



Compression Therapy may not be Necessary after Endovenous Ablation Therapy for the Treatment of Varicose Veins

Angela A. Kokkosis^{1*} and Harry Schanzer²

¹Department of Vascular Surgery, Stony Brook University Medical Center, USA

²Department of Vascular Surgery, Mount Sinai Medical Center, USA

Abstract

Objective: Compression therapy is routinely used after endovenous saphenous ablation therapy (EVA) for the treatment of varicose veins. The rationale for compression therapy is enhancement of vein closure and prevention of superficial thrombophlebitis (STP) and deep thrombophlebitis (DVT). A very common patient complaint postoperatively is the discomfort elicited by the compression. The present work aims to determine whether compression therapy is necessary as an adjunct to EVA.

Methods: A total of 108 consecutive lower extremities in 96 patients were treated with EVA. Forty-nine of the treated extremities had postoperative compression, 59 did not. All patients had duplex evaluation at one week following EVA and then were clinically evaluated at one and three months. Primary end points were status of the treated vein, presence or absence of STP or deep venous thrombosis, and degree of varicose vein resolution.

Results: There was no difference between compression and no-compression groups in sex (68.8% vs. 67.3% female), age (59 vs. 56), CEAP class (C2-C3, 88% vs. 92%; C4-C5, 12% vs. 8%), extent and size of varicose veins (Classes I-II: <6 mm diameter, 57% vs. 66%; Classes III-IV: >6 mm diameter, 43% vs. 34%), type of vein treated (GSV 84% vs. 71%, SSV 8% vs. 17%, accessory 8% vs. 12%) and operative variables. There was a 96% follow-up rate at 1 week, 4 saphenous veins in the compression group remained open (p=0.0395). Three patients in the compression group and 0 patients in the no-compression group had STP. One patient in the compression group had thrombus extension up to the saphenofemoral junction. At one month both groups had the same rate of varicose vein regression and need for secondary procedures.

Conclusion: Compression therapy does not add any further benefit to EVA and therefore consideration should be given to eliminating it, thus simplifying and improving the postoperative recovery.

Keywords: Compression therapy; Varicose veins; Chronic venous disease; EVLT; Endovenous ablation

OPEN ACCESS

*Correspondence:

Angela A. Kokkosis, Department of Vascular Surgery, Stony Brook University Medical Center, HSC T19-090, Stony Brook, NY 11794, USA, Tel: (631)444-9120; E-mail: Angela.Kokkosis@stonybrookmedicine.edu

Received Date: 21 Aug 2017

Accepted Date: 20 Oct 2017

Published Date: 27 Oct 2017

Citation:

Kokkosis AA, Schanzer H. Compression Therapy may not be Necessary after Endovenous Ablation Therapy for the Treatment of Varicose Veins. *Clin Surg.* 2017; 2: 1700.

Copyright © 2017 Angela A.

Kokkosis. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

Compression therapy is routinely used by most practitioners after endovenous saphenous ablation (EVA) for the enhancement of vein closure and prevention of superficial thrombophlebitis (STP) and deep thrombophlebitis (DVT). Several prior studies evaluated the effect of a prolonged course of compression therapy after EVA or open surgery, and demonstrated no significant differences in procedure outcomes, or complications [1-4]. With regards to whether there was improvement in postoperative pain, there were conflicting results [1-4]. The present work aims to prospectively determine whether compression therapy is necessary as an adjunct to EVA.

Methods

Symptomatic patients to be treated with endovenous ablation of the great, small, or anterior accessory saphenous vein from January 2013-October 2014 were prospectively recruited for this study in a non-randomized fashion. The protocol and informed consent were approved by the Mount Sinai School of Medicine Institutional Review Board. Venous disease descriptors were based

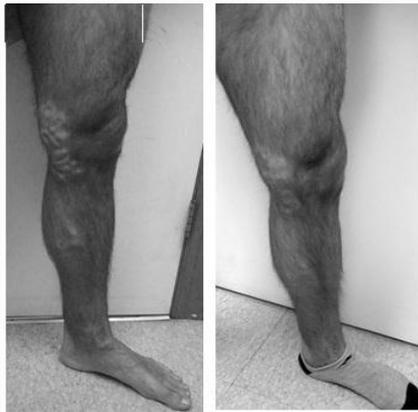


Figure 1: Partial Improvement.
1a. Pre-procedure 1b. Post-procedure

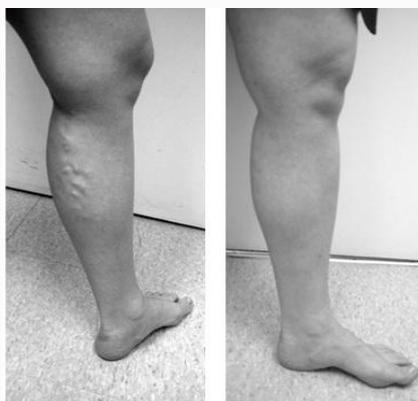


Figure 2: Complete improvement.
2a. Pre-procedure 2b. Post-procedure

on currently established terminologies [5], and the diagnosis and treatment of the patients with chronic venous disease included in this study follows the published current Society for Vascular Surgery/American Venous Forum Clinical Practice Guidelines [6-7]. All patients were evaluated with Duplex ultrasound preoperatively and were found to have reflux of the axial vein (reversal of flow induced by distal compression with the patient in standing position >0.5 sec). Each patient's chronic venous insufficiency status was classified using the clinical component of the CEAP classification; C0-no varicose veins, C1-telangiectasias and reticular veins, C2-varicose veins, C3-edema, C4-skin changes, C5-healed ulcer, and C6-active ulcer. Inclusion criteria for this study were symptomatic patients with C2-C5 venous disease and GSV reflux >0.5 sec. Extent and size of varicose veins was classified based on a previously defined scale [8]: Class I ≤ 6 mm and localized to thigh or leg, Class II ≤ 6 mm and involving thigh and leg (extensive), Class III >6 mm and localized to the thigh or leg, and Class IV >6 mm and extensive.

Exclusion criteria were C6 venous disease, prior surgery, history of superficial venous thrombosis, deep venous thrombosis or pulmonary embolism, history of radiation, history of trauma, current pregnancy, or age <18 years.

Endovenous ablation procedure

Details of our technique and follow-up have been previously described [9]. The laser EVA procedure was performed in an office setting, on an ambulatory basis, under local-tumescence anesthesia

without sedation. Access to the vein was obtained at the lowest point of reflux, using a percutaneous technique. A 600 nm laser fiber was used with an 810-nm diode laser generator set at 14 Watts, continuous mode.

Compression therapy

Following the procedure, the extremity was wrapped with an elastic bandage which was left in place for 1 day. Patients in the compression group were instructed to remove the bandage the next day and place a 20 mmHg to 30 mmHg thigh-high compressions stocking to be worn daily for one week. The no-compression group discontinued compression therapy after the initial wrap was removed. Normal activity was encouraged and avoidance of vigorous exercise involving the lower extremities for one week was recommended. Ibuprofen (400 mg every 8 hr) was prescribed for pain control for one week.

Follow-up

Patients were seen one week after the procedure. At that time, a Duplex ultrasound test was performed to assess for successful closure of the treated vein and to rule out the extension of thrombus into the deep vein (DVT). At one month, patients were examined again, and the status of their varicose veins was evaluated visually by the treating surgeon. Objective comparisons were made between pre-procedure and one-month post-procedure using grid/semi-quantification photographs, as previously described [8]. The degree of varicose vein resolution was categorized as no improvement, partial improvement, and complete improvement (Figure 1).

Recorded parameters

These included age, sex, size and extent of varicosities (class I-IV), and diameter and length (patient supine) of axial vein to be treated.

End points

Primary endpoints were: 1) closure of the saphenous vein at 1 week, 2) the degree of visible varicose vein resolution at one-month post-EVA, 3) presence or absence of STP, and 4) presence or absence of DVT.

Statistics

All continuous data are presented as mean values, and categorical values as counts or percentages. Statistical analysis included two-tailed Fisher exact test for calculation of P values for categorical values ($P >0.05$ was significant). A two-tailed Student t-test was used to calculate P values for all continuous variables.

Results

A total of 96 patients and 108 consecutive limbs were included in the study. There were 67 females (67%), and the mean age was 58 years old (29-86). There was no difference between compression and no-compression groups in sex (68.8% vs. 67.3% female), age (59 vs. 56), CEAP class (C2-C3, 88% vs. 92%; C4-C5, 12% vs. 8%), extent of varicose veins (Classes I-II: <6 mm, 57% vs. 66%; Classes III-IV: >6 mm, 43% vs. 34%), type of vein treated (GSV 84% vs. 71%, SSV 8% vs. 17%, accessory 8% vs. 12%) or operative variables (Table 1). Additionally there was no significant difference in the diameter or length of the treated veins between the compression groups versus the no-compression group (Table 2).

There was a 96% follow-up rate at 1week. Four saphenous veins in the compression group remained open ($p=0.0395$). Three patients in the compression group and no patients in the no-compression

Table 1: Demographics.

	Compression	No Compression	P-value
Female	68.8%	67.3%	NS
Age	59	56	NS
CEAP			
• C2-3	88%	92%	NS
• C4-5	12%	8%	NS
Varicosities			
• Classes I-II <6mm	57%	66%	NS
• Classes III-IV >6mm	43%	34%	NS
Type of vein treated			
• GSV	84%	71%	NS
• SSV	8%	17%	NS
• Accessory	8%	12%	NS

Table 2: Diameters and Lengths of Treated Axial Veins.

Compression						
	Proximal D (cm)	SD	Distal D(cm)	SD	Length(cm)	SD
GSV	0.68	0.28	0.48	0.17	33.3	12.2
ASV	0.85	0.41	0.59	0.24	28.6	19.4
SSV	0.47	0.13	0.39	0.13	16.8	12.1
No Compression						
	Proximal D (cm)	SD	Distal D(cm)	SD	Length(cm)	SD
GSV	0.69	0.26	0.46	0.14	35.0	12.4
ASV	0.48	0.11	0.40	0.12	18.8	5.3
SSV	0.41	0.16	0.40	0.11	16.9	4.4
P-value	NS		NS		NS	

P=NS for all values compression vs. no-compression

Table 3: Procedure Outcomes.

	Compression	No Compression	P-value
Saphenous closure (1 week)	91.8%	100%	0.0395
DVT	1/49	0/59	NS
SVT	3/49	0/59	NS

****3 patients/4limbs without closure**

- 1) C2 v4—ASV, prox D 1.2, dist D 0.85, length 16
- 2) C2v3—GSV, prox 0.76, dist 0.69, length 31
- a. C2v3—GSV, prox 0.75, dist 0.74, length 29
- 3) C4v2—GSV, prox 0.42, dist 0.35, length 35

group had STP. One patient in the compression group had thrombus extension up to the saphenofemoral junction (Table 3).

At one month both groups had the same rate of varicose vein regression and need for secondary procedures (Table 4). There was no significant difference in the number of patients who decided to undergo secondary interventions (phlebectomies and/or sclerotherapy), when it was recommended, 52.1% (12/23) in the “compression” group versus 44.8% (13/29) in the “no compression” group, P=0.78.

At 3 months, all patients who followed up had complete resolution of their varicose veins regardless of compression therapy: 19 patients in the compression group, and 14 in the no compression group.

Table 4: Degree of Varicose Vein Resolution at 1 month.

	No improvement	Partial Improvement	Complete Improvement
Compression	1 (2.8%)	22 (61.1%)	13 (36.1%)
No Compression	1 (2.6%)	28 (71.8%)	10 (25.6%)
P-value	NS	NS	NS

Discussion

Compression therapy is widely used as an adjunct to endovenous ablation for the treatment of varicose veins. In our experience however, post-operative compression is a major source of patient complaints. The present study strongly suggests that this addition to EVA therapy does not add any further benefit with respect to varicose vein resolution, saphenous vein closure or incidence of superficial or deep phlebitis. Similar findings were reported by Bakker et al. in a prospective randomized control trial containing a total of 69 patients [1]. They concluded that clinical results and complications were similar whether the stockings were worn for 2 days or 7 days. A contradictory finding in our study was that 4 saphenous veins in 3 patients remained open at 1-week post EVA in the compression group, however all saphenous veins were closed in the no compression group. Further analysis of these patients does not clearly explain this finding. Two patients had C2 venous disease with class III-IV varicose veins, and the third patient had C4 venous disease with class II varicose veins; in comparison to the cohort the clinical severity does not deviate. Additionally the diameters of the treated saphenous veins (0.42 cm - 1.2 cm) are comparable to the range (0.24 cm - 1.68 cm) and average (0.67 cm) of the diameters within the cohort.

A recently published article by Elderman et al. [11] studied the effect of compression therapy use after laser ablation on postoperative pain. In this report, two groups were randomized into the use or no use of elastic stockings for two weeks after ablation, and the result was a very moderate decrease in post-operative pain in the compression group. We did not evaluate this parameter in our study, but it is our clinical impression that the effect on postoperative pain reduction is if anything minimal and greatly overshadowed by the discomfort and inconvenience elicited by the use of compression therapy, i.e. elastic bandages or compression stockings.

An important limitation of this study is the lack of randomization. The initial intent of this research was to randomize, but upon giving informed consent and stating the possible risks of not using post-procedure compression i.e. incomplete closure of the treated vein, increased risk of SVT or DVT, incomplete varicose vein regression; it became very difficult to recruit patients into the no-compression arm of the study. We therefore desisted randomization and performed the study as it is been reported here. Moving forward, the current non-randomized data makes it more feasible to randomize future patients as it demonstrates that no compression does not increase risk of DVT, SVT, or incomplete venous closure. Furthermore, the determination of whether patients were entered into the compression or no compression was performed by the operating surgeon at the time of the procedure, and thus could be a source of selection bias. Finally, no objective quality of life assessment was utilized in this study.

In conclusion, the present study strongly suggests that compression therapy does not add any further benefit to endovenous ablation in terms of saphenous vein closure, incidence of SVT, DVT or varicose vein regression. Since compression is a major postoperative

complaint, consideration should be given to eliminating it, thus simplifying and improving the postoperative recovery. For a more definitive answer to this issue, a larger, prospective randomized study with quality of life assessment is needed.

References

1. Bakker NA, Schieven LW, Bruins RMG, van den Berg M, Hissink RJ. Compression Stockings after Endovenous Laser Ablation of the Great Saphenous Vein: A Prospective Randomized Controlled Trial. *Eur J Vasc Endovasc Surg.* 2013;46(5):588-92.
2. Biswas S, Clark A, Shields DA. Randomised clinical trial of the duration of compression therapy after varicose vein surgery. *Eur J Vasc Endovasc Surg.* 2007;33:631-7.
3. Houtermans-Auckel JP, van Rossum E, Teijink JAW, Dahlmans AA, Eussen EF, Nicolai SP, et al. To wear or not to wear compression stockings after varicose vein stripping: A randomised controlled trial. *Eur J Vasc Endovasc Surg.* 2009;38:387-91.
4. Lugli M, Cogo A, Guerzoni S, Petti A, Maleti O. Effects of eccentric compression by a crossed-tape technique after endovenous laser ablation of the great saphenous vein: a randomized study. *Phlebology* 2009;24:151-6.
5. Eklof B, Perrin M, Delis KT, Rutherford RB, Gloviczki P; American Venous Forum, et al. Updated terminology of chronic venous disorders: the VEIN-TERM transatlantic interdisciplinary consensus document. *J Vasc Surg.* 2009;49:498-501.
6. Gloviczki P, Comerota AJ, Dalsing MC, Eklof BG, Gillespie DL, Gloviczki ML, et al. The care of patients with varicose veins and associated chronic venous diseases: Clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum. *J Vasc Surg.* 2011;53:2S-48S.
7. Nicolaidis AN, Allegra C, Bergan J, Bradbury A, Cairois M, Carpentier P, et al. Management of Chronic Venous Disorders of the Lower Limbs Guidelines According to Scientific Evidence. *Int Angiol.* 2008;27(1):1-59.
8. Kokkosis A, Schanzer H. Anatomical and clinical factors favoring the performance of saphenous ablation and microphlebectomy or sclerotherapy as a single-stage procedure. *Phlebology.* 2015.
9. Schanzer H. Endovenous Ablation plus Microphlebectomy/Sclerotherapy for the Treatment of Varicose Veins: Single- or Two-Stage Procedure? *Vasc Endovasc Surg.* 2010;44(7):545-9.
10. Huang TW, Chen SL, Bai CH, Wu CH, Tam KW. The Optimal Duration of Compression Therapy Following Varicose Vein Surgery: A Meta-analysis of Randomized Controlled Trials. *Eur J Vasc Endovasc Surg.* 2013;45:397-402.
11. Elderman JH, Krasznai AG, Voogd AC, Hulsewé KW, Sikkink C. Role of compression stockings after endovenous laser therapy for primary varicosis. *J Vasc Surg: Venous and Lym Dis.* 2014;2:289-96.