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Original Article

Endovascular Ablation Therapies for Varicose Veins in Elderly Patients☆

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SUMMARY

Background: Varicose veins are a common vascular disease in elderly patients. Both endovascular laser ablation (EVLA) and radiofrequency ablation (RFA) are reported to have good technical, clinical, and patient-reported outcomes for the treatment of varicose veins. We did not find any reports on treating elderly patients with endovascular ablation procedures in the literature. The aim of this study was to determine whether endovenous thermal ablation techniques are safe and effective in treating elderly patients with varicose veins.

Method: A retrospective analysis of 57 EVLA cases and 46 RFA cases was conducted at a single center. Patients in the 65–88-year age group were assessed for postoperative pain, hematoma, thrombophlebitis, hyperpigmentation, wound infection, and skin burn.

Results: Minor complications identified in the studied patients were hematoma (2.9%), thrombophlebitis (5.8%), hyperpigmentation (8.7%), wound infection (4.9%), and skin burn (1%). In the RFA group, 38 patients (83%) had no need for oral analgesic tablets on postoperative Day 3. In the EVLA group, 25 patients (44%) had no need for oral analgesic tablets on postoperative Day 3. Two patients in the EVLA group needed a secondary intervention due to recurrent vein issues. There were no major complications in either group.

Conclusion: The outcomes for our older patients who underwent endovascular ablation therapy were comparable to other studies performed with the general population. Our results show that both EVLA and RFA are feasible, safe, and well-tolerated by elderly patients.

1. Introduction

The prevalence of varicose veins ranges from 1% to 73% in women and 2% to 56% in men[1]. Traditional surgical methods for treating varicose veins, including saphenofemoral junction (SFJ) ligation, great saphenous vein (GSV) stripping, and multiple phlebectomies, have been the accepted treatment of choice for almost a century[2]. However, traditional surgical methods to treat varicose veins are associated with significant complications, high recurrence rates, and some patient dissatisfaction. In a randomized trial of SFJ ligation methods for primary saphenous incompetence, the 2-year clinical recurrence rate was 33% and Doppler ultrasound-proven recurrence was up to 22%[3]. About 10 years ago, new alternatives to these surgical treatments [endovascular laser ablation (EVLA) and radiofrequency ablation (RFA)] were developed, which are having a major impact on management choices[4].

Endovenous thermal ablation techniques, which include RFA or EVLA, are less invasive varicose vein treatment alternatives to stripping the incompetent GSV and the results are as effective as the traditional stripping surgery[5]. The largest meta-analysis examined 64 eligible studies and showed that the success rate was higher in patients undergoing endovascular ablation therapy than in patients undergoing traditional surgery[3]. According to several randomized trials, patients who underwent endovenous thermal ablation surgery had shorter recovery times before

☆ Conflicts of interest: All contributing authors declare that they have no conflicts of interest.

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returning to normal activities than patients who underwent traditional stripping surgery[6–8].

The aim of this study was to evaluate whether endovenous thermal ablation techniques are safe and efficient in treating cases of varicose veins in elderly patients.

2. Patients and methods

From December 2009 to August 2011, 103 patients between 65 and 88 years of age were enrolled for the study. Of these, 46 patients (63 limbs) underwent treatment for GSV with RFA techniques using the ClosureFast RF catheter and 57 patients (68 limbs) underwent EVLA using a 980-nm wavelength laser. The study was retrospective and conducted by two surgeons at Mackay Memorial Hospital. Of the 103 patients, 70 were women and 33 were men. Comorbidities were mild, with the most frequent being hypertension in 15 patients (14.6%), cardiovascular disease in two patients (1.9%), osteoarthritis of the knee joint in six patients (5.8%), and diabetes mellitus in 12 patients (11.7%).

2.1. Data analyses

All data were analyzed using the Statistical Package for the Social Sciences version 14.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were used to summarize the demographic characteristics of patients. Fisher's exact test and Chi-square tests were used for categorical data. Data were presented as mean or percentages, and $p < 0.05$ was considered statistically significant.

Table 1
Demographics and treatment details of the study patients ($N = 103$).

Variables	Total	RFA ($n = 46$)	EVLA ($n = 57$)	χ^2/t	p
	N (%)	n (%)	n (%)		
Sex				0.91[a]	0.34
Male	33 (32)	17 (37)	16 (28)		
Female	70 (68)	29 (63)	41 (72)		
Age (y)				0.88	0.38
mean ± SD	67.0 ± 5.12	66.3 ± 5.39	67.6 ± 5.02		
Min	65	65	65		
Max	88	83	88		
CEAP class				4.91[a]	0.43
C1	0	0	0		
C2	36	16	20		
C3	24	10	14		
C4	21	8	13		
C5	12	6	6		
C6	10	6	4		
Postoperative complications					
Wound infection				0.49[a]	0.48
Yes	5	3	2		
No	98	43	55		
Hematoma				0.16[a]	0.69
Yes	3	1	2		
No	100	45	55		
Thrombophlebitis				0.33[a]	0.58
Yes	6	2	4		
No	97	44	53		
Paresthesia				0.13[a]	0.72
Yes	10	5	5		
No	93	41	52		
Hyperpigmentation				0.00[a]	0.99
Yes	9	4	5		
No	94	42	52		
Skin burn				0.81[a]	0.37
Yes	1	0	1		
No	102	46	56		

CEAP = Clinical–Etiology–Anatomy–Pathophysiology; EVLA = endovascular laser ablation; RFA = radiofrequency ablation; SD = standard deviation.
[a] Fisher's exact test.

2.2. Ethic statement

This study was approved by the Institutional Review Board of Mackay Memorial Hospital (13MMHIS052). The Clinical–Etiology–Anatomy–Pathophysiology (CEAP) clinical class distribution in our patients was mostly C2 ($n = 36$ patients) and C3 ($n = 24$ patients; Table 1).

In the preoperative preparation, all patients underwent the plethysmography examination to rule out deep vein thrombosis. The patients with cardiovascular disease who used anticoagulation drugs such as aspirin were required to stop their use at least 7 days before the operation. Symptomatic varicose veins and incompetence of the GSV were confirmed by duplex ultrasound examination.

In the EVLA group, 40 patients (70%) received local anesthesia [subcutaneous standard tumescent solution; 50 mL 1% lidocaine with 1:200,000 adrenaline (epinephrine) in 1000 mL normal saline], which was infiltrated along the length of the vein with or without ultrasound guidance; 17 (30%) patients in the group received general or spinal anesthesia accompanied by tumescent infiltration. In the VNUS ClosureFast radiofrequency group, local anesthesia was administered in seven (15%) patients; 39 (85%) patients in the group received general or spinal anesthesia accompanied by tumescent infiltration along the saphenous vein with ultrasound guidance. Tumescent solution infiltration can protect against thermal injury to the soft tissue and compress the treated vein to improve contact with the RFA catheter or laser fiber, thereby enhancing the ablation result.

The laser fiber or RFA catheter was introduced into the GSV using the *cut-down method*, creating an incisional wound about 1 cm in length above the malleolus bone. With ultrasound guidance, the laser fiber tip or RFA catheter was inserted about 2 cm below the SFJ. Tumescent solution was infiltrated along the length of the treated vein with or without ultrasound guidance. In the EVLA group, the laser fiber was continuously withdrawn at a speed of 1 cm/second, delivering energy greater than 60 J/cm to the vein wall. The ablation power was set to 15 W at the thigh level, 12 W at the knee-joint level, and 8 W at the lower leg level. In the RFA group, the catheter treated a 7-cm vein segment in one 20-second energy cycle. The treatment temperature was set to 110°C at the thigh level and 95°C at the knee-joint level down to the lower leg. The ablation procedure was performed on an outpatient basis for 40 (70%) patients in the EVLA group and seven (15%) patients in the RFA group, all receiving only local anesthesia. Seventeen (30%) patients in the EVLA group and 39 (85%) patients in the RFA group received general or spinal anesthesia, with all patients being discharged from the hospital the 2nd day after the operation.

All patients were followed after the operation for 9–29 months, with a mean time of 14.5 months. Patients were evaluated at postoperative Day 3, at 1 week, at 1 month, at 3 months, and then at 3-month intervals. From the chart records, we collected data about analgesic tablet use, hematomas, skin burns, wound infections, thrombophlebitis, paresthesia, or hyperpigmentation.

3. Results

From December 2009 to August 2011, 103 patients received either EVLA or RFA, including 70 women and 33 men, with a mean age of 67 years. The study enrolled 103 patients (131 legs) in the “over 65” age group. The EVLA group consisted of 68 legs (41 women and 16 men; mean age of patients: 67.6; range: 65–88 years). The RFA group consisted of 63 legs (29 women and 17 men; mean age of patients: 66.3; range: 65–83 years). The median follow up was 14.5 months and ranged from 9 to 29 months.