

Treatment of varicose veins using the Cryo laser after foam technique

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ABSTRACT

Sclerotherapy is the treatment of choice for telangiectasias and reticular veins. The most common side effects of this procedure are hyperpigmentation and matting, which are feared owing to their aesthetic damage and difficulty of treatment. Combined treatments with laser and hypertonic glucose sclerotherapy have been described with excellent results, but limited to treatment of veins of ≤ 2 mm in diameter. Cryo laser after foam sclerotherapy is a procedure to treat reticular veins in the lower extremities that utilizes first foam sclerotherapy with polidocanol then immediately followed by transdermal Nd:YAG 1064 laser treatment and we can treat veins ≤ 5 mm. This report presents a successful case of varicose vein treatment using combined transdermal laser and sclerotherapy with foam sclerotherapy with polidocanol to treat veins > 2.5 mm in diameter. (*J Vasc Surg Cases Innov Tech* 2024;10:101549.)

Keywords: Chronic venous disease; Leg veins; Sclerotherapy; Varicose veins

Telangiectasias and reticular veins belong to class 1 of the Clinical, Etiological, Anatomical, and Pathophysiological clinical classification, and the treatment of choice is sclerotherapy, with commonly used sclerosants being polidocanol and hypertonic glucose.¹⁻⁴ However, each treatment has a series of complications, with the most common being hyperpigmentation and matting,^{3,4} which are feared owing to their adverse aesthetics and difficulty of treatment. Combined treatments with laser and hypertonic glucose sclerotherapy has been described with excellent results, but limited to treatment of veins < 2.5 mm in diameter.^{5,6} Laser after foam (CLaF) sclerotherapy combines the synergy of transdermal Nd:YAG 1064 laser and foam sclerotherapy with polidocanol that we modified to treat larger veins, obtaining better aesthetic results with fewer complications.

CASE REPORT

A 55-year-old female patient, Fitzpatrick II skin type, nonsmoker, sedentary, without comorbidities or drug allergies, and regularly using oral contraceptives, complained of aesthetic issues caused by telangiectasias, reticular veins, and combined varicose veins on the anterior aspect of the right leg, with no previous treatment history. Surgical treatment (phlebectomy) was recommended, but the patient refused and sought alternative treatment. An ultrasound examination (Mindray M6, probe 5-

12 Hz) was performed, but did not identify saphenous or perforating veins reflux, with the largest venous diameter being 3.9 mm in an upright position and nonweight bearing (Fig 1). Detailed photo documentation was taken (Fig 2), and the patient provided informed consent with detailed information about the treatment and possible complications.

The patient underwent marking of the target veins using augmented reality because this technology facilitated the detection of spider veins and telangiectasia by capturing the target vessel image and projecting it onto the skin in a bright green color (VeinViewer Flex, Christie Medical, Lake Mary, FL) and evaluation of various venous calibers using a transverse image of ultrasound device in a standing position. After vein marking, traditional foam was prepared using the TESSARI method with 0.5% polidocanol (Health Tech, Sao Paulo, Brazil) and injection with a total volume of 8 mL, followed immediately by transdermal laser application using a 6-mm spot size, fluence of 80 J/cm, and pulse duration of 40 ms (Etherea MX Laser, Vydenca Medical, Sao Paulo, Brazil), with a single pass and the use of a skin cooling device (Siberian Fit, Vydenca Medical, Sao Paulo, Brazil). Compression with 20- to 30-mm Hg elastic stockings (Sigvaris Group, Winterthur, Switzerland) was applied for 24 hours.

The patient was followed for a period of 60 days with a consultation at 30 days after the treatment. After this period, another treatment session was performed using the same parameters for the treatment of residual telangiectasias. The patient still had some residual telangiectasias. We normally plan a new session in 60 days. During this time, intravenous clots tend to disappear and the risk of injury from the laser is lower. At the end of the 120-day period, final photo documentation was obtained (Fig 3) to compare with the previous photo and another ultrasound examination was performed showing the total resolution of the previously treated veins in the leg.

DISCUSSION

The CLaF technique is a procedure that combines a transdermal Nd:YAG 1064 laser and foam sclerotherapy

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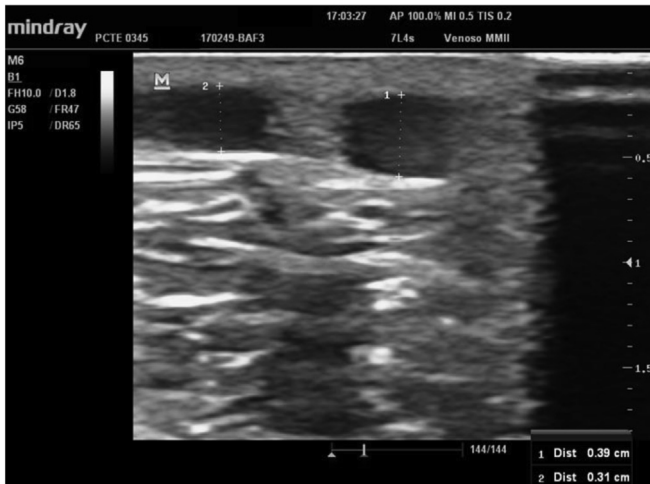


Fig 1. Duplex ultrasound examination.



Pre-processing documentation

Fig 2. Before the procedure.



Result after 120 days of LAAF treatment
(2 sessions)

Fig 3. After the procedure. LAAF, laser after foam.

with polidocanol, applied in sequence, to treat reticular veins in the lower extremities. We felt that, given the synergy of these two techniques, we could with some modifications treat larger veins, obtaining better aesthetic results with fewer complications. Previous studies have

demonstrated the success of combining transdermal laser treatment with the use of sclerosants in the treatment of lower extremity varicose veins.⁵⁻⁸ Dinache et al¹⁰ (2020) demonstrated that the laser can interact with the foam, further reducing its microbubbles and increasing its stability, as well as allowing better interface interaction with the tissue. Additionally, external cooling provided by cold air prevented damage to the skin surface. A constant flow of cold air directed at the skin surface removes dramatically heat by convection, avoiding damage to the skin surface. Moreno-Moraga et al^{7,8} reported treatment outcomes of microvarices (≤ 3.0 mm), hypothesizing that the laser increases the effectiveness of foam scattering and provides a better lesion effect on the vessel owing to the prior action of the foam on the varicose vein wall. The dispersion of laser light and its absorption increase owing to the components of the foam. Therefore, the effect of laser light can be expanded if polidocanol is used as the foam constituent, as the area of light dispersion in the tissue becomes larger, increasing its absorption and improving its action.^{9,10} Thus, we can use lower concentrations and volumes of polidocanol to treat varicose veins, with less of an inflammatory response and intraluminal thrombus, and fewer

hyperchromic spots. Motivated by these studies, we began using a technique in our clinic that combines the use of transdermal laser and foam sclerotherapy with polidocanol to treat patients with varicose veins >2 mm and ≤ 5 mm, who do not wish to undergo surgery. We used as parameters the application of a transdermal laser with a 6-mm spot, fluence between 60 and 80 J/cm, and pulse duration between 30 and 40 ms, consecutively after injection of 0.5% polidocanol foam. This technique is based on that used by Moreno-Moraga et al; however, we only use the 6-mm spot size to treat all venous calibers as proposed by Miyake et al.⁵ Furthermore, we use higher and more constant energy.

Our few cases have shown that a combination of polidocanol foam and transdermal laser has the potential to improve the final appearance of treated varicose veins when compared with the standard technique, with great potential to decrease the formation of intraluminal thrombus and the need for drainage significantly when compared with using isolated polidocanol foam, providing better results with fewer risks. A Cochrane review comparing laser plus sclerotherapy (polidocanol) vs sclerotherapy (polidocanol alone) suggested that there may be greater resolution or improvement (or both) of telangiectasias in the combined group (standardized mean difference, 5.68; 95% confidence interval, 5.14–6.23; 2 studies; 710 participants) and no clear difference in hyperpigmentation (relative risk, 0.83; 95% confidence interval, 0.35–1.99; 2 studies; 656 participants),² but we do not have studies comparing the association between laser and polidocanol foam.

The Fitzpatrick skin phototype is a commonly used system to describe a person's skin type in terms of response to ultraviolet radiation exposure. For such patients with Fitzpatrick skin types 4 to 6, the use of Nd:YAG laser could burn and usually we exclude these patients from CLaF. This new approach is a treatment option for patients who fear or are unable to undergo phlebectomy for 3- to 5-mm varicose veins.

CONCLUSIONS

We observed good efficacy in the association between transdermal laser and foam sclerotherapy with polidocanol in this case, and CLaF may represent an alternative treatment modality for veins >2 mm in patients who would like to avoid phlebectomies. Further study is warranted.

The patient provided a statement regarding consent for publication of this manuscript.

DISCLOSURES

None.

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