

EvlT in Surgeons Perview: A Case Series at Tertiary Care Centre

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Abstract

Background: Lower limb varicose veins are a frequently encountered medical condition that requires surgical intervention either through conventional procedures or minimally invasive procedures.

Methodology: A case series of 17 patients with lower limb varicosities admitted under the Department of General Surgery at Apollo General Hospital, Film Nagar from September 2019 to December 2021 studied and treated with Endovenous laser ablation without Doppler guidance intra-operatively. Patients were followed up post-operatively after 1 week, 1 month, 3 months and 6 months to note the regression of symptoms as well as complications of the procedure and recurrence of varicosities.

Results : Dilated veins and edema have significantly reduced in all 17 cases within 7-10 days. Pigmentation present in 6 of the 9 patients faded over time of 6 months. Symptoms like itching, eczema decreased over the same time. No recurrences were noted. No DVT or infections observed. 23.5% of our patients required Foam sclerotherapy for the treatment of residual varicosities, immediately after EVLT in the same sitting. 47% complained of mild pain 1 week after the procedure, 12% had moderate pain while 41% had no pain. No patients complained of pain during their subsequent visits. One patient complained of painful palpable superficial vein thrombosis which disappeared by 3rd follow-up visit.

Conclusion: EVLT without Doppler guidance is an efficient treatment modality for varicose veins treatment providing better cosmetic, functional results without radiological expertise.

Keywords: Endovenous laser therapy, varicose veins, minimally invasive procedure.

Introduction

Varicose veins are dilated tortuous veins in the subcutaneous tissues, as a consequence of valvular incompetence leading to reflux and pooling of blood. Untreated varicose veins cause ulcers, superficial vein thrombophlebitis and cosmetic inferiority. Therefore, lower limb venous insufficiency is a frequently encountered medical condition that decreases an individual's quality of life both cosmetically and as a debilitating illness. Though treated traditionally with high ligation and stripping, endovenous laser ablation therapy [EVLT] (minimally invasive procedure) that uses lasers energy, has become the preferred modality of treatment as it causes decreased intraoperative blood loss, decreased operating time(1), less morbidity, fast recovery which decreases the disability adjusted life year(DALY) and expedite

early return to work and physical activity, better cosmetic result and decreased post-operative pain which gives high patient satisfaction(2,3). The procedure is safe to use in children for various pediatric diseases such as venous malformations, Klippel-Trenaunay syndrome, AV fistula with good outcome(4). Even with these advantages of EVLT over traditional methods, EVLT has few setbacks such as thrombophlebitis. Hyper pigmentation along the length of the treated vein is a rare complication and can regress within an year (5). Secondary bleeding and wound infections are rare as no large cutaneous incisions are made (5). There were no variations in the relief of venous symptoms, CEAP staging or general quality of life (6).

Endovenous techniques include thermal and non-thermal procedures. Thermal techniques include radio frequency ablation (RFA) and EVLT. EVLT uses either bare fibers or radial fibres and a wavelength of 1470nm which possess high absorption by water. Non- thermal techniques include Mechanochemical ablation(MOCA), cyanoacrylate/ glue closure and foam sclerotherapy(5) .

EVLT delivers energy directly to the endothelial lumen, resulting in non-thrombotic vein occlusion due to collagen contraction, denudation of endothelium, vein wall thickening, microperforation and ultimately luminal contraction and fibrosis. This is abetted by tumescent anaesthesia providing a heat sink and compression of the vein against the laser fibre(2), which occludes the vein resulting in cessation of blood flow through it.

The following study is a case series of 17 patients where the cases treated with EVLT without intraoperative doppler guidance for lower limb varicose veins are reviewed and taken as the basis for our current study to audit our EVLT data to compare with the data of other studies of EVLT and traditional open procedures.

Methodology:

The present study was conducted between September 2019 - December 2021 at Apollo General Hospital, Film Nagar.

Inclusion criteria:

- All patients above 18 yrs of age
- Patients with either one or both lower limbs varicosities.
- elective admission
- Symptomatic GSV reflux confirmed by duplex imaging.
- Associated small saphenous vein reflux on duplex imaging.
- Isolated multiple perforator incompetence.

Exclusion criteria:

- Deep Vein Thrombosis.
- Clot in great saphenous vein.
- Peripheral vascular disease.
- Pregnancy.
- Recurrence

A total of 17 cases were treated with EVLT during this period. Laser with a wavelength of 1430nm and energy of 36 watts/cm below the knee and 64 watts/cm above the knee was given using radial fibre.

Procedure:

Patients were taken on OPD basis, history was taken, symptoms and signs noted followed by general and local examination and admitted into male/female surgical ward. Color venous duplex of the diseased limb was done where the varicose veins, incompetent perforators, SFJ and SPJ were marked with marker pen along its course. Patients who presented with bilateral varicose veins were treated for the limb with more severe complaints. All the patients underwent Endovenous Laser Therapy using 1430nm diode laser

Patients were given prophylactic antibiotic and Inj.Diclofenac was used as analgesic. Under aseptic precaution, the affected vein is cannulated above the ankle at the marked site using radial artery sheath using seldinger technique.

Tumescent anaesthesia (30 ml 2% Inj.Lidocaine, 10 ml Inj.Sodium bicarbonate, 10 ml Inj.Bupivacaine and 300ml normal saline) is infiltrated along the vein. Laser fibre is pushed up to SFJ under guide light monitoring and withdrawn 4cm below and fired and 64 watts/cm above knee and 36 watts/cm below knee, in continuous mode, while withdrawing.

The patients were suggested to wear stockings post operatively and discharged. Follow up was done 1 week postoperatively with the Doppler report, after 1 month, 3 months and 6 months. After regression of symptoms, occurrence of complications such as pain, paraesthesia, palpable superficial thrombus were assessed.

4. Results

The present study was conducted in the Department of Surgery, during the period of September 2019 - December 2021 at Apollo General Hospital, Film Nagar.

A total of 17 patients were subjected to Endovenous Laser Therapy.

Patient demographics:

Among the patients who underwent Endovenous Laser Therapy, 24% (4 patients) were female and 76% (13 patients) were male. The mean age group of the patients of varicose veins subjected to Endovenous Laser therapy was 36.41 ± 12.34 . 76% (13 patients) of the patients presented with unilateral signs and symptoms with 24% (4 patients) showing bilateral involvement. The more common side involved was the right side (69% - 9 patients) compared to the left side (31% - 4 patients).

64.7% of the patients (11 patients) had normal BMI- Body Mass Index ($18.5-24.9 \text{ kg/m}^2$), 35.3% patients were overweight ($25-29.9 \text{ kg/m}^2$).

Doppler Report

The most common vein involved was the GSV (94% - 16 patients) in our study. 76% had exclusive GSV involvement, 6% had exclusive SSV involvement with 18% having both veins involved. In the present study 65% patients had perforator incompetence, 82% and 18% had SFJ and SPJ incompetence respectively. There were no known cases of DVT and superficial vein thrombosis.

Operative Parameters:

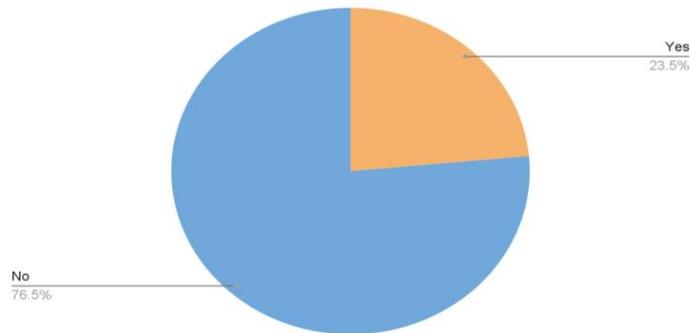
The average number of days the patients were kept admitted was 3.4 ± 0.67 . Average time for ablation taken was 230.66 ± 82.66 seconds; with average energy was 5147.96 ± 1780.95 Joules and average of Power being 31.58 ± 14.82 Watts/cm.

23.5% of our patients required Foam Sclerotherapy for the treatment of residual varicosities, immediately after EVLT in the same sitting.

Table1: Patients demanding Foam Sclerotherapy after EVLT

Foam sclerotherapy	No. of patients	Percentage %
Yes	4	23.5
No	13	76.5
Total	17	100

Patients requiring Foam Sclerotherapy after EVLT



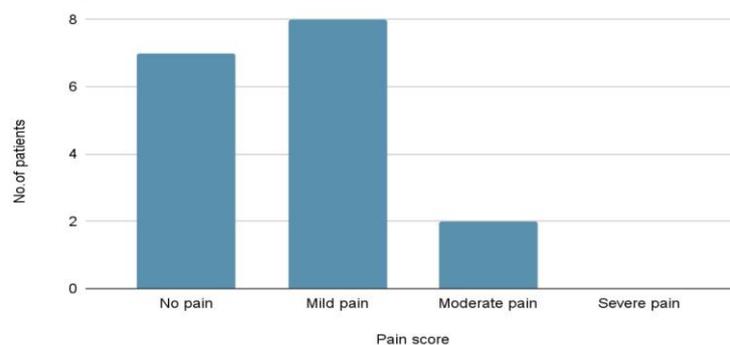
Outcomes:

Most of the patients (47%) complained of mild pain in 1 week of the procedure, 41% had no pain while 12 % had moderate pain.

Table 2: Pain score after 1 week:

Pain score	No.of patients	Percentage%
No pain	7	41
Mild pain(1-3)	8	47
Moderate pain(4-6)	2	12
Severe pain(7-10)	0	0
Total	17	100

No. of patients vs Pain score



According to the statistical analysis the symptoms of dilated veins and oedema have significantly reduced within a week($p < 0.001$). Itching significantly reduced after one month ($p < 0.05$) and ulcers after 3 months ($p < 0.002$).According to statistical analysis,

reduction in pigmentation ($p=0.335$), eczema ($P=0.155$) and bleeding ($P=0.365$) is not significant.

Of the patients treated with evlt , two patients (12%) had entry point ulcers, and one patient (6%) developed thrombophlebitis post-operatively.

Patients were followed up for lower limb residual varices or recurrence at 1 month.

Discussion:

The present results of our case series of EVLT without intraoperative doppler were compared to EVLT data from standard literature.

The symptoms of dilated veins and oedema have significantly reduced within 7-10 days($p<0.001$). Dilated veins disappeared immediately after the procedure as evidenced by pre and immediate post operative photos taken in the operation theatre. Also itching significantly reduced after two months ($p>0.05$) and ulcers after 3 months ($p<0.001$). According to the study by Celalettin et al(8) there was significant reduction in itching and ankle swelling within 1 week of EVLT ($p<0.001$).

No recurrences were noted among the patients treated. Rate of recurrence post EVLT was 2.4% in the study by Tan KK et al(10), 7% in the study by Celalettin et al(8), 5.6% in the study by Kwang et al(11) and no recurrences in our study. Recurrence was noted in 9.4% patients of cryostripping according to the study by Kwang et al(11) and in 0.5% patients of RFA in the study by Ahmed et al(12).

Among the patients treated, 47% complained of mild pain 1 week after the procedure, 12% had moderate pain while 41% had no pain. According to the Bhaskar et al(7) study 58% complained of mild pain 1 week after the procedure, 4% had moderate pain while 34% had no pain. None of the patients complained of pain during their subsequent follow-up visits similar to the study by Bhaskar et al(7) where patients had no complaints of pain after 1, 3 and 6 months of procedure. 23.5% patients required foam sclerotherapy compared to 26 % of patients who required foam sclerotherapy in the Bhaskar et al (7) study.

According to the statistical analysis, reduction in pigmentation, eczema and bleeding is not significant. However, eczema that was present in only 1 patient disappeared after 2 months [eczema present in 2 patients disappeared after 1 month according to Bhaskar et al](7) , bleeding that was present in 1 patient disappeared immediately similar to Bhaskar et al (7). Pigmentation was still present in 6 out of 9 [5 out of 8 patients according to Bhaskar et al](7) patients at 6 months but it had significantly faded over time. In our study, 1 patient (6%) had a palpable painful superficial vein thrombosis one week after the procedure which disappeared before the 3rd follow-up visit (at 3rd month). None of our patients had haematoma formation, infection, DVT as complications. According to the study by Nedzad et al(9) 8.1% of the patients of EVLT developed haematomas on the 7th day while 48.2% patients had haematomas, 5.1% had infection and 3.4% had DVT amongst the patients who underwent high ligation and stripping.

Our study shows dissolution of most of the symptoms and signs of varicose veins after EVLT. Dilated veins and bleeding disappeared immediately after the procedure whereas symptoms - oedema, eczema, itching and ulcers disappeared with time. Some patients had pigmentation present even after 6 months but the intensity had greatly reduced. Thus, our study showed marked regression of symptoms post EVLT and showed similar results to other studies on the outcomes of EVLT and the outcomes of other minimally invasive procedures like RFA. It is safe, effective, quick, leading to faster recovery (average stay in hospital ~ 3 days) and return to daily activities with low complication (one case of thrombophlebitis) and no recurrence rate.

Therefore, our study shows EVLT without Doppler guidance has similar results to EVLT, in the literature which is done under Doppler guidance, but superior outcomes when compared to the conventional procedures.

Conclusion:

The follow-up results of our study demonstrate EVLT without Doppler guidance is an efficient treatment modality for lower limb varicose veins providing better cosmetic, functional results without radiological expertise making it an effective day care surgical procedure for the treatment of varicose veins.

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