

Treatment of Great Saphenous Vein Insufficiency by Endovenous Laser Therapy: Clinical Description and Short Term Follow up of 20 Iranian Patients

Mohammad Mozafar, Hamidreza Haghhighatkah, Morteza Sanei Taheri, Khashayar Atqiaee, Seid Ali Tabatabaei, Niki Tadayon

Laser Application in Medical Sciences Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract:

Background: Endovenous Laser Therapy (EVLT) for Greater Saphenous vein (GSV) insufficiency is a newly established method of treatment only recently made available in Iran. The present study seeks to describe the results of the first 20 patients treated with EVLT at Shohada-e Tajrish Medical Center, Tehran, Iran.

Methods: 20 patients (16 male, 4 female) with the mean age of 38.9 and an average length of symptoms of 5.9 years, were treated with a 980-nm laser diode under local anesthesia. CEAP classification (Clinical Severity, Etiology, Anatomy, Pathophysiology) and AVSS scores (Aberdeen Varicose Vein Symptom Severity Score) were used to determine disease severity and symptoms before and after the procedure. Outcome was measured by the rate of recurrence as shown in Doppler ultrasonography evaluation.

Results: The mean procedure time was 49 minutes, and the mean admission time was 1.1 days. A success rate of 85% percent was recorded at 6-12 months of follow up. The patients showed a significant reduction in AVSS and CEAP scores (PV=0.0001), Pain (PV=0.00001), Parasthesia and Edema (PV=0.001).

Conclusion: EVLT seems promising as a novel method of treatment for GSV insufficiency in the Iranian population with many advantages, including higher success rates in comparison with conventional methods of treatment.

Keywords: laser therapy; saphenous veins; venous insufficiencies

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***Corresponding Author:** Mohammad Mozafar, M.D; Shohada-e Tajrish Medical Center, Tajrish Sq, Tehran, Iran. Tel: +98-2122721144; Fax: +98-2122721144; Email: Mohamad_mozafar@yahoo.com

Introduction

In recent years, Endovenous Laser Therapy (EVLT) for varicose veins has been proven to be an effective alternative to conventional methods of treatment (1). The procedure possesses several advantages over treatment modalities, such as sclerotherapy and surgical stripping including the ability of being performed in an outpatient

setting, use of local, instead of spinal anesthesia, less postoperative pain and bruising, and earlier return to work (2,3). The procedure also results in similar or improved rates of success as measured by reflux in Doppler Ultrasonography and/or patient satisfaction (3-5).

EVLT has been used for the treatment of varicosis in several settings and anatomic locations (6), but insufficiency of the greater saphenous vein (GSV)

is by far the most studied (4, 7-9).

EVLV was made available at Shohada-e-Tajrish Medical Center, Tehran, Iran in 2010. Here, we describe the preliminary results of 20 patients who underwent the procedure at this Medical Center.

Method

Overall, 20 patients underwent the procedure, 16 men and 4 women. All suffered from GSV insufficiency and had experienced exhausting non-invasive methods of treatment such as compression stockings. The average age of patients was 38.9 (23-71), and average duration of symptoms prior to the procedure was 5.9 years (1-20).

Patients were included in the study based on visualization of the insufficient GSV by Doppler ultrasonography (DUS) and signing of an informed consent approved by the hospital Ethics Committee. Disease severity was determined using the CEAP classification (Clinical Severity, Etiology, Anatomy, Pathophysiology) before and after the procedure. Patients' symptoms were scored using Aberdeen Varicose Vein Symptom Severity Score (AVSS) criteria. Some specific symptoms were also separately documented, including pain, parasthesia, and bruising. Pain was measured using a Visual Analogue Scale (VAS).

Prior to the procedure anatomy of GSV was mapped using DUS in all patients. Access site was selected below the knee and the course of the varicose vein was anesthetized with the mixture of 500cc normal saline, 50cc 1% lidocain, and 1cc bicarbonate under sonographic guidance. The procedure was performed in sterilized conditions.

Access needle was inserted into the GSV under ultrasonographic guidance and a 0.035-in guide wire was introduced into the vein (Seldinger Technique). The intravenous placement was confirmed with ultrasonography. The introducer sheath was placed over the wire and the laser fiber was inserted into the sheath up to 2-5 millimeter out of the sheath tip. The laser fiber was fixed, with a 980-nm diode laser in pulse mode (1 second on and 0.5 second off) or (100 milliseconds on / off), and a 10 watt power was used. Energy was delivered percutaneously into the GSV via a 600- micro m fiber, and the fiber was carefully withdrawn down to the ablation starting point ($V=2\text{mm/s}$).

In patients with concomitant perforator

insufficiency, these veins were surgically ligated through small incisions after to laser therapy.

Patients were examined and their symptoms recorded on the day of the procedure, one week and six months post operation. DUS evaluation of the treated vein was performed six months post operation. At follow up, success was defined as the persistent occlusion and gradual narrowing, or disappearance of the treated vessel.

Results

20 patients (16 male, 4 female) with the mean age of 38.9 and an average length of symptoms of 5.9 years, were treated with a 980-nm laser diode under local anesthesia. No serious technical complications were reported at the time of the procedures used. The procedures lasted from 20 to 120 minutes (mean=49), and the average admission time was 1.1 days (1-2). Four patients (28.6%) reported bruising

after the procedure. Seventeen patients showed successful sonographic results on the six months follow up period (85.0%).

Preoperatively, the patients reported a mean AVSS score of 11.7 (6-21.3) which was significantly reduced to 3.3 (0-16) six months postoperatively ($P = 0.0001$).

The mean CEAP score also displayed a significant reduction from 4.1 (2-6) before the operation to 1.5 (0-6) at the six months follow up period ($P = 0.0001$).

Also pain showed a significant and considerable reduction from 5.5 +/- 2.8 on the VAS scale preoperatively, to 1.1 +/- 1.9 postoperatively ($P = 0.00001$).

The prevalence of parasthesia and edema was also significantly reduced after the procedure. Parasthesia which was present in fifteen patients preoperatively (78.9%) was reduced to 2 case (10.5%), while the prevalence of edema went down from 13 (68.4%) to 2 (10.5%) ($P \text{ value}=0.001$ for both).

Discussion

Surgical ligation and stripping are considered the conventional methods for the treatment of GSV insufficiency. They have demonstrated outstanding early results, but with a five-year recurrence rate

of 20-40%, the long term outcomes are not as excellent (10). It has been proposed that this high rate of recurrence is due to neovascularization within the saphenous canal (11). EVLT omits this mechanism of recurrence by occluding the canal altogether. In addition, it offers the convenience of being performed under local anesthesia, while clinical trials have shown that it also reduced rates of scarring, Parasthesia, pain, bruising, and earlier return to daily activities (1, 4, 5, 12).

EVLT, first described in 2001 as an alternative method of treatment for insufficient GSVs (13), was recently made possible at Shohada-e Tajrish Medical Center, Tehran. The results of the first group of patients treated with this method seem promising. Like previous reports in other countries (13-16), our patients demonstrated significant reduction in both AVSS and CEAP scores, while pain, Parasthesia, and edema also showed highly significant reductions after the procedure.

In our patients, 3 cases (15%) demonstrated sonographic evidence of recurrence. This puts our success rates at 85%. Recanalization happened via a large communicating vein, or incompetent perforating vein in the thigh which were ignored before treatment. The latest meta-analysis on ELVT which puts together results of 64 studies on the topic, approves the effectiveness of the procedure, and describes a success rate of 94% compared to 78% for conventional surgeries (17). While our numbers are slightly lower than that of larger multicenter studies (although still superior to conventional methods of treatment), we believe this may be due to the smaller number of patients in the study. We hope that future studies on larger groups of patients will clarify this discrepancy.

In conclusion, EVLT appears to be a promising method of treatment for GSV incompetency which offers all the benefits of conventional treatments plus reduced hospital stay, earlier return to daily activities, and higher success rates without the need for general anesthesia. Future clinical trials are needed to reconfirm its superiority to conventional surgery in the Iranian population.

References

1. Rasmussen LH, Lawaetz M, Bjoern L, Vennits B, Blemings A, Eklof B. Randomized clinical trial comparing endovenous laser ablation, radiofrequency ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins. *Br J Surg* 2011 Aug;98(8):1079-87.
2. Nael R, Rathbun S. Treatment of varicose veins. *Curr Treat Options Cardiovasc Med*. 2009; 11(2):91-103.
3. Hoggan BL, Cameron AL, Maddern GJ. Systematic review of endovenous laser therapy versus surgery for the treatment of saphenous varicose veins. *Ann Vasc Surg* 2009;23(2):277-87.
4. Kalteis M, Berger I, Messie-Werndl S, Pistrich R, Schimetta W, Polz W, et al. High ligation combined with stripping and endovenous laser ablation of the great saphenous vein: early results of a randomized controlled study. *J Vasc Surg* 2008;47(4):822-9.
5. Darwood RJ, Theivacumar N, Dellagrammaticas D, Mavor AI, Gough MJ. Randomized clinical trial comparing endovenous laser ablation with surgery for the treatment of primary great saphenous varicose veins. *Br J Surg*. 2008;95(3):294-301.
6. Khilnani NM, Grassi CJ, Kundu S, D'Agostino HR, Khan AA, McGraw JK, et al. Multi-society consensus quality improvement guidelines for the treatment of lower-extremity superficial venous insufficiency with endovenous thermal ablation from the Society of Interventional Radiology, Cardiovascular Interventional Radiological Society of Europe, American College of Phlebology and Canadian Interventional Radiology Association. *J Vasc Interv Radiol* 2010;21(1):14-31.
7. Leelaudomlipi S, Sriphojanart S, Lersithichai P, Angkoolpakdeekul T, Pootrakul P, Horsirimanont S, et al. Preliminary report: initial experience of endovascular laser therapy for varicose veins due to greater saphenous vein incompetence in Thailand. *J Med Assoc Thai*. 2005;88(4):473-7.
8. Rasmussen LH, Bjoern L, Lawaetz M, Lawaetz B, Blemings A, Eklof B. Randomised clinical trial comparing endovenous laser ablation with stripping of the great saphenous vein: clinical outcome and recurrence after 2 years. *Eur J Vasc Endovasc Surg*. 2010;39(5):630-5.
9. van Groenendaal L, van der Vliet JA, Flinkenflögel L, Roovers EA, van Sterkenburg SM, Reijnen MM. Treatment of recurrent varicose veins of the great saphenous vein by conventional surgery and endovenous laser ablation. *J Vasc Surg* 2009;50(5):1106-13.
10. Fischer R, Linde N, Duff C, Jeanneret C, Chandler JG, Seeber P. Late recurrent saphenofemoral junction reflux after ligation and stripping of the greater saphenous vein. *J Vasc Surg*. 2001;34(2):236-40.
11. van Rij AM, Jones GT, Hill GB, Jiang P. Neovascularization and recurrent varicose veins: more histologic and ultrasound evidence. *J Vasc Surg* 2004;40(2):296-302.
12. de Medeiros CA, Luccas GC. Comparison of endovenous treatment with an 810 nm laser versus conventional stripping of the great saphenous vein in patients with primary varicose veins. *Dermatol Surg* 2005;31(12):1685-94. discussion 1694.
13. Navarro L, Min RJ, Bone C. Endovenous laser: a new minimally invasive method of treatment for varicose veins-preliminary observations using an 810 nm diode

- laser. *Dermatol Surg* 2001; 27(2): 117-22.
14. Min RJ, Khilnani N, Zimmet SE. Endovenous laser treatment of saphenous vein reflux: long-term results. *J Vasc Interv Radiol* 2003;14(8):991-6.
 15. Yilmaz S, Ceken K, Alparslan A, Sindel T, Luleci E. Endovenous laser ablation for saphenous vein insufficiency: immediate and short-term results of our first 60 procedures. *Diagn Interv Radiol*. 2007;13(3):156-63.
 16. Min RJ, Khilnani NM. Endovenous laser treatment of saphenous vein reflux. *Tech Vasc Interv Radiol* 2003;6(3):125-31.
 17. van den Bos R, Arends L, Kockaert M, Neumann M, Nijsten T. Endovenous therapies of lower extremity varicosities: a meta-analysis. *J Vasc Surg* 2009 Jan;49(1):230-9.