

Management of Lower Limbs Varicose Veins Using Endovenous Laser Ablation, Our experience at King Hussein Medical Center

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ABSTRACT

Objective: To evaluate the treatment results for lower limbs varicose veins using Endovenous Laser Ablation (EVLA) at King Hussein Medical Center (KHMC).

Methods : A retrospective review of the records of 87 patients with 116 lower extremities great saphenous vein (GSV) varicosities treated using EVLA at KHMC /vascular unit between January 2011 and June 2018 was conducted .Sixty-six patients were females and 21 were males. The mean age was 40 years. A mean follow up period of one year included clinical assessment and duplex scan denoting success rate, efficacy, complications and safety of the procedure.

Results: Successful complete occlusion of the GSV was reported in 107 cases (92.2%) whereas partial occlusion appeared in 6 legs (5.2%) and 3 showed vein recanalization during follow up period. Those were further effectively managed using Ultrasound Guided Sclerotherapy (UGS).No surgical intervention was necessary in any of the limbs. None of the patients developed significant complications .Eight patients had mild to moderate post operative pain that was treated with oral analgesics. Fifteen patients complained of GSV tract induration. All procedures were performed as day case and patients were mobilized and discharged on same day of procedure.

Conclusion: EVLA for treatment of lower limb GSV appears to be safe and effective technique. It is minimally invasive with low complications and high success rate.

Keywords : Endovenous laser ablation, sclerotherapy , Great saphenous vein

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Introduction

Lower limbs varicose veins represent one of the common vascular presentations in adult population, affecting 15 % of men and 25 % of women ^(1,2).

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Incompetence of the sapheno-femoral junction (SFJ) and reflux of the great saphenous vein contribute to the majority of lower extremities varicosities⁽¹⁻⁴⁾. For decades, surgical SFJ ligation and GSV stripping constituted the traditional standard management^(1, 2,3,5,6). EVLA is increasingly used during the last few years as a minimally invasive method to manage leg varicosities efficiently and safely⁽⁵⁻⁸⁾. In this article, we report our experience in treating lower limb GSV varicose veins using EVLA technique.

METHODS

A retrospective review of the records of 87 patients with 116 lower limbs varicose veins who underwent treatment for their GSV using EVLA at KHMC /Vascular Unit between January 2011 and June 2018 was conducted. Sixty six patients were females (76%) and 21 were males (24%). Their mean age was 40 years (18- 72). All patients were evaluated in the vascular surgery clinic where history was taken and physical examination was performed. At the vascular unit laboratory, patients were re-examined with duplex ultrasound B mode imaging combined with color and pulsed Doppler using 5- 10 MHz linear array introducer. All legs were duplex scanned to document: deep veins patency, the competence of the superficial veins including reflux assessment with the patient in the erect position, vein length and diameter.

Patients who had undergone previous sapheno-femoral ligation were included in the study (15 patients). Those suffering from deep vein thrombosis (DVT) or incompetence, peripheral arterial disease with impalpable pulses and patients with poor general conditions were excluded.

After comprehensive evaluation, patients who met the inclusion criteria were offered EVLA as an alternative to surgical management and a written informed consent was obtained.

ENDOVENOUS LASER ABLATION TECHNIQUE

All patients' EVLA procedures were performed as day cases in the vascular unit theatres. Fifty two patients preferred spinal anesthesia, including all patients with bilateral lower limb procedures. Under ultrasound guidance (PHILIPS HD 11 XE ultrasound machine), GSV was conducted and 6F sheath was introduced into the vein at an appropriate point near the knee level. Site was chosen beforehand by duplex ultrasound where the length, diameter and tortuosity of the vein were noted.

The laser fiber (Ceralas E 1470, Biolitec /Germany) is introduced and located 1.5 – 2.0 cm distal to the sapheno femoral junction.

Tumescent anesthetic solution (500 ml of normal saline 0.9%, 20 ml of lidocaine 2.0% and 10 ml sodium bicarbonate 8.4 %) was infiltrated in the perivenous space of the whole length of the GSV to be treated.

Laser tip position was rechecked again using longitudinal and transverse ultrasound views .Laser ablation was commenced and gradually laser was pulled back. Laser system used a wave length of 1470 nm for all patients with mean energy of 65 Joules/cm (60 -80 J/cm).

Following EVLA process, intra operative ultrasound scan was performed to confirm the shrinkage of the vein.

A graduated above knee compression stocking therapy class II (20-30 mmHg) was applied at the end of the procedure and for one week duration.

Patients were discharged and advised to return to their usual activities as soon as possible. They were called for clinical and ultrasound evaluation at 1 week ,6 months , 1 and 2 years (mean one year) checking for obliteration , fractional occlusion or recanalization of the vein.

RESULTS

During the study interval, a total of 116 incompetent GSV in 87 patients were managed by means of EVLA procedure. Twenty nine patients had bilateral veins involvement .Fifteen patients had previous unilateral SFJ surgical ligation with residual GSV incompetence. CEAP classification (clinical, etiologic, anatomic and patho-physiologic) ranged from (C2-C6, Ep, As,Pr). The median length of veins treated was 35 cm (22-45cm), since in 90 cases (78%) the treatment was started at below knee level. The diameter of the treated segment of the GSV varied between 3 – 15 mm (median 6.4 mm). **Table I and II**

Initial technical access success was reported in all patients although complexity was faced in 3 cases. In one patient, the advancement of the introducer sheath was difficult as the vein was very tortuous and became small in size as it went into spasm. In the other two patients , cannulation of the vein at below knee level was hard .The vein was re-punctured and cannulated successfully 10 cm proximal to the original chosen site ,while an open cut wound was used for the second vein.

In all patients, intra operative ultrasound scans was performed at the end of the process as well as one week after and confirmed the obliteration of the handled GSV.

A mean follow up period of one year (6 -24 months) was carried out where clinical assessment and duplex scan demonstrated successful complete occlusion in 107 GSV (92.2%), partial vein obliteration in 6 legs (5.2%) and three (2.6 %) showed vein recanalization with a large thigh tributary identified .

Ultrasound guided sclerotherapy (UGS) was performed to obliterate the recurrent veins at different intervals of the follow up resulting in secondary success .No surgical treatment was necessary in any of the limbs.

None of our patients developed significant complications like DVT, pulmonary embolism (P.E.), bleeding, cellulitis, skin burns, hematomas or nerve injury. In fifteen patients, the presence of erythematous streaks and induration at the tract of the treated GSV were noted.Eight patients had mild to moderate post operative pain that was controlled by oral analgesics.

All the procedures were performed on out- patient basis and the patients were discharged on the same day of the procedure.

Table I: Demographic data and veins characteristics

Number of patients	87
Number of treated legs	116
Mean age	40 (18-72 years)
Male : female	21: 66
Mean treated vein length	35 (22- 45 cm)
Median Diameter of treated vein	6.4 (3 – 13 mm)
GSV sizes distribution :	
3-5 mm	22 cases
5-10mm	78 cases
more than 10 mm	23 cases

Table II: CEAP classification of the treated varicose veins

CEAP	n (%)
C1	0 (0)
C2	63 (54.3 %)
C3	37 (32 %)
C4	12 (10.3 %)
C5	3 (2.6 %)
C6	1 (0 .86%)

DISCUSSION

Lower limbs varicose veins are quiet common problem in the community^(1,2,5). The classical treatment is surgical in the form of SFJ ligation and GSV stripping^(2,3,9). Endovenous delivery of laser energy was first reported by Bone in 1999⁽¹⁰⁾. Since then EVLA of the saphenous vein has gained increasing popularity as a minimally invasive technique for treatment of varicose veins and has been shown by many authors to be a safe and effective method^(11,12).

The successful outcomes of EVLA have been reported by different series to be considerably high, ranging between 90 – 100 % in obliterating incompetent GSV^(2,5,6,12). Our complete occlusion rate of the vein treated effectively appeared in the same range (92%), confirming reliability of the technique. Partial vein occlusion and recanalization (5.2 and 2.6 % respectively) were noticed in our study as well as in other studies^(1,5,7). A large mid thigh perforator reflux was identified in some patients while in others ,residual GSV communicating with veins draining at the anterior accessory saphenous branch and short saphenous veins was noticed. Further management by UGS for the residual varices, partially occluded and recanalized veins was performed successfully during follow up sessions. No surgical treatment was required in any of these limbs.

Many authors compared outcomes of endovenous procedures with surgical management^(5,7,13,14,15). They demonstrated results to be at least as good for EVLT as for surgery including technical success and safety^(3,4,5,16,17). There was some benefit over open surgery in terms of post operative pain , recovery and time to return to normal activities. Most of our patients were pain-free post EVLA and they were sent home within few hours after complete recovery from the anesthesia with recommendations to ambulate . Those with post procedure pain were advised to use oral analgesics that were prescribed to all patients but to be used only if circumstances require.

Preoperative duplex ultrasound to evaluate GSV may be of great help to avoid access failure. The vein characteristics including: tortousity, diameter, length, existence of occluded thrombotic segments and presence of large branches can help in choosing puncture site and avoid difficult cannulation. Some authors described helpful maneuvers in cases of vein spasm and difficult access which we used in some of our patients^(3,5,6). They described re-puncturing the vein at a proximal site, applying warm towels and local massaging, rotating the angled access wire and the use of surgical exploration.

Since the introduction of laser system, different wavelengths have been used (810, 940, 980, 1470 nm)^(3,8,11). Different studies suggested that higher wavelength like 1470 nm have a better absorption of laser in water and cause less pain , bruising and vein wall perforation^(11,18,19,20,21,22). They recommended the use of 1470nm laser fiber with energy density of 80 J/cm or less as an advisable option for the management of saphenous vein incompetency⁽¹⁹⁻²¹⁾. All our patients reviewed from the medical records , received same laser system with fixed wave length of 1470 nm and a mean energy of 65 J/cm.

Although EVLA is considered as a minimally invasive procedure ,some complications have been recorded^(1,2,3,6). These included : hematoma formation, DVT , P.E. ,nerve damage, skin ulceration and infection .In our review, as well as other studies ,no major complications occurred apart from induration and ecchmosis along the managed vein in few patients confirming safety of the procedure⁽¹⁻³⁾.

In our study, as in other publications, the majority of our patients were young females^(1,5,8,9). This may verify the cosmetic outcome of the EVLA procedure usually seeked by this age group. Also some of

our patients were above 65 years making EVLA a suitable procedure in elderly patients who might be at poor risk for surgical intervention.

CONCLUSION

Minimally invasive techniques such as EVLA for the GSV incompetence appear to be safe and effective. It is simple to perform, manage large diameter saphenous vein percutaneously and on outpatient basis with mild procedure complications.

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