sample size calculation: $4Z\alpha^2P(1-P)/W^2$

Subjects & selection method: The study population was drawn from patients who presented to MGM Medical College & Hospital , Navi Mumbai with primary varicose veins of lower limb.

Inclusion criteria:

All patients with primary varicose veins of lower limb with superficial and perforator venous incompetence with or without following complications

1. Chronic swelling
2. Skin changes (Lipodermatosclerosis, eczema and pigmentation)
3. Ulceration.

Exclusion criteria:

1. Secondary varicose veins
2. Varicose veins in other body parts.
3. Children

Procedure methodology

Patients were admitted and underwent necessary investigations including the Venous Doppler of the affected limb and Complete Blood Count and HIV, HbsAg, HCV. Surgical management was planned as per the CEAP classification. Pre-operatively an injectable dose of an antibiotic of Injection Cefotaxim 1 gm iv was administered along with an analgesic. Disinfection and sterile draping of the lower limb and groin was done. The patient was placed in reverse trendelenberg position, an introducer needle was inserted into the vein, a microguidewire was inserted into the vein, followed by the placement of a 6F micro sheath. The wire was advanced so it that runs across the SFJ, always with ultrasound guidance. The laser fiber was then introduced through the sheath into the GSV or SSV and advanced proximally to the SFJ or SPJ. The fiber tip extends proximally 1-2 cm beyond the end of the sheath. Perivenous tumescent anaesthesia is delivered.

Power was set between 10 and 15 W. The energy was administered endo-venously, either in a pulsed fashion (pulse duration of 1–3 s with fiber pull- back in 3- to 5-mm increments every 2 s) or continuously with a constant pullback of the laser fiber (pullback velocity ranging from 1 to 3 mm/s). Post operatively the patient was given oral antibiotics and analgesics for a period of 5 days. Early complications were checked within 24 hours including superficial burns, thrombosis, pain, swelling, haematoma, bleeding or infection. Late complications were checked after 1 month including paraesthesia, DVT and recanalization of the vein. Final outcome was evaluated in terms of return to normal activities, post op stay in hospital and complications.

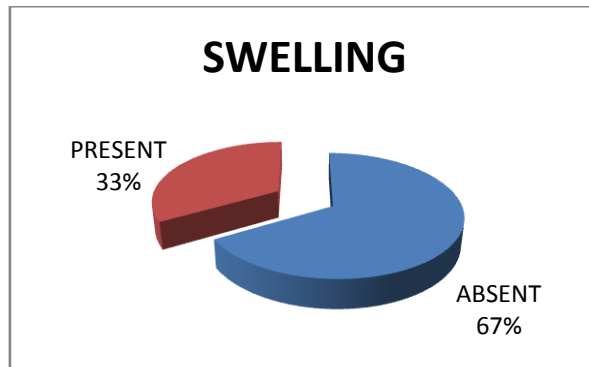
III. Result

In patients who underwent EVLA, it was observed that 20 % of the cases (6/30) returned back to their normal activities within a span of 4 hours post operatively. 6 patients took more than 12 hours to return to their normal activities. In a span of 24 hours all patients returned to their normal activities.

	Count	Column N %
1 DAY	3	10.0%
11 HOURS	2	6.7%
12 HOURS	2	6.7%
14 HOURS	1	3.3%
16 HOURS	2	6.7%
2 HOURS	1	3.3%
4 HOURS	7	20.0%
5 HOURS	3	10.0%
6 HOURS	5	13.3%
7 HOURS	1	3.3%
8 HOURS	3	10.0%

Table 1 – Table showing time taken to return to normal activities post EVLA

Among the patients who underwent EVLA, post operatively ,we studied various complication which are known to occur post the procedure. 10 patients out of 30 (33.3%) developed swelling at the site of venepuncture.



Pie chart 1 – Percentage of patients who developed localized swelling post EVLA

On a scale of 1 to 5, 13 out of 30 patients had pain with pain score of 3 which is moderate amount of pain. Only 4 patients (Pain score 4 and 5) had severe pain. 7 patients out 30 had no pain with a pain score with 1 and 6 patients out 30 had pain with a score of 2 which was mild pain.

Pain Score	Count	Column N %
1	7	23.33
2	6	20.00
3	13	43.33
4	2	6.67
5	2	6.67

Table 2 – Distribution on the basis of post-operative pain

Among the other complications which were noted in 30 patients , Ecchymosis was noted in 3 patients (10%), Paresthesia was seen in 2 patients (6.66%), Wound Bleeding at the enipuncture site was seen in 1 patient (3.33%), 1 patient developed thrombophlebitis. None of the cases had developed superficial burns, or heat induced thrombosis, local hematoma, infection at the puncture site. No patient reported or presented with recanalization of the vein. A significant finding which was noted in patients post EVLA is the change in size of ulcers in the patients. Out of 30 patients who were included in the study, 7 patients had ulcers pre-operatively. The was a significant change in the size which was seen as reduction is the size of ulcers in 6 patients and 1 patient had completely healed ulcer at 1-month follow-up

IV. Discussion

Varicose veins are one of the common pathology which we come across in day to day surgical practice. It presents with varying clinical manifestation ranging from pain, early changes such as telangiectasia, reticular veins to well dilated varicose veins to skin changes such as eczema, lipodermatosclerosis, atrophic blanch to advanced stages to ulcer formation.

In our study it was observed that men were affected more than women which is in concurrence to the prevalence in The Edinburgh study of veins wherein there was a predilection for varicosity in Males. The probable cause is that more number of men are involved in various occupations which require prolonged standing.

Majority of the patients which were found were farmers, cooks and shopkeepers. Most of the patients who presented with dilated, superficial veins had complains of pain which was more towards the end of the day. Only few patients presented to the OPD with complications like ulcerations and rest of the patients presented with dilated veins and skin changes such as pigmentation, eczema. The patients who presented with the complications were the ones who were unaware and ignorant regarding the course of the disease. Hence the presentation was delayed. If the patients would have presented early appropriate management and intervention on time could have reduced the progression and morbidity of the disease and burden on the health care system.

EVLA is now an established endovascular therapy for the treatment of varicose vein. In patients who underwent EVLA it was observed that the patients returned back to the normal activities earlier that is in less than 24 hours. Hence the patient can be discharged on the same day and this can be carried out as a day care procedure.

While assessing and following up the patients in post-operative period we also noted the decrease in the size of ulcers which the patients had pre-operatively including one patient who had a completely healed ulcer in less than a month after EVLA. We noted that Ecchymosis and paresthesia followed by thrombophlebitis and bleeding at venipuncture site were the most commonly noted complications out of all above mentioned complications.

In an international endovascular working group registry that included 3696 procedures bruising after EVLA was observed in 75% of the cases, paresthesia in 3 %, Thrombophlebitis in 1.87%, skin burns in 0.46%, DVT in 0.27%, pulmonary embolism in single report.^[8]

In the current scenario although EVLA is replacing the surgical methods of treatment for varicose veins but high costs and availability of the LASER technology still remains a limiting factor that prevents its use on a large scale.

V. Conclusion

EVLA is an effective modality in the treatment of varicose veins. It reduces the post-operative morbidity of the patients and has less anesthesia related complications. It can be performed on a day care basis as well. Post-procedure, patient returns back to normal activity in lesser duration and hence reduces the financial burden on the patient.

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