VARICOSE VEIN SURGERY BY RADIOFREQUENCY ABLATION:

IMMEDIATE AND 6-MONTH POSTOPERATIVE EVALUATION OF THE TREATMENT FOR GREAT SAPHENOUS VEIN INSUFFICIENCY

ABSTRACT:

Introduction: The so-called internal saphenectomy has been the standard surgical treatment for many years. The advent of the treatment of venous insufficiency by thermal ablation in the 90's introduced the possibility of performing minimally invasive procedures, with the radiofrequency ablation of the saphenous vein among these options.

Aim: To evaluate prospectively and by Doppler scanning the radiofrequency ablation treatment for great saphenous vein insufficiency.

Materials and method: Between April and December 2015, a longitudinal prospective study was conducted on 50 cases (31 women, 19 men; 19 - 80 years old, with a median of 51 years) treated for chronic great saphenous vein insufficiency with varicose vein surgery by endovenous radiofrequency ablation. The treatment indication included the following patients according to the Clinical, Etiologic, Anatomic and Pathophysiologic (CEAP) classification: CEAP2 (n=31), CEAP3 (n=3) and CEAP4a (n=16). Twenty five of the 50 patients treated were associated with micro-incision phlebectomy of insufficient epifascial tributaries in the treated leg. All patients were controlled at the clinic, where a Doppler scan was performed on them to check the closure of the great saphenous vein treated and they were examined for pain and other complications.

AUTHORS:

LEGUIZAMÓN, M.;

ARLORO, V.;

PAOLINI, J. E.;

GIRALDEZ, N.;

FROSCH, M.;

MÉNDEZ M. S.;

COHEN, C. I.;

LAMELZA, V.

Peripheral Vascular Surgery Service of Sanatorio Dr. Julio Méndez, City of Buenos Aires.

CORRESPONDENCE:
mail: cvascularobsba@gmail.com

Results: The clinical remission of the effects of the great saphenous vein insufficiency treated was observed from the first month after treatment in all patients. At the same time, a Doppler scan found that 62% (n=31) of patients had great saphenous vein occlusion 2 cm from the saphenofemoral junction. No patient presented deep venous thrombosis or thrombus migration. As to follow-up, 36% (n=18) received follow-up care for nine months and 64% (n=32) for six months. Using the verbal numerical scale for pain assessment, 86% (n=43) of patients said they felt no pain, 2% (n=1) had mild pain, 10% (n=5) felt moderate pain and 2% (n=1) suffered from severe pain. As for procedure-related complications, 2 patients presented infection on the puncture site that was treated with antibiotics, 4 patients felt pain that required a combination of NSAIDs and pregabalin for its resolution, while 2 patients were treated with a centrally acting analgesic, NSAID and pregabalin for its treatment. Ecchymosis at the thigh level was observed in 2 cases.

Conclusions: The results obtained in relation to the closure of the insufficient great saphenous vein and the clinical remission of symptoms in all cases make varicose vein surgery by endovenous radiofrequency ablation a safe and effective technique. While reported complications are comparable to the results published for endovenous treatments, they correspond to the beginning of the learning curve for the procedure.

Keywords: Endovenous thermal ablation, varicose vein surgery by radiofrequency, superficial venous insufficiency.

INTRODUCTION

Since Friedrich Trendelenburg's description[1] of his operative technique of great saphenous vein ligation in 1891, open surgical therapy has been the mainstay of the treatment of patients with symptomatic chronic venous insufficiency. John Homans in 1916 advocated the technique of ligation of tributaries at the saphenofemoral junction[2], and Keller[3] and Mayo[4] promoted the saphenous vein stripping technique in the early 1900. Recently, minimally invasive endovenous techniques that reduce postoperative complications and improve recovery time and quality of life in comparison with standard surgical techniques have been introduced for the treatment of varicose pathology.[1] Our working group has applied the technique of

endovenous radiofrequency ablation for the treatment of great saphenous vein insufficiency. The purpose of our work was to prospectively evaluate by Doppler scanning the immediate and 6-month results of the radiofrequency ablation treatment for great saphenous vein insufficiency.

MATERIALS AND METHODS

Radiofrequency ablation is the controlled denaturation of collagen in the vein wall by heat, with the consequent collapse of its lumen.[1] To this end, a 7F endovenous radiofrequency ablation catheter 100 cm long connected to a RF energy generator is used.

In the period between April and December 2015, a longitudinal prospective study of clinical follow-up was conducted by collecting information about 50 patients diagnosed with great saphenous vein insufficiency by ultrasound scan that underwent radiofrequency ablation surgery in our Service. The treated population consisted of 31 women and 19 men between 19 and 80 years, with a median of 51 years. Clinic postoperative controls were performed for 6 months to evaluate the clinical response and ultrasonographic changes in order to verify the degree of procedure-induced thrombosis of the great saphenous vein.[2]

The selection of patients with symptomatic venous insufficiency was based on the Clinical, Etiologic, Anatomic and Pathophysiologic (CEAP) classification and included CEAP1 to CEAP4 stage patients with irregular response to medical treatment, in whom saphenofemoral junction and/or great saphenous vein insufficiency, with or without collaterals, was observed by ultrasound scan (Figure 1).

CEAP classification for chronic venous disease
C0 No visible or palpable signs of venous disease
C1 Telangiectasies or reticular veins
C2 Varicose veins
C3 Edema
C4a Pigmentation and eczema
C4b Lipodermatosclerosis and atrophie blanche
C5 Healed venous ulcer
C6 Active venous ulcer

Eight of the 50 patients had received previous treatment with sclerotherapy in other institutions, 2 with microsurgery and 1 with both procedures. Initial medical treatment included elastic compression stockings (mostly with 8/15-mmHg

compression), associated with oral venotonics (diosmin-hesperidine) and a change of habits of the patient (exercises, change of footwear, no prolonged standing position, rest in the Trendelenburg position). Doppler scanning was used as the diagnostic method, determining reflux time above 500 milliseconds and saphenous vein diameter over 25 mm[3].

For the preoperative evaluation, standard pre-surgical studies were performed with laboratory tests, including blood count and coagulation profile, and basic cardiac evaluation. The studies of all patients showed acceptable parameters, with low surgical risk.

Surgical technique

The procedure was performed at an operating room on all patients and under spinal anesthesia in 38 patients, local anesthesia associated with neuroleptanalgesia in 10 patients and general anesthesia in 2 patients (Figure 2). An ultrasound mapping was performed on the great saphenous vein at pre-malleolar level and at the saphenofemoral junction. The affected saphenous vein was acceded at pre-malleolar level or at the middle third of the leg by ultrasound-guided puncture (n=30) or by pre-malleolar dissection (n=20) (Figure 3). A 7F introducer with hemostatic valve and, through it, an endovenous RF ablation catheter (ClosureFast) connected to the generator were placed using the Seldinger technique. The position of the end of the catheter was controlled by ultrasound scan as it must be 2 cm below the saphenofemoral junction.[4] A tumescent solution (250 ml of saline solution with 20 ml of lidocaine 2%) was infiltrated along the saphenous vein to compress the vein over the catheter and to protect the saphenous nerve, skin and subcutaneous cell tissue from its heat. The generator was set at a temperature of 120°, with pulses of a maximum of 20 seconds. It has a security system that supports a maximum of 25 watts of power to reach this temperature and, from that level, it is disabled to avoid thermal complications in the patient. Endovenous ablation was performed under a proximal to distal approach; to this end, two cycles of ablation were used in the first segment of the great saphenous vein and in the segments with insufficient perforating veins. It was very important not to apply radiofrequency below the upper third of the leg to prevent damage to the nerve.

A phlebectomy of varicose epifascial tributaries was performed in 25 cases using the Müller technique, and a ligation of the saphenofemoral junction associated with varicose vein surgery was performed in 2 cases.[5] Once the

procedure was completed, the induced thrombosis was checked by ultrasound scan and compression bandaging of the whole lower limb was applied.

A first postoperative control was performed at the outpatient clinic 7 days after the intervention to assess the clinical response. Subsequent controls took place after 30, 60, 90 and 180 days and included Doppler scanning performed by members of the team to determine the evolution of the venous occlusion and to track possible complications.

RESULTS

Out of the 50 patients operated on, 5 needed 24-hour hospitalization and the rest were outpatients with hospital discharge on the day. Two of the hospitalized patients were operated on in both lower limbs and the remaining 3 presented irregular anesthesia recovery, requiring more observation time.

Thirty-nine patients did not have postoperative pain and resume their usual activities between 5 and 21 days later (Figure 4).

The most common complications included: hypoesthesia on the front of the operated leg in 14 patients, with spontaneous resolution; infection of the puncture site (3 patients); neuralgia in ankle (3 patients); hematoma (2 patients); anesthesia in ankle (2 patients); malleolar collection (1 patient) and telangiectasies (1 patient) (Figure 5).

Ultrasound scanning control showed thrombosis of the saphenous vein in 90% of patients, mostly as from 2 cm from the saphenofemoral junction (31 patients), 9 patients as from 4 cm, 3 cases as from 15 cm from the junction, 2 cases as from 10 cm from the junction, 4 cases as from the lower third of the thigh. Reflux was found in none of the cases with recanalization (Figure 6).

The medical discharge with vocational rehabilitation occurred after 15 days in 25 patients, after a week in 7 patients, after 3 weeks in 7 patients, and after longer periods in the rest due to postoperative complications (Figure 7).

DISCUSSION

Chronic venous insufficiency is a prevalent disease largely affecting the labor force with significant social and economic consequences.

Varicose vein surgery by radiofrequency is an outpatient alternative to the conventional procedure. Its advantages include being a minimally invasive procedure without

incisions in most cases and with a lower incidence of postoperative complications, such as hematoma and surgical site infections.[6] Postoperative pain, absent in most cases, is said to be considerably milder if present, leading to faster recovery and vocational rehabilitation.[7]

With the appropriate surgical technique, induced thrombosis occurs distally 2 cm from the saphenofemoral junction, with minimum risk of deep vein thrombosis secondary to the procedure.[8] Almost no significant differences are found between ultrasound scanning controls in immediate and late postoperative periods, so skipping the former could be considered in the future.[9]

These results translate into the clinical improvement of all the evaluated patients despite variations in their controls.[10]

CONCLUSION

The results obtained in relation to the closure of the insufficient great saphenous vein and the clinical remission of symptoms in all cases make the varicose vein surgery by endovenous radiofrequency ablation a safe and effective technique. While reported complications are comparable to the results published for endovenous treatments, they correspond to the beginning of the learning curve for the procedure. ■

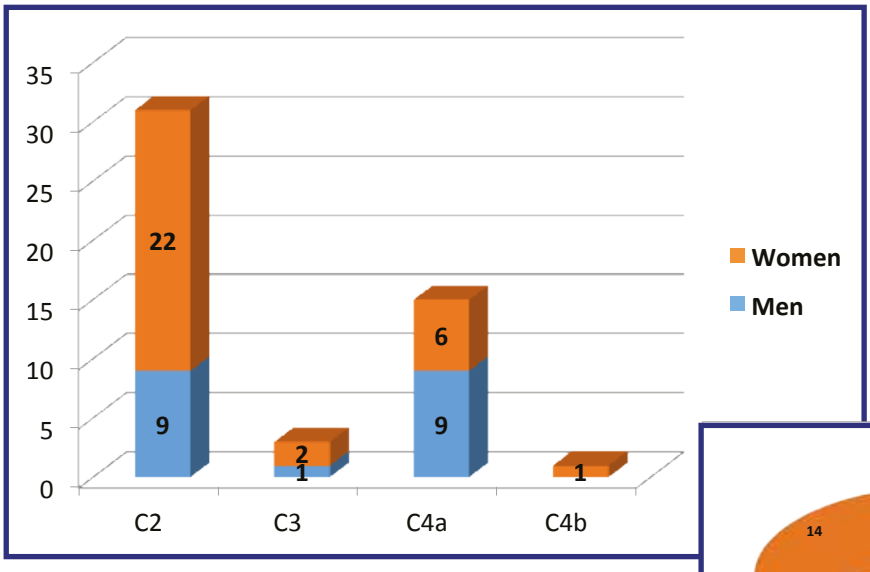

Figure 1. Patients included in treatment according to CEAP classification.

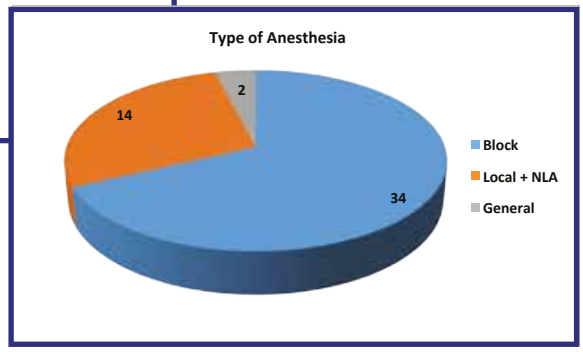

Figure 2. Anesthesia used during procedures.

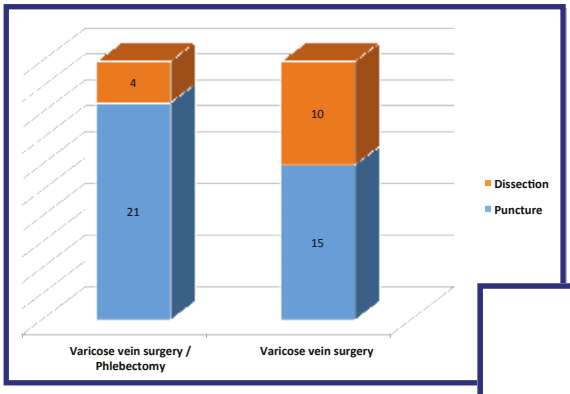

Figure 3. Surgical technique applied on the selected patients.

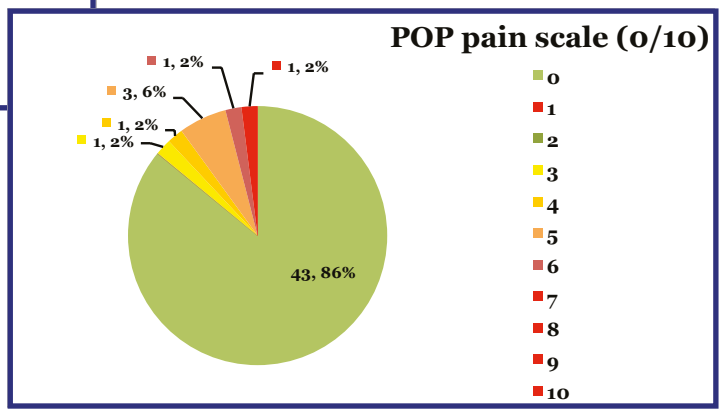

Figure 4. Verbal numerical scale of postoperative pain.

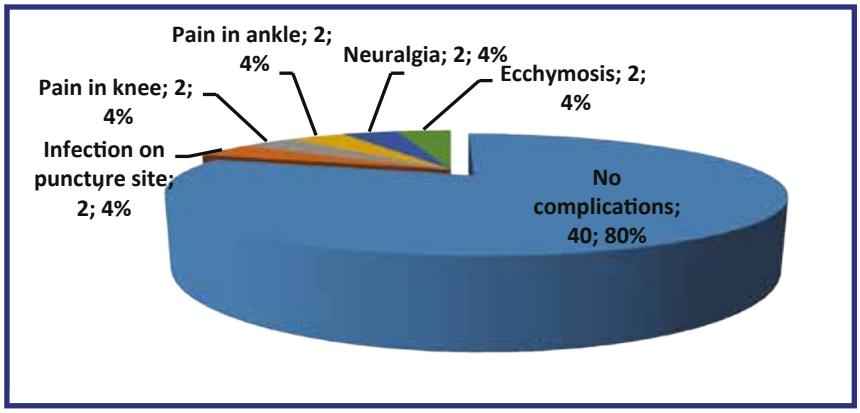

Figure 5. Complications presented in postoperative controls.

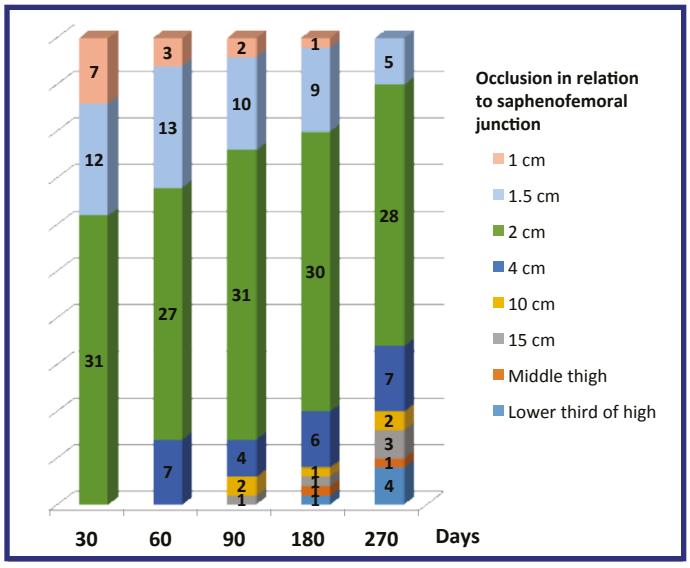

Figure 6. Control of venous occlusion in relation to the saphenofemoral junction as verified by Doppler scanning.

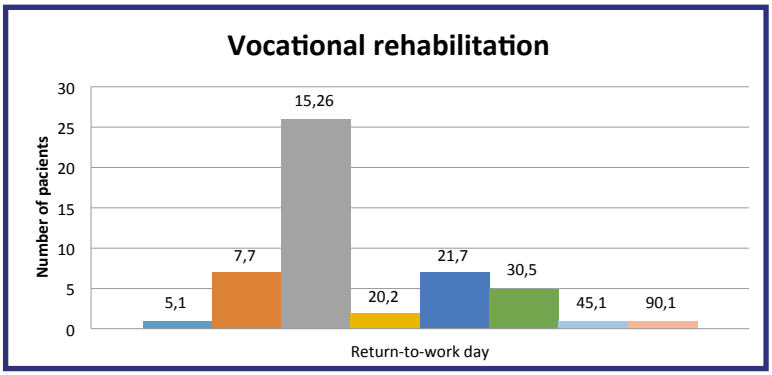

Figure 7. Vocational rehabilitation after surgery, in days.

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