

Subject Area:

Radiofrequency endogenous ablation and concomitant sclerotherapy

Ihab N. A. Hanna

National Institute of Diabetes and Endocrinology, doctorihabhanna@gmail.com

Khaled ElKafas

Cairo University

Follow this and additional works at: <https://jmisr.researchcommons.org/home>



Part of the [Medical Sciences Commons](#), and the [Medical Specialties Commons](#)

Recommended Citation

A. Hanna, Ihab N. and ElKafas, Khaled (2020) "Radiofrequency endogenous ablation and concomitant sclerotherapy," *Journal of Medicine in Scientific Research*: Vol. 3: Iss. 4, Article 8.

DOI: https://doi.org/10.4103/JMISR.JMISR_88_20

This Original Study is brought to you for free and open access by Journal of Medicine in Scientific Research. It has been accepted for inclusion in Journal of Medicine in Scientific Research by an authorized editor of Journal of Medicine in Scientific Research. For more information, please contact m_a_b200481@hotmail.com.

Radiofrequency endogenous ablation and concomitant sclerotherapy

Ihab N.A. Hanna^a, Khaled ElKafas^b

^aDepartment of Vascular Surgery, National Institute of Diabetes and Endocrinology, ^bDepartment of Radiology, Cairo University, Cairo, Egypt

Abstract

Background

Varicose veins are a widespread disease with various treatment modalities ranging from classic saphenofemoral crosssection and ligation and stripping to various minimally invasive interventional procedures. The era of endovenous interventions has now stabilized head to head in results with surgical procedures, hence the shift to minimally invasive procedures. All minimal invasive endovenous procedures have excellent results, particularly when correctly selected according to the varicose vein case and the treated vein. Thermal ablation techniques are now established and have reliable and satisfactory outcomes, yet nonthermal techniques have offered further options. This article provides a novel approach combining the usage of radiofrequency endovenous ablation (RFA) simultaneously with transcatheter and transsheath ultrasound-guided foam sclerotherapy.

Patients and methods

We enrolled 50 patients with Duplex-confirmed primary varicose vein who had RFA and concomitant sclerotherapy. All patients were followed up by Duplex 1 week later and at 1- and 6-month intervals.

Results

In our study, we enrolled 50 patients, comprising 33 males and 17 females. Mean age was 45.36 years. The most frequent symptoms were pain (42%), swelling (28%), and fatigue (30%). Vein diameters ranged from 6 to 12 mm. Superficial thrombophlebitis in three patients was managed successfully by Clexane. One case developed endovenous heat-induced thrombosis (EHIT) and was treated by new oral anti coagulant (NOAC) Duplex assessment. All cases remained closed by Duplex at month, with vein ablation seen by the Duplex. The case with EHIT resolved ultimately on NOAC at 3 months, and the case of superficial thrombophlebitis at 1 month revealed adequate recanalization and relief of symptoms. Only one patient mentioned nonconvenient results, not meeting her expectations.

Conclusion

Combining foam sclerotherapy and RFA seems a safe and effective modality and should be explored in further studies.

Keywords: Radiofrequency, transsheath foam sclerotherapy, transcatheter foam sclerotherapy, ultrasound guided

INTRODUCTION

The varicosities in lower limbs and their complications have a significant socioeconomic burden; varicose veins are estimated to affect more than 20% of the general population [1].

Different treatment modalities are known, including high ligation, stripping and phlebectomy, laser thermal ablation or endovenous radiofrequency, and foam sclerotherapy as endovenous chemical ablation or embolization with cyanoacrylate. All these treatments have different degrees

Correspondence to: Ihab N.A. Hanna, MD, Department of Vascular Surgery, National Institute of Diabetes and Endocrinology, Cairo, Egypt.
Tel: +20 122 329 5085.
E-mail: doctorihabhanna@gmail.com

Access this article online

Quick Response Code:



Website:
www.jmsr.eg.net

DOI:
10.4103/JMISR.JMISR_88_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Submitted: 07-Aug-2020 Revised: 17-Aug-2020 Accepted: 07-Oct-2020 Published: 23-Dec-2020

How to cite this article: Hanna INA, ElKafas K. Radiofrequencyendogenous ablation and concomitant sclerotherapy. J Med Sci Res 2020;3:289-92.

of both clinical and radiological success parameters, and meanwhile, there is variable recurrence rate in treated limbs in the medium to long term, which is expected about 30% at 5 years by some authors [2].

Although often it was reported as a cosmetic problem by the general population, varicose veins may cause symptoms such as pain, swelling, fatigue, leg heaviness, itching, restless leg syndrome, burning sensation, ulcers, and in many cases, result in restriction of movement and loss of ability to work [3].

Safety and effectiveness of endovenous thermal ablation techniques are comparable alternatives to longstanding surgical treatments in the greater saphenous vein (GSV) varicosities. The radiofrequency endovenous ablation (RFA) is a common technique that achieves venous occlusion by the application of heat to the vein wall via a percutaneously introduced catheter into the lumen of the vein [4]. Endovenous ablation techniques, as shown from meta-analyses data, are at least as equivalent to classical surgery in terms of efficacy and safety yet superior in terms of complications, pain, and ecchymosis development, time until return to regular daily life activity, and patient satisfaction [5].

Ultrasound-guided foam sclerotherapy (UGFS) is known in many studies for its inferiority in the rate of venous occlusion compared with other endovenous methods, such as surgery and radiofrequency or laser [6,7].

Given the efficacy and protection of UGFS in the treatment of saphenous veins, perforators, tributaries, venous ulcers, venous malformations, and recurrences [8], yet studies indicate a higher occurrence of saphenous diameter recanalization rates [9].

The catheter usage, as the means of sclerosant foam delivery, has been tried to deliver more sclerosing material to improve the results [10]. After insinuating the catheter in a vein and with the aid of the use of ultrasound-guided perisaphenous infiltration of the tumescent anesthesia thus reducing the vein caliber, hence blood amount inside, before foam delivery [11].

Cavezzi *et al.* [12] conducted a prospective observational study to assess the results of transcatheter sclerotherapy foam of the great saphenous vein, with perivenous infiltration with tumescent anesthesia and intrasaphenous irrigation with normal saline, in combination with phlebectomy of the varicose tributaries in terms of short and mid-term safety and efficacy. They concluded that their technique was both safe and effective at short/mid-term follow-up in terms of clinical and Duplex-based outcomes.

Initially, the manufacturer of RFA closure fast catheter recommended that the catheter should be positioned 0.5–1 cm from the femoral vein. However, this distance was associated with a higher extension than expected of thrombus from the saphenofemoral junction (SFJ) into the femoral vein. Consequently, the recommendation changed to distance the catheter tip position to not less than 2 cm, to decrease the

incidence of thrombus formation and extension into the femoral vein [13].

Aim

The aim was to assess the safety and efficacy of concomitant use of RFA and transcatheter and transsheath foam sclerosing material sclerotherapy.

PATIENTS AND METHODS

In our study, we enrolled 50 patients, comprising 32 males and 18 females, attending the vascular clinic at Greek Hospital Alabassia during the period from April 2018 to April 2019. Patients with symptomatic varicose veins with great saphenous vein incompetence were included in the study.

Inclusion criteria

(1) Primary varicosities with the incompetence of the GSV (reflux >0.5 s) with or without reflux of the SFJ terminal valve were included.

Exclusion criteria

The following were the exclusion criteria:

- (2) Polidocanol allergy.
- (3) Thrombophilia (e.g. AT III deficit, protein C, and protein S).
- (4) Severe peripheral arterial occlusive disease (e.g. the basal ankle-brachial index under 0.5).
- (5) Deep venous thrombosis (acute).
- (6) Symptomatic patent foramen ovale.
- (7) Thrombosis in superficial veins.
- (8) Immobility.
- (9) Cardiac or kidney failure disease.
- (10) Pregnancy.
- (11) Active cancer.

Patients gave their informed consent to the treatment and the study protocol after they were fully informed about the interventional procedures.

Patients were preoperatively mapped and marked by Duplex ultrasound (Fig. 1). They lied supine in Trendelenburg position and were prepared. A 7-Fr sheath is insinuated to the GSV under Duplex guidance just above or below the knee level. The RF catheter is advanced till 2 cm distal to the SFJ (Fig. 2). Duplex-guided tumescent anesthesia is initiated, and usually, five to six punctures are needed [Fig. 2]. Now the 2 ml of freshly prepared foam sclerotherapy of polidocanol 1% repaired by Tessari method is injected in transcatheter (Fig. 3) slowly without pressure, followed by the pullback of RF catheter and firing of two cycles in the first time followed by one cycle at a time till reaching the sheath. Lastly, a final one cc of foam is injected in the sheath, which is then pulled out, and pressure garments are immediately applied. Elastic stockings are used for 1 month, and the patient is allowed to ambulate after one hour and resume daily activities on the following day except for heavy strain workload. Postoperative analgesia is



Figure 1: Preoperative mapping. Same patient clinical end result.



Figure 3: Foam coming out of end of catheter.

usually not needed. Postoperative Duplex is done at 1 week, 1 month, 3 months, and 6 months (Fig. 4).

RESULTS

In our study, we enrolled 50 patients, comprising 33 males and 17 females. The mean age was 45.36 years, with a minimum age of 28 years and a maximum age of 75 years. During diagnosis, the most frequent symptoms were pain (42%), swelling (28%), and fatigue (30%). Venous diameters ranged from 6 to 12 mm.

All patients were performed under tumescent anesthesia with adjuvant sedation during injection of the tumescent anesthesia and were preferred to safeguard against burn caused by overheating, then if and when it occurred, an extra dose of tumescent anesthesia was then injected at that region. The pain levels were obtained using the visual scoring system of Wong-Baker. The highest score was 5 (one patient), the lowest score was 1, and the mean score was 1.54.

All patients were followed up by ultrasound Duplex as per the protocol. All had occluded great saphenous vein. Only

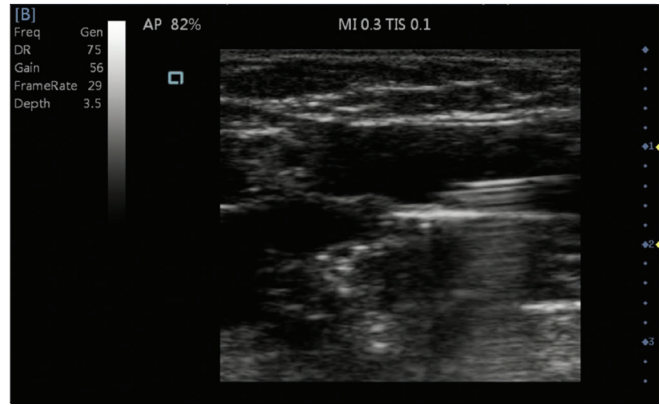


Figure 2: RF catheter in place and tumescent anesthesia given under Duplex guidance.

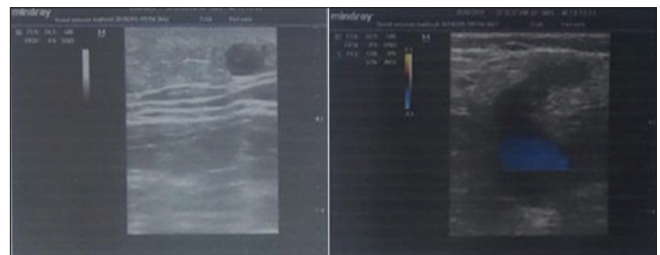


Figure 4: Postoperative Duplex 1 week later shows successful ablation of GSV and its related anterior lateral tributary in thigh with competent SFJ with no proximal heat-induced thrombosis. SFJ, saphenofemoral junction.

three patients developed superficial thrombophlebitis and were anticoagulated by Clexane subcutaneous and resolved ultimately.

One case developed EHIT grade 1 and was treated by NOAC. Duplex assessment and patient's interrogation about the satisfaction of treatment were repeated at 1 week and at 1-, 3-, 6-month intervals.

All cases remained closed by Duplex at month with vein ablation seen by the Duplex. The case with EHIT resolved completely on NOAC at 3 months, and the case of superficial thrombophlebitis at 1 month revealed adequate recanalization and relief of symptoms. Only one patient mentioned nonconvenient results not meeting her expectations.

DISCUSSION

While in many countries, surgical ligation and stripping continue to be the standard treatment of varicose veins, endovenous thermal ablation has become the preferred procedure according to the current international guidelines and recommendations [14]. Effectiveness of large GSV foam sclerotherapy can require the use of higher doses of sclerosant content, which may affect the safety of UGFS [15].

Using the present technique, it was possible to use quite low doses of sclerosing materials in large GSVs in conjunction with endovenous ablation by radiofrequency. Connor *et al.* [16] described evidence that blood sclerosant inactivation is more

pronounced to a certain distance from the injection site; hence, the use of a catheter may limit the effect to the area of fresh foam injection in minimal amounts rather than injection along with the entire targeted patent GSV.

The ideal synergistic effect of two potent safely methods that are achieved by radiofrequency 2 cm apart from SFJ thus diminishing EHIT, with foam sclerotherapy in minimal dose with perivenous tumescent and ultrasound guidance to act on the initial 2 cm, as well as the final step of the procedure through the sheath, is very appealing, particularly when tacking in consideration that a recent randomized controlled trial of catheter foam sclerotherapy versus radiofrequency found no statistically significant differences in vein occlusion and short-term outcomes recorded by patients [17].

Ultrasound-guided perisaphenous tumescence infiltration has added efficacy and safety when using sclerosant foam injected via a radiofrequency catheter, where the tumescent mechanical and chemical (adrenaline) action ultimately results in a narrowing the caliber of the vein before foam injection.

CONCLUSION

Combining foam sclerotherapy and RFA seems a safe and effective modality, yet further studies to confirm this are highly recommended.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Rabe E, Pannier F. Epidemiology of chronic venous disorders. In: Gloviczki P, ed. *Handbook of venous disorders. Guidelines of the American Venous Forum*. 3rd ed.. London: Hodder Arnold; 2009. 105–112.
- Van der Velden SK, Biemans AA, De Maeseneer MG, Kockaert MA, Cuyppers PW, Hollestein LM, et al. Five-year results of a randomized clinical trial of conventional surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy in patients with great saphenous varicose veins. *Br J Surg* 2015; 102:1184–1194.
- De Maeseneer M, Cavezzi A. Etiology and pathophysiology of varicose vein recurrence at the sapheno-femoral or sapheno- popliteal junction: an update. *Veins Lymph* 2012; 1:10–14.
- Braithwaite B, Hnatek L, Zierau U, Camci M, Akkersdijk GJ, Nio D, Sarlija M, Ajduk M, Santoro P, Roche E. Radiofrequency-induced thermal therapy: results of a European multicentre study of resistive ablation of incompetent truncal varicose veins. *Phlebology*. 2013;28:38–46.
- 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; 49:230–239.
- 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. *British Journal of Surgery*. 2011;98:1079–87.
- O'Flynn N, Vaughan M, Kelly K. Diagnosis and management of varicose veins in the legs: NICE guideline. *Br J Gen Pract* 2014; 64:314–315.
- Rabe E, Otto J, Schliephake D, Pannier F. Efficacy and safety of great saphenous vein sclerotherapy using standardised polidocanol foam (ESAF): a randomised controlled multicentre clinical trial. *European Journal of Vascular and Endovascular Surgery*. 2008;35:238–45.
- Cloridge Smith P. Sclerotherapy and foam sclerotherapy for varicose veins. *Phlebology* 2009; 24:260–269.
- Milleret R, Garandau C, Brel D, Allaert FA. Sclerosis of the large saphenous veins with foam delivered by ultrasound-guided catheter on empty vein "alpha-technique". *Phlebology*. 2004;57:15–8.
- Cavezzi A, Mosti G, Di Paolo S, Tessari L, Campana F, Urso SU. Ultrasound-guided perisaphenous tumescence infiltration improves the outcomes of long catheter foam sclerotherapy combined with phlebectomy of the varicose tributaries. *Veins and Lymphatics*. 2015;4.
- Cavezzi A, Mosti G, Campana F, Tessari L, Bastiani L, Urso SU. Catheter foam sclerotherapy of the great saphenous vein, with perisaphenous tumescence infiltration and saphenous irrigation. *European Journal of Vascular and Endovascular Surgery*. 2017;54:629–35.
- VNUS Medical Technologies. Important update regarding the use of the VNUS Closure Fast Catheter, 2007. Available at: <https://sites.google.com/a/endovnustraining.com/vnuscourse/home/vnus-practice> [Last Accessed on 2018 Jan].
- O'Donnell TF, Passman MA, Marston WA, Ennis WJ, Dalsing M, Kistner RL, Lurie F, Henke PK, Gloviczki ML, Eklöf BG, Stoughton J. Management of venous leg ulcers: Clinical practice guidelines of the Society for Vascular Surgery® and the American Venous Forum. *Journal of Vascular Surgery*. 2014 ;60:3S–59S.
- Cavezzi A, Parsi K. Complications of foam sclerotherapy. *Phlebology* 2012; 27:46–51.
- Connor DE, Joseph JE, Exner T, Ma DD, Parsi K. Infusion of foam sclerosants results in a distance-dependent procoagulant activity, haemoconcentration and elevation of D-dimer levels. *Phlebology*. 2014 Dec;29(10):677–87.
- Mishra MK, Soni RK, Mohil RS, Sinha A. Comparative study of outcome of duplex ultrasound-guided, catheter-directed foam sclerotherapy and radio-frequency ablation in the management of great saphenous varicose veins. *Indian Journal of Surgery*. 2016;78:375–81.