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**TOURISM
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Tourism product as a factor of competitiveness of
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**THEMATIC
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**UNIVERSITY OF KRAGUJEVAC
FACULTY OF HOTEL MANAGEMENT
AND TOURISM IN VRNJAČKA BANJA**



CONTEMPORARY APPROACH IN THE TREATMENT OF VARICOSE SYNDROME OF THE LOWER EXTREMITIES - THE POSSIBILITY OF SPA TREATMENT

Momir Šarac¹; Dragan Sekulić²

Abstract

Radiofrequency ablation is efficient in great saphenous vein occlusion on the long term. Ultrasound-guided foam sclerotherapy is the most cost-effective strategy in many models. Balneohydrotherapy seems to improve the quality of life of patients with chronic venous insufficiency.

96 patients with chronic vein insufficiency were treated in 2016 with minimal invasive methods. 14 patients (14.6%) were treated with ultrasound guided foam sclerotherapy, and 82 patients (85.4%) were treated with radiofrequency ablation of great saphenous vein. Both lower extremities at the same time were treated in 33 patients (34.4%). Aesthetic moment was completed with minimal incisions and absence of sutures. The recovery included: wearing compression stockings during 2-3 weeks, walking, cold water bath. After 2-week time, all patients were ready to undertake normal every-day and business activities.

Endoluminal thermal ablation is an easy, safe and well tolerated method for the treatment of varicosis. Spa balneotherapy may give a good chance of secondary prevention and effective therapy of chronic vein insufficiency of inferior limbs, but also that it needs of other clinical controlled trials.

Key Words: *vein, radiofrequency ablation, foam therapy, balneohydrotherapy*

JEL classification: *I10*

1 Momir Šarac, PhD, general and vascular surgeon, Military Medical Academy, Department of Vascular and Endovascular Surgery, Crnotravska 17, Belgrade, tel: +381642939682, e-mail: momirsarac@yahoo.com

2 Dragan Sekulić, MD, Military Medical Academy, Department of Vascular and Endovascular Surgery, Crnotravska br. 17, Belgrade, tel: +381606616999, e-mail: doktorsekula@gmail.com

Introduction

Incompetent superficial veins are the most common cause of lower extremity superficial venous reflux and varicose veins (Kuyumcu et al., 2016). Varicose veins (VV) are, by WHO definition, abnormally dilated superficial veins (Picture 1).

Picture 1: *Varicose veins*



Source: *Pinterest*

Risk factors that increase the chance of developing varicose disease are: family history to VV, age (≥ 50 years), female gender, 2 or more pregnancies (multiparity), the use of oral contraceptives, standing job (> 6 hours per day), and obesity. There are several different theories about the etiology of primary VV, such as valvular incompetence of the vein, the inherent weakness of the vein wall, and the existence of arterio-venous fistula (AVF). The common pathogenic mechanism in all these hypotheses is increased pressure in the superficial veins, with their sequential dilation and valvular incompetence (Marston & Johnson, 1995). Common signs of changes in the vein system is the feeling of heaviness and swelling in the legs, pains, warm feeling of the skin, swelling of the ankles, leg spasms, leg fatigue, visible augmented veins, tiny veins and changed or peeling skin. Chronic venous disorders encompass a spectrum of venous diseases from simple telangiectases (spider veins) and reticular veins, varicose veins, leg edema from dysfunctional venous tone with valve incompetence and abnormal calf muscle pump function, to more severe and advanced forms of venous

disorders, including hyperpigmented skin changes, dermal sclerosis, and ulcer formation.

Complication of varicose veins unthreatment is superficial thrombophlebitis (SVT). Varicose veins are the most common predisposing risk factor for the development of SVT. SVT in varicosities may be manifested as tender nodules with localized induration and erythema. (Picture 2).

Picture 2: *Superficial thrombophlebitis below knee*



Source: *Authors*

Some focused study evaluated the incidence of pulmonary emboly in 11% patients with isolated SVT in the thigh (Picture 3).

Picture 3: *Superficial thrombophlebitis below knee and at the thigh*



Source: *Authors*

The most common site was propagation of the SVT in the GSV into the common femoral vein, what could have a lung thromboemboly as a consequence (Cronenwett & Johnston, 2014). Some manifestations of chronic venous disorders are aesthetic problem as a spider and reticular veins (Picture 4 and 5).

Picture 4: *Spider veins*



Picture 5: *Spider and reticular veins*



Source: *Authors*

However, the most limiting and painful complication and manifestation of chronic venous disorder and untreatment varicose veins is ulcer formation (Picture 6 and 7).

Picture 6: *Chronic vein ulcer*



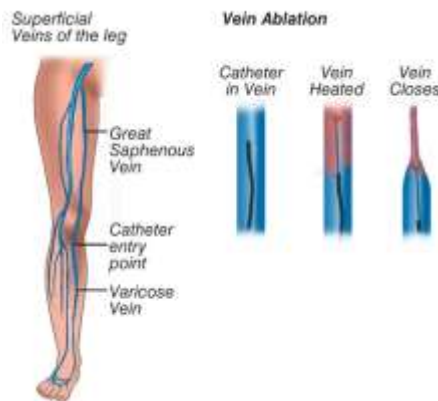
Source: *Authors*

This complication limits gait and leaves a patient in bed. The treatment of ulcers is very long, difficult and painful.

Until recently, standard treatment has been a surgery, with high ligation and stripping GSV, combined with phlebectomies. Following the development of new technological and technical accomplishments in vascular surgery, including stent grafts, it became possible to solve such problems by the use of endovascular approach (Šarac et al., 2011). In the past decade, alternative treatments such as endovenous ablation of the GSV with laser (EVLA), radiofrequency ablation (RFA) and ultrasound-guided foam sclerotherapy (UGFS) have gained on popularity.

Radiofrequency ablation is efficient in great saphenous vein occlusion in the long term (Balint et al., 2016) (Picture7).

Picture 7: *Radiofrequency ablation of GSV*



Source: *Lorven Heart and Vascular, Florida*

Radiofrequency ablation is less painful than endovenous thermal laser ablation (Sporbert, et al. 2016). As long-term differences in recurrence and quality of life are small, the overall cost effectiveness is driven primarily by initial treatment costs and ultrasound-guided foam sclerotherapy is the most cost-effective strategy in many models (Meissner, 2016). Some randomised trials have compared several methods of treating great saphenous vein (GSV) insufficiency. The technical failure rate was highest after foam sclerotherapy, but both radiofrequency ablation and foam were associated with a faster recovery and less postoperative pain than endovenous laser ablation and stripping (Rasmussen et al., 2011). That is why we have decided to treat GSV

insufficiency with radiofrequency ablation and miniphlebectomy using tumescent anesthesia, and ultrasound guided foam sclerotherapy respecting strict indication. French authors in unoperating patients used balneohydrotherapy program which consisted of Kneipp therapy (10 minutes), walking 10 minutes in a special mineral water pool with underwater jets at 23 degrees C, massage and bathing in a mineral water tub at 34 degrees C. They concluded that balneohydrotherapy and usual care combined is superior to usual care alone, and balneohydrotherapy seems to improve the quality of life of patients with chronic venous insufficiency (Forestier, 2014).

Ultrasound Guided Foam Sclerotherapy (UGFS) is a highly specialised procedure for treating advanced varicose veins that are hidden beneath the skin (Picture 8).

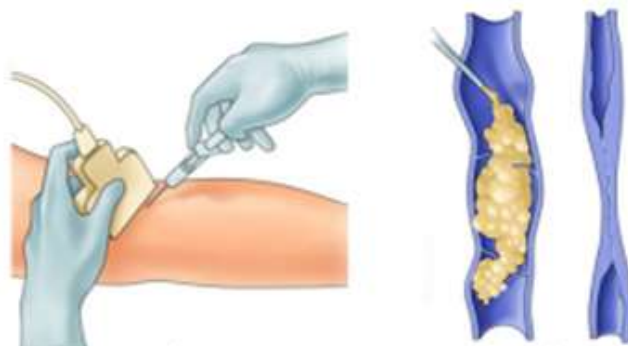
Picture 8: *Ultrasound guided foam sclerotherapy*



Source: *Cardiac & Vascular Consultantas*

The procedure is extremely safe and effective, involving injecting a sclerosant solution into the abnormal veins usingultrasound guidance, causing the vein wall to collapse (Vein Health, Medical and Cosmetics) (Picture 9).

Picture 9: *Ultrasound guided foam sclerotherapy-illustration*

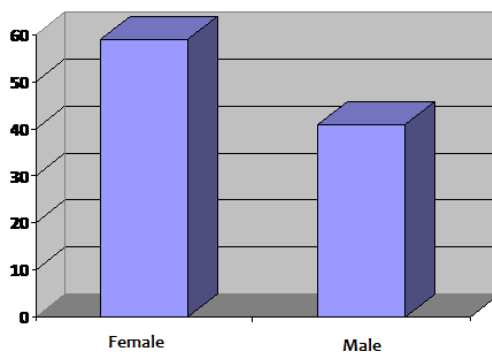


Source: *Vascular Surgery, UK*

Matherials/Methods

96 patients with chronic vein insuffitiency were threated in 2016 with minimal invasive metods. 57 patients (59%) were female, and 39 of them (41%) were male.

Figure 1: *Distribution concerning sex*



Source: *Authors*

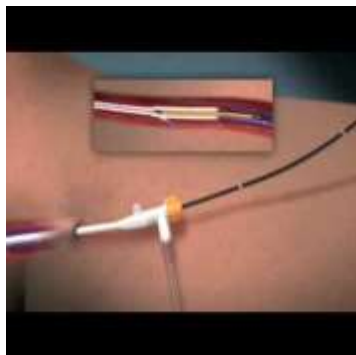
All of them done preoperative Color duplex scan of lower extremities and we confirmed indication for operative (RF) threatment or ultrasound guided foam sclerotherapy threatment. Possible contraindications such as deep vein thrombosis, coagulopathy, or cardiac disease were excluded with Color duplex scan, laboratory examination and cardiologic exam. The disturbances in hemostasis may influence the perioperative and early postoperative period inducing serious complications (Šarac et al., 2016).

14 patients (14.6%) were treated with ultrasound guided foam sclerotherapy, and 82 patients (85.4%) were treated with radiofrequency ablation of great saphenous vein. 65 patients (67.7%) were treated with radiofrequency ablation of great saphenous vein. In that group both lower extremities at the same time were treated in 33 patients (34.4%). RF was combined with UGFS in 17 patients (17.7%): 7-10 days after RF, we did UGFS for small residual veins.

During the month we followed the local and systemic complications, which included hematoma, infection, pain, thrombosis of deep veins, and lung thromboemboly. Hematoma was measured in centimeters and expressed as significant when it was larger than 5 cm. We also followed the period of recovery to return to normal activities. Infection was significant when followed with high temperature (more than 37 degrees). Verbal rating scale (VRS) has been used extensively in the acute and research setting to measure pain. Patients characterised pain as: “No pain”, “Mild pain”, “Moderately strong pain”, and “Strong pain”. They provide simple, efficient and minimally intrusive measures of pain intensity (Wall & Melzack, 1999).

Radiofrequency ablation (RFA) is a medical procedure in which dysfunctional tissue is ablated using the heat generated from medium frequency alternating current (in the range of 350–500 kHz). Radiofrequency ablation catheters cannot be easily passed along a tortuous superficial vein; therefore, the procedure is principally used in the treatment of truncal varicose veins, such as the great saphenous vein (Picture 10).

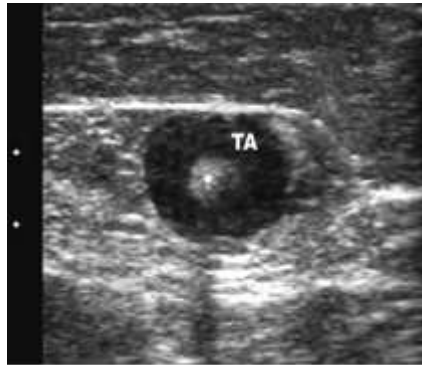
Picture 10: *RF ablation illustration*



Source: *Varistop, Radiofrequency Ablation*

It is ultrasound guided procedure where we place the probe in GSV and give tumescent anesthetic in vein compartment. In this way, we take vein of skin and subcutaneous tissue, and it is ready for termoablation (ElKaffas et al., 2010) (Picture 11).

Picture 11: *GSV with tumescent anesthetic in the compartment of vein-ultrasound view*



Source: *Min, J.R. (2009), Saphenous Vein Ablation*

The advantage of this method is that we can do bilateral ablation of GSV in the same act. Two days after intervention, we did rewinding. Four days after the intervention, the rewinding was not necessary in the ambulance and the patient had a shower at home. Elastic bandage is needed for 2-3 week, but a week after the procedure patient returned of usual activities (Picture 12).

Picture 12: *Before and after RF ablation GSV*



Source: *CDI Vascular Care, Treatment Options for Varicose & Spider Veins*

When we decided for UGFS, we respected the strict indications and contra-indications. None of the treated patients had atrial or ventricular septal defect, and all of them had intact GSV. Ultrasound was used to verify sclerosant in varicose vein, and in GSV it was either not detected or found only in traces (Picture 13).

Picture 13: *Ultrasound view, no sclerosant in GSV*



Source: *Crows Nest Cosmetic and Vein Clinic, Austria*

Elastic bandage was advised in the next 4-10 days. Only a day after the procedure, the patients were able to walk, work and have usual activities wearing an elastic bandage. After 4-10 days, there was no need for one. 27 patients (28.1%) of the total number had a spider or reticular veins what we treated with UGFS or with infrared lamp guided (Picture 14 and 15).

Picture 14: *Red lamp guided vein sclerotherapy*



Source: *Health Management*

Picture 15: *Before and after UGFS or infrared lamp guided threatment of reticular veins*



Source: *Authors*

The aesthetic effect achieved by the entire treatment was very satisfactory.

Results

Of 82 patients threated with RF ablation GSV, we had 5 patients (6.1%) with hematoma wider than 5cm, and it was retreated after 10-21 days. The complications which followed after a month are summarized in Table 1.

Table 1: *Percent of followed complications*

Followed complication	Patients (%)
Hemathoma wider than 5cm	5 (6.1%)
Infection	1 (1.2%)
Pain	16 (19.5%)
Deep vein thrombosis	0 (0%)
Lung thromboemboly	0 (0%)

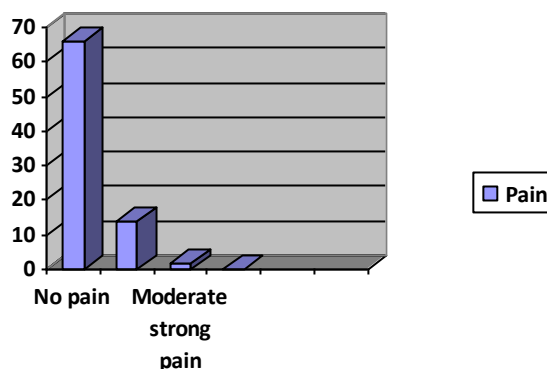
Source: *Authors*

One patient (1.2%) had infection, where we made incision and evacuated the infected hematoma. That patient did not have high temperature and the infection was non-significant, and non-systemic. This complication did not persist in a recovery period.

66 patients (80%) described their state as that of “No pain” on Verbal rating scale. 14 patients (16.9%) confirmed “Mild pain” and 2 patients

(3.1%) acknowledged “Moderate strong pain” on Verbal rating scale (VRS). We had no patients with “Strong” pain on VRS Figure 2.

Figure 2: *Grade of pain*



Source: *Authors*

All patients with pain had that symptom during 1-4 days. After the first and second rewinding, the pain disappeared in 100% patients. 7 patients (7.2%) had pain during changes of weather (only in RF group). That means the pain is associated not only with the procedure, but it can also be associated with bandages or body-mass-index, or complications existing before the procedure (thrombophlebitis, etc.). Adequate application of tumescent anesthetic has a great significance in lower pain after RFA. Manifestation of pain was measured by VRS in group with unilateral, bilateral and RF combined with UGFS.

We did not have complications as a deep vein thrombosis and lung thromboemboly, which we can associate with good perioperative management and excluding contraindications to the treatment.

In postoperative period, we recommended short-distance walking on the direct postoperative period, a shower, a bath after 4 days, and mild massage after 7 days. Elastic bandage with stockings was necessary in the first 7 days, day and night; after this period, we recommended only on a daily wearing during the period of 7-21 days. Every procedure helps in withdrawal of hematoma, and returning to normal life activities. Physical exercise was possible 4 weeks after the operation, without any complications.

In the group treated with combined RF and UGFS methods, recovery and return to usual activities was similar to the group treated only with RF method. They used the expressions "No pain" or "Mild pain" on VRS to describe their condition, and did not suffer hematoma wider than 5cm. Postoperative walking and cold bath were recommended just as after applying only RF method. These patients were recommended short-distance walking on the direct postoperative period, a shower, a bath after 4 days, massage after 7 days, while physical exercise was possible 4 weeks after the operation. No complications were recorded.

14 patients were treated with UGFS only, and in that group no haematomas wider than 5cm were recorded, pain was classified as "No pain", and patients had usual activities a day after the procedure. After UGFS we had no systemic or local complications in terms of hematoma, pain or infection. Physical exercise was recommended 5-7 days after the procedure. Cold bath were possible after 4-5 days. Walking was recommended a day after the procedure.

Spider and reticular veins were treated in 5 patients with sclerotherapy guided with infrared lamp. All of them used elastic bandage for a few days (3-7) and the day after the treatment they could return to usual activities. 3-6 days after the procedure they were able to take sports training.

Discussion

Minimal invasive procedures in treating chronic venous insufficiency are very popular because of minimally painful procedures, a short period of recovery, fast return to job duties, while the aesthetic moment is without scares and threads. Less postoperative pain gives an advantage to RF ablation compared to endovenous laser ablation and stripping. Good indication and selection patients are very important in treating with UGFS. This method is more comfortable and it is a method of ambulance care. Combination of RF and UGFS in patients with GSV insufficiency and spider and reticular veins give very good effect in both therapy and aesthetic moment.

Contrary to widespread belief, bathing in water at temperatures above 28 degrees C does not adversely affect venous function in patients with varicose veins. When applied in moderation (34 degrees C for 20 minutes) this physical therapy should not be regarded as contraindicated

in this and related conditions, especially given its known hemodynamic benefits (Hartmann, et al., 1998).

Due to the minimally invasive treatment and fast recovery, walking in direct postoperative period we have a place and time for spa therapy in recovering. After 7 days, we recommended walking, cold water hydromassage, elastic bandage during 7 days. If we treated spider or reticular veins only, all spa procedures will be possible a day after this treatment.

Spa treatment is a popular way to administer physical therapy for CVDs in France, but its efficacy has not yet been assessed in a large trial. Patrick et al. study demonstrates that spa therapy provides a significant and substantial improvement in clinical status, symptoms, and quality of life of patients with advanced venous insufficiency for at least 1 year (Carpentier, et al., 2014). According to the studies by Alberti et al., physical exercise increases the muscle tone of the lower limbs and as a consequence it can improve its effect on the venous system, resulting in a drop in pressure when walking and an increase in venous blood return (Petraccia, et al., 2014).

There are spa centers in Slovenia, the USA, Australia, and Singapore offering preoperative care, diagnosis, postoperative care, or neoperative care of different forms of chronic venous disease (Dempsey, 2017) (Picture 16 and 17).

Picture 16: *Spa vein center USA*



Source: *Spa Vein Center*

Picture 17: *Before and after hydrotherapy of spider veins in Spa center in Singapore*



Source: *Asia USA Realty (Singapore)*

Comparing the prices of such procedures in the near and far surroundings, we can see that lower prices of these procedures in Serbia provide an opportunity for foreign tourist treatment in our country.

Conclusion

The requirements for operative treatment are one ambulance with portable equipment for RF or UGFS, and ultrasound for diagnostic and guide procedures. We can do this procedure in every spa center in Serbia. Spa treatment and operative care would act in common in development of spa and health tourism in Serbia. Minimally invasive procedures are increasingly present and provide greater comfort for a patient and faster recovery. Such an approach could lead to the development of health tourism in Serbia, especially if you compare the prices of these procedures in our country and in the countries of EU.

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