Endovenous laser treatment for varicose veins in Singapore: a single centre experience of 169 patients over two years

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ABSTRACT

Introduction: Endovenous laser therapy (EVLT) is one of the many minimally-invasive procedures that have been developed in recent years for the treatment of varicose veins. We present our single centre experience of 169 patients who underwent EVLT.

Methods: All patients who underwent EVLT since its introduction in our institution were included in our series.

Results: A total of 270 incompetent long saphenous veins in 169 patients were ablated by EVLT from February 2006 to January 2008. Bilateral EVLT was performed in 101 (59.8 percent) patients, with the remaining 68 (40.2 percent) undergoing unilateral EVLT. The mean age of the patients was 54 (range 19–78) years and there were 112 (66.3 percent) women. The majority of our patients (63.3 percent) had symptoms for more than five years. The symptoms included lower limb cramps and aches (47.9 percent) as well as lower limb swelling (16.6 percent). The median follow-up was six months. Complications from our series included numbness over the affected lower limbs (10.7 percent) and skin pigmentation (4.1 percent). Only 2.4 percent of patients had recurrence after one year.

Conclusion: Early results with EVLT have been impressive, and this study has reaffirmed the safety and effectiveness of EVLT in the treatment of varicose veins.

Keywords: endovenous laser therapy, long saphenous veins, varicose veins

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INTRODUCTION

Varicose veins of the lower limbs affect many people worldwide, with the extent of involvement in as high as 40 per cent of women and 20% of men reported.[1-3] The main aetiology is usually due to the reflux at the saphenofemoral junction, while a smaller group of patients may also have incompetence of the short saphenous vein or the perforators.[4-6] Some of the common risk factors for varicose veins include female gender, family history, two or more kids, obesity and prolonged standing.[7] The presentation of varicose veins is often variable and its severity is unpredictable, ranging from just an unsightly cosmetic appearance and lower limb discomfort, to its multiple complications such as oedema, skin discolouration, eczema, ulceration and even profuse bleeding.[6-8] Despite these problems, most patients do not undergo any treatment for a long period of time even when complications arise, mainly because the only definitive therapeutic option is surgery, which is not only invasive but also associated with surgical complications, prolonged recovery periods and significant recurrence rates.[9]

As with the progress seen in all aspects of surgery over the decades, technological advancement has changed the way in which surgery is performed nowadays. Minimally invasive procedures are currently widely accepted. However, this change has only begun to be seen in the treatment of varicose veins in recent years. Techniques such as endovenous radiofrequency ablation, ultrasonographically-guided foam sclerotherapy and endovenous laser treatment (EVLT) have all been described with varying results.[6-11] EVLT is one procedure with impressive long saphenous vein (LSV) ablation rates even at five-year follow-up.[8,11,12] In this study, we present our single centre experience with the 169 patients who have undergone EVLT since its introduction in our institution.

METHODS

EVLT was introduced in our institution in February 2006. Since then, patients were assessed by two of our

Table I. Characteristics of all patients who underwent EVLT.

Characteristics	No. (%) of patients
Total no. of patients	169
Unilateral limbs	68 (40.2)
Bilateral limbs	101 (59.8)
Total no. of limbs	270
Patients operated on in the first year	68 (40.2)
Unilateral EVLT	35 (51.5)
Bilateral EVLT	33 (48.5)
Patients operated on in the second year	101 (59.8)
Unilateral EVLT	33 (32.7)
Bilateral EVLT	68 (67.3)
Age (range) (years)	54 (19–78)
Gender	
Female	112 (66.3)
Male	57 (33.7)
Racial distribution	
Chinese	126 (74.6)
Malay	13 (7.7)
Indian	19 (11.2)
Others	11 (6.5)
Median (range) follow-up (months)	6 (0–16)
Premorbid conditions	
Hypertension	33 (19.5)
Diabetes mellitus	8 (4.7)
Ischaemic heart disease	3 (1.8)
Risk factors	
Occupations requiring prolonged standing	56 (33.1)
More than one child (n = 112 women)	60 (53.6)

Table II. Duration and types of symptoms of all patients.

Symptom	No. (%) of patients
Duration (years)	
< 1	7 (4.1)
1–5	55 (32.5)
> 5	107 (63.3)
Type	
Cramping and aching sensation	81 (47.9)
Swelling	28 (16.6)
Skin pigmentation	38 (22.5)
Venous ulcer	19 (11.2)
Previous bleeding episode(s)	6 (3.6)
Cosmetic complaints	52 (30.8)

consultant vascular surgeons on the suitability for EVLT to be performed for the treatment of varicose veins. After a thorough history was obtained and a complete physical examination, patients were scheduled for duplex scanning of their affected lower limbs on the presence and severity of the varicose veins. All duplex scans were performed by our trained vascular technologists using an ATL HDI 5000 ultrasound machine (ATL Ultrasound, Bothell, WA, USA). Duplex scanning was performed to document the patency of the deep veins and to evaluate the extent and severity of the reflux in the superficial venous system (LSV, short saphenous vein and perforators) with patients in the standing position. Venous reflux was defined as a reverse flow of more than 0.5 seconds, while perforators were considered incompetent if the diameter was 4 mm or more and/or had an outward directional flow exceeding 0.5 seconds.[13] Patients were excluded if there was evidence of deep venous thrombosis (DVT), superficial thrombophlebitis, non-healing ulcers, non-palpable pedal pulses or if they were unfit for general anaesthesia.

EVLT may be performed on either one or both lower limbs after a thorough re-evaluation and upon obtaining informed consent from the patient. All EVLT procedures with or without ligations of the perforators were performed under general anaesthesia in the operating theatre by either of our two consultant vascular surgeons using the Dornier Medilas D FlexiPulse 940-nm diode laser (Dornier MedTech GmbH, Wessling, Germany). Preoperatively, the LSV and the perforators were identified and the findings correlated to the Duplex scans performed earlier. Patients were often discharged the same day of the surgery or stayed overnight for further observation in our ambulatory surgery 23-hour ward and discharged the next day.

RESULTS

A total of 270 incompetent LSVs in 169 patients were ablated by EVLT from February 2006 to January 2008. Bilateral EVLT was performed in 101 (59.8%) patients, while the remaining 68 (40.2%) underwent unilateral EVLT. More patients also underwent EVLT during the second year of its introduction (101 vs. 68). The mean age of the patients was 54 (range 19–78) years, and there were 112 (66.3%) women and 57 (33.7%) men. The median follow-up for all these patients was six (range 0–16) months, with 13 (7.7%) patients defaulting on follow-up immediately after the surgery. In addition, 56 (33.1%) patients had an occupation that required prolonged standing of more than eight hours, such as a sales assistant or waiter. Out of the 112 women, more than half (53.6%) had two or more children. Some of the associated premorbid conditions in our patients included hypertension (19.5%), diabetes mellitus (4.7%) and ischaemic heart disease (1.8%) (Table I).

The majority of our patients (63.3%) endured symptoms for more than five years before seeking surgical treatment (Table II). The most common symptom was a cramping and aching sensation in the lower limbs in 81 (47.9%) patients. Other symptoms included lower limb swelling in 16.6% patients, skin pigmentation in 22.5%, previous venous ulcers in 11.2%, and bleeding episodes

Table III. List of complications of all EVLT performed.

Complications	No. (%) of patients
Hypoaesthesia	18 (10.7)
Pigmentation	7 (4.1)
Swelling and induration	6 (3.6)
Erythema	2 (1.2)
Bruising	2 (1.2)
Recurrence within one year	4 (2.4)

from the varicose veins in 3.6% patients. A significant proportion of our patients (30.8%) opted for the surgery due to cosmetic reasons. There was no mortality in our series. During follow-up, all patients had resolution of their varicosities and improvement in their symptoms postoperatively. However, some complications of EVLT experienced by our patients included hypoaesthesia over the affected lower limbs in 10.7% patients, swelling and induration in 3.6%, skin pigmentation in 4.1%, erythema in 1.2% and bruising in 1.2% patients. During follow-up, 2.4% patients complained of a recurrence of their varicosities (Table III) at the end of one year post-surgery.

DISCUSSION

Chronic venous insufficiency and varicose veins affect a significant proportion of any population.[1-3] Even though it rarely results in any mortality, it often has a detrimental effect on the quality of life of these patients. The typical symptoms include significant pain, cramps and skin pigmentation.[6-8] Apart from these symptoms, many patients worldwide opt for the procedure for cosmetic reasons, as evidenced by 30% of the patients in our series. Patients often delay seeking treatment of their varicose veins as the effective treatment for varicose veins is either surgery, which is associated with several complications, or conservative measures where compliance is difficult.[9,11,14] As a result, many patients only present to the vascular surgeons after suffering from these symptoms for many years, as exemplified by two-thirds of our patients.

The classic treatment for varicose veins has been high ligation and LSV stripping; although associated with an excellent early outcome, long-term results of 20%–40% recurrence rates have been reported.[15-17] However, technological advancements have allowed minimally invasive procedures to be introduced for the treatment of varicose veins. Across the various methods, the principal aims of treatment are to eliminate the LSV reflux and to improve the symptoms. EVLT is one such procedure with impressive LSV ablation rates at five-year follow-up.[8,11,12] This procedure consists of the introduction of a percutaneous transvenous catheter-guided laser fibre and the transmission of laser energy through this fibre. The process is carried out under direct visualisation, made possible by the red aiming beam light of the laser tip from just beneath the skin. This causes a thrombotic occlusion of the laser-treated veins by causing endothelial cell damage, and all of these contribute to procedural ease and safety, improved effectiveness and minimal surgical scarring.

Successful occlusions of the LSV at a rate of over 90% immediately after EVLT were reported.[8,18,19] Our recurrence rate of 2.3% with a median follow-up of six months is comparable to many other series.[19-21] Some reports have also described a recurrence rate of less than 5% after two years follow-up following EVLT.[8,21] To our knowledge, there are no published reports describing long-term follow-up results due to the recent introduction and adoption of EVLT in the treatment of varicose veins. Recent studies have reported improved quality of life in the early postoperative period and a decreased length of stay, which have allowed patients to have an earlier return to their normal lifestyle and activities.[22-24] Postoperative morbidity and complications have also been described to be less frequent compared to those after stripping.

Serious complications following EVLT are uncommon.[11] DVT is rare, with a reported incidence of less than 8%.[25,26] No one in our series had DVT. However, a proportion of our patients did have several complications. The most common complication was numbness in 18 patients, followed by pigmentation in seven, and swelling and induration in six. Hypoaesthesia is not rare after EVLT, but this impairment is usually self-limited and often improves within months.[27,28] Hyperpigmentation along the course of the treated vein can also be seen at times, especially if the vein is above the fascial level and in thin individuals, but this complication also gradually fades over time.[11,28] Many studies have also described the incidence of swelling, bruising and discomfort following EVLT; these are also often self-limited.[11,28]

Several drawbacks of our series include the fact that no repeated duplex scans were performed postoperatively to accurately depict the ablation of the LSV or to identify recurrence, although a thorough physical examination was performed for each patient during their follow-up. In addition, we did not determine if EVLT brought about an improved quality of life as compared to conventional surgery. We are hoping to address these issues through a randomised controlled trial that is ongoing in our institution, comparing the outcome and quality of life between EVLT and conventional surgical ligation and stripping. In conclusion, early results with EVLT have been impressive, and this study confirms the safety and effectiveness of EVLT in the treatment of varicose veins.

However, its long-term results still require more in-depth evaluation through multicentre investigations and randomised controlled trials.

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