

RESEARCH ARTICLE

Radiofrequency Endovenous Ablation: A Safe and Effective Modality for Varicose Veins Treatment

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ABSTRACT

Varicose veins are dilated, tortuous superficial veins, causing aching pain, swelling, and cramps in the affected lower limb. The key behind having such a problem is venous insufficiency after valve failure in the involved dilated vein. Surgery was the standard procedure for removing these dilated veins. A new era of treatment emerged, where endovenous radiofrequency ablation is applied under local and tumescent anesthesia by the aid of Doppler ultrasound. This study aims to assess the safety and efficacy of radiofrequency ablation in treating varicose veins. Our center is the first center in Baghdad, Iraq using this technique for treating varicose veins. Forty-five patients with varicose veins were enrolled in a prospective study from October 2017, through March 2019, aged 20–56 years; females 27 (60%), and males 18 (40%). Their veins were scanned by Doppler ultrasound and were diagnosed as having venous insufficiency; a total of sixty veins were ablated by radiofrequency, fifty (83%) long saphenous veins, and only ten (17%) short saphenous veins. The patients were scored clinically using comprehensive classification system for chronic venous disorders (CEAP) clinical score, 75% of patients were C2-C4, while only 25% of patients C5-C6. The time for each limb was around 20 minutes. A 100% technical success, and an excellent vein occlusion rate postoperatively. No postoperative complications were noted. After 1-week', 1-month', and 6 months' follow-up, there was an improvement in CEAP clinical score, an early post-procedure return to daily activities. Therefore, endovenous radiofrequency ablation shows excellent results in terms of safety, efficacy, and patient satisfaction.

Keywords: Endovenous radiofrequency ablation, Varicose veins, Venous insufficiency.

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INTRODUCTION

Varicose veins are dilated, tortuous superficial veins, which usually affect the lower extremities. Reflux in the long saphenous vein is vital in the progress of signs, besides symptoms of long-lasting venous inadequacy. Furthermore, producing symptoms, like swelling of the leg, heaviness plus calf pain, and shallow venous inadequacy, may lead to severe restrictions in usual everyday actions and a deprived class of life, due to the development of venous hypertension, as the complication consists of ulceration of the skin, even in the nonappearance of deep venous inadequacy.¹ Lower limb venous insufficiency is a widespread condition and affects about 25% of the population.² For many decades, open surgery was the “gold standard” for the treatment of varicose veins, which involves the ligation and/or removal of the involved insufficient vein.³ Five years after surgery, the recurrence rate is 25 and 50%, for the long and short sphenous veins, respectively. In addition to recurrence, other cons for open surgery is that it is performed under general or spinal anesthesia, long postoperative stay in

bed with a financial burden to the patient, patient left with two long incisions at least, wound infection, postoperative pain, and hematoma, neural, vascular, and lymphatic damage.⁴ To avoid the mentioned postoperative complications associated with open surgery, new modalities for varicose veins treatment have been used. One of those modalities is radiofrequency venous ablation (RFA), where an endovenous thermal ablation technique is done aiming to obliterate the treated vein segment by thermal injury to the venous wall.⁵ This study aims to evaluate and assess the safety and clinical effectiveness of RFA in treating varicose long and short sphenous veins.

METHODS

Forty-five patients underwent RFA from October 2017 till March 2019, in an outpatient-based clinic in Baghdad. In Iraq, our center is the first one to use the second-generation Closure Fast™ catheter (Covidien), in treating varicose veins. The patients were enrolled in a prospective study, with 1-week, 1-month, and 6 months duplex scan follow-up after RFA. The

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patients were scanned with duplex ultrasonography for venous insufficiency and were scored clinically, according to the CEAP clinical classification system (Table 1).

- Patients were selected in terms of:
- having venous insufficiency (long, short saphenous veins),
- vein diameter ≥ 5 mm,
- subcutaneous thickness ≥ 5 mm,
- absence of severe tortuous treated vein, and
- previous surgical and/or endovenous treatment.
- The following patients were excluded from the study:
- patients with deep venous thrombosis,
- post-thrombotic syndrome,
- superficial thrombophlebitis,
- pregnancy,
- immobility,
- vein diameter less than 5 mm,
- peripheral arterial insufficiency,
- severe tortuosity of the treated vein,
- bleeding disorders, and
- patients having allergy for local anesthesia.

An informed consent was taken from all patients. The RFA technique included the use of a catheter rod to bring alternative radiofrequency that had high rate frequency that cause venous shrinkage, collagen reduction, and physical shrinkage. The leg of the patient was prepared by washing it with an antiseptic solution and dressed in a disinfected manner. Used local anesthesia with ultrasound direction, put the cannula in the vein, added tumescent anesthesia locally, consisting of normal saline 400 mL, 1% lidocaine 40 mL, 7.5% sodium bicarbonate 5 mL, and 1:100,000 of epinephrine, and then

introduced around the target vein. The catheter was introduced through a sheath. The radiofrequency was transported, causing in round similar denaturation collagen ground, besides endothelial damage at increased temperature 110–120°C of target vein. 3–7 cm in distance of venous sections treated in 20 seconds. Patients made to wear 20–30 mm Hg progressed compression socks made from elastic materials for 14 days. Post-RFA patients were evaluated in terms of technical success, return to normal daily work, patient satisfaction, CEAP clinical improvement, and post-procedure complications. The analysis of data was carried out using the Statistical Packages for Social Sciences Version 20.0 (SPSS 20.0). The data were presented in the form of tables of frequency and percentage.

RESULTS

The age ranged from 20 to 65 years with a median age of 37.9. Females were 27 (60%), while males comprise only 18 (40%). RFA, 50 (83%) long saphenous veins, and only 10 (17%) short saphenous veins, ablated 60 total legs (Table 2).

8 patients (18%) were treated for both long saphenous vein (LSV) and short saphenous vein (SSV), concomitantly; while, only one patient (2%) ablated for SSV. For the CEAP clinical score, about 75% of patients were classified into C2-C4, and only 25% of patients scored into C5-C6. The time for the procedure was about 20 minutes per limb. All the patients returned to their normal daily activity directly after the procedure. No need for hospitalization. The technical success rate was 100%. One-week follow-up after the procedure, the vein occlusion rate was 93%, 100% after one-month, but after six months follow-up, only one patient had partial recanalization. In regards to CEAP clinical score, there was an improvement in 15 cases (33%) one-week post-RFA, 25 cases (56%) one-month later, and 38 cases (84%) after 6 months. No post-procedure complications were noted in terms of wound infection, hematoma, bleeding, or nerve injury. The pain was tolerable and controlled by analgesics for not more than two days.

DISCUSSION

A new era for the treatment of chronic venous insufficiency has emerged, where the classical surgical method “stripping” evolved to a minimally invasive endovenous ablation by radiofrequency. In the classical surgical way, the diseased, dilated vein is stripped out of the body, whereas endovenous radiofrequency ablation keeps the vein inside the body, but exclude it out of the circulation. The ablation leads to obliteration of the vein and its fibrosis. The advantages of RFA are less pain after the operation, enhanced high class of life, and fasten reoccurrence to daily actions and effort.⁶ Our study shows an excellent occlusion rate of the saphenous veins, as other studies.⁷ Patients return to their daily activities shortly after the procedure of RFA, with negligible complications after the procedure.⁸ In regards to CEAP clinical score, there is an improvement in the symptoms that patients experienced before RFA, e.g., lower limb edema, which disappeared after RFA. Therefore, RFA for the treatment of venous insufficiency was effective, safe, and convenient for patients.⁹

Table 1: Clinical CEAP classification

| <i>C: Clinical classification</i> | |
|-----------------------------------|--|
| C0 | No visible or palpable signs of venous disease |
| C1 | Telangiectasia or reticular veins |
| C2 | Varicose veins |
| C3 | Edema |
| C4 | Pigmentation or eczema |
| C5 | Healed venous ulcer |
| C6 | Active venous ulcer |

Table 2: Patient's characteristics

| | No. | Percentage (%) |
|----------------------|-----|----------------|
| Total patients | 45 | - |
| Female | 28 | 60 |
| Male | 17 | 40 |
| Total treated veins | 60 | - |
| Long saphenous vein | 50 | 83 |
| Right leg | 32 | 53 |
| Left leg | 18 | 30 |
| Short saphenous vein | 10 | 17 |
| Right leg | 4 | 7 |
| Left leg | 6 | 10 |

CONCLUSION

The RFA for treating venous insufficiency is a safe, efficacious, and short procedure. It can be made in an outpatient-based office, with no need for patient hospitalization, and early return to daily activities and work post-procedure. The minimally invasive procedure with no stitches to be used, so no postoperative wound infection, under local anesthesia, and with an excellent appealing aesthetic outcome. The only pitfall is the tortuous varicose veins that can only be treated by classical surgical procedures.

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