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Case Report

Treatment of Non-Aesthetic Facial Veins: A Case Study of the Combined Method of Laser with Polidocanol Foam

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Abstract

Background: The veins in the frontal region of the face, Right Supratrochlear Vein and Left Supratrochlear Vein can become exaggeratedly dilated in situations of emotion (crying or smiling), stress, physical exertion, lowering the head and other situations that can cause great embarrassment. Nd:Yag 1064nm is the most versatile LASER for the treatment of facial vessels, and can be used in telangiectasias and reticular veins. It's different spot size and pulse duration settings allow the most suitable parameterization for different types of veins. Due to its ease, practicality of use and for delivering good results, sclerotherapy is still the gold standard technique for sclerosis of varicose veins and telangiectasias. The 1064 nm Nd:YAG LASER is also efficient. Its limit is more restricted in veins of larger caliber (>3mm) and faster flow and, for physical reasons, the distance from the varicose vein to the skin should not exceed 3.5mm to 4mm. The pain at high fluences, the higher cost and the occurrence of relapses when used alone, make us opt for combined therapies in some situations.

Case: Patient P.B.C, female, 43 years old, dancer, without previous comorbidities. She looked for an outpatient doctor with vascular care in February/2022 with a complaint of discomfort due to the forehead, with significant vessel dilation after physical exercise. Physical examination showed a dilated right and left supratrochlear veins. The treatment of sclerotherapy with polidocanol foam associated with the QS Nd:YAG 1064nm laser was indicated.

Conclusion: Sclerotherapy associated with selective and immediate photo thermolysis, using the long-pulse Nd:YAG 1064 LASER increases the efficiency of the treatment of varicose veins, reducing possible complications when any of the techniques are used in isolation.

Keywords: Sclerotherapy; Microfoam polidocanol; Nd:YAG LASER; Facial veins; Right supratrochlear vein; Left supratrochlear vein.

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Introduction

The veins in the frontal region of the face can become exaggeratedly dilated in situations of emotion (crying or smiling), stress, physical exertion, lowering the head and other situations that can cause great embarrassment. Moreover, with age skin thinning and subcutaneous tissue atrophy occur, and the appearance tends to worsen. The frontal veins, also called the Right Supratrochlear Vein (RSV) and Left Supratrochlear Vein (LSV), originate in the forehead and communicate with the frontal branches of the superficial temporal vein (Figure 1). This group of veins converge to form a single trunk, passing through the midline of the forehead, usually parallel to the vein of the same name, on the opposite side (Figure 1b). The two frontal veins communicate at the root of the nose by a transverse branch, called the nasal arch. In this location they receive some small veins from the back of the nose. They separate in the nose (Figure 1a), joining the supraorbital vein to form the angular vein. Its drainage is partially directed by the superior and inferior ophthalmic veins to the cavernous sinus. The other route of angular vein drainage is through the facial vein, which drains into the internal jugular vein.

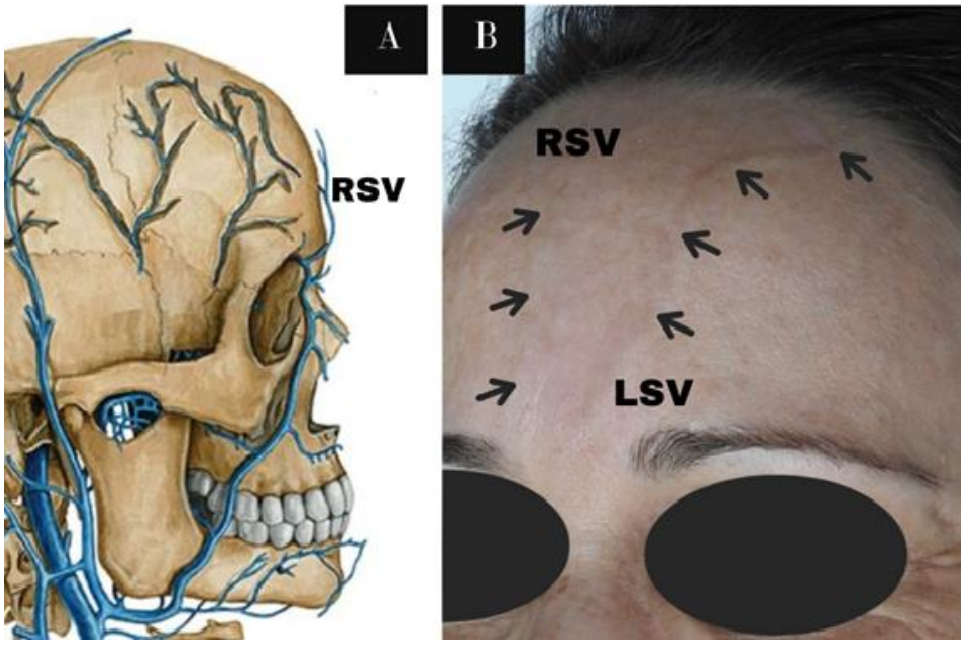

Figure 1: Anatomy of the right (RSV) and left (LSV) supratrochlear veins. a) shows the right supratrochlear vein (RSV) descending towards the root of the nose, and at the medial angle of the orbit, it joins the supraorbital vein to form the angular vein, whose drainage is, in part, directed by the superior and inferior to the cavernous sinus. The other route of angular vein drainage is through the facial vein, which drains into the internal jugular vein. b) Image of the patient's veins (RSV and LSV); arrows indicate the course of the veins.

Frontal vein is located at an average depth of 2mm with a caliber ranging from 2mm to 3.5mm and before indicating supratrochlear vein treatment, we studied its anatomy and flow using doppler ultrasound and augmented reality, (Vein Viewer™) (Figure 2b and 2c). To facilitate its study, we can induce a caliber change in the office by placing the patient in the frontal decubitus and Trendelenburg position. The treatment of frontal veins is a constant challenge, due to the fact that sclerotherapy of this vein

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drains into the cavernous sinus through the superior ophthalmic vein. Inadvertent administration of the sclerosing agent can lead to iatrogenic aseptic cavernous sinus thrombosis. Patients may present with a variety of clinical findings which may include a combination of tumefaction, vascular engorgement, orbital pulsation, and exophthalmos, depending on the relationship between the lesion and the vascular system.

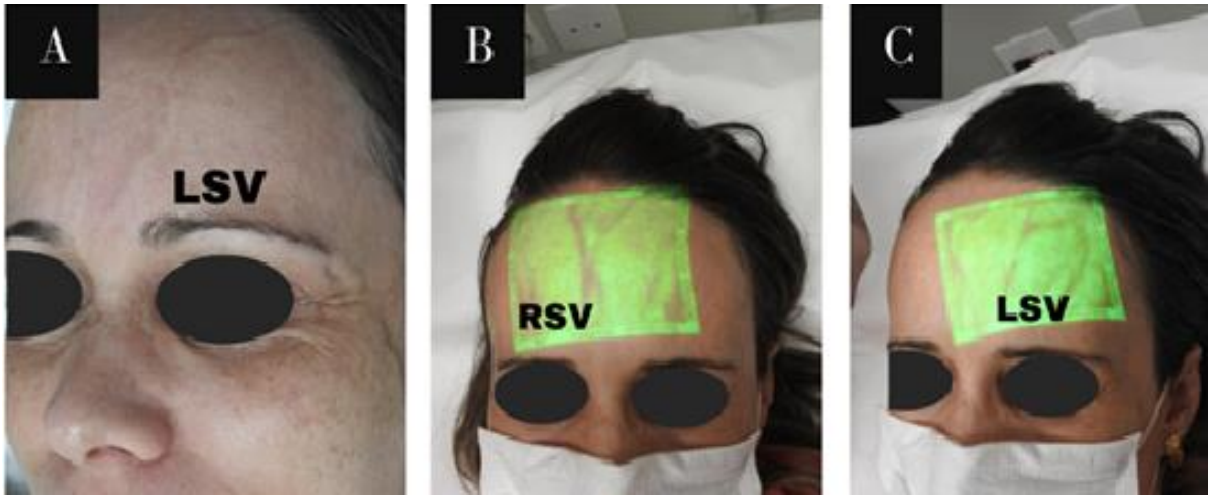

Figure 2: Visual aspect of the right (RSV) and left (LSV) supratrochlear veins. a) Without the use of augmented reality (Vein Viewer™) and (b and c) with the use of augmented reality (Vein Viewer™) showing RSV (a) and LSV (c).

One option for the treatment of facial veins is the use of the Long Pulse Nd:Yag 1064nm Transdermal Laser. There are several studies that approach the treatment of superficial veins (varicose veins) with the use of LASER Nd:Yag 1064nm of long pulse, the first being carried out by Weiss and Weiss in 1999 [1]. In this pioneering study, they demonstrated that Nd:Yag 1064nm is effective in the treatment of vessels (varicose veins) of the Lower Limbs with calibers ranging from 0.5 to 3.0mm. One of the negative factors for the use of LASER in isolated therapy is the need for many sessions, in addition to its limitation in high phototypes and veins with greater distance from the skin surface. The great variety of colors, sizes, depth, caliber and venous connections shows that the treatment of non-aesthetic venous lesions cannot be supported by just one "foot". In other words, just a LASER with general parameters is not enough. This will not be enough, as different injuries cannot be treated with the same parameters. Nd:Yag 1064nm is the most versatile LASER for the treatment of facial vessels, and can be used in telangiectasias and reticular veins. Its different spot size and pulse duration settings allow the most suitable parameterization for different types of veins. Another option for the treatment of unsightly facial veins is the use of Endo laser (EVLA – Endovascular LASER Ablation), 1470nm, radial fiber 400microns. However, this procedure, in addition to having a higher operating cost, generates more discomfort and should ideally be performed under local anesthesia associated with anesthetic sedation in a hospital unit.

The gold standard technique for sclerosis of varicose veins and telangiectasias is still sclerotherapy. It has low cost, good results

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and a faster learning curve. We know that 1064nm Nd:YAG LASER is also efficient. However, it demands a longer learning curve, has a higher cost of use, does not have good results in larger veins (>3mm) and, for physical reasons, does not work in veins whose distance from the varicose vein to the skin is greater 3.5mm to 4mm. Added to these facts, the issue of pain in high influences, and the occurrence of relapses, when used alone, make us opt for combined therapies in some situations.

Polidocanol is a detergent solution, unlike other groups of sclerosing agents, this category of agents can be mixed with air (gas) to be used in foam form in order to obtain a more efficient sclerosis [2]. Polidocanol is probably the most common sclerotherapy agent used to treat varicose veins and telangiectasias. The most common concentrations used are 0.5%, 1% and 3%, with their indication varying with the caliber of the vein to be treated. When polidocanol is stirred and "foamed" there is virtually no limit to the maximum caliber of varicose veins for use. What is observed is the eventual need for a greater number of sessions to treat larger varicose veins (>3mm). Polidocanol is a safe, versatile and low-cost sclerosant. The risk of skin necrosis when used in the form of foam is low, and its application is practically painless [3]. Guidelines for treating varicose veins with polidocanol foam endorse maximum volumes of solution injection per session or per limb. These volumes range from 10 to 20ml. Guidelines on how to deliver single and large-volume injections have been proscribed as they significantly increase the risk of complications in the deep venous system, the most common being venous thromboembolism, visual symptoms, cardiac events, pulmonary symptoms. Cerebrovascular events do not seem to be related to volume, but to the quality of the injected foam.

The combined therapy of sclerosing agents with Nd:Yag 1064nm LASER allows the use of the sclerosing agent in lower concentrations and in less volume, decreasing the inflammatory response and better control of the venous segment to be treated. Foam sclerotherapy basically involves stirring the liquid (sclerosing detergent) with ambient air, CO_2 gas or ideally a physiological gas (70% CO_2 + 30% O_2). The technique for its manufacture is simple and is done through the communication of 2 syringes, one with the medication and the other with air (gas), through a device with luer lock connectors.

The foam fills the vein in all its volume and its dilution happens more slowly, when compared to other sclerosing agents. By occupying the entire volume of the vein, there is greater contact with the endothelial wall, producing greater damage. In addition, because its dilution is slower, the contact time of the foam with the endothelium also increases. In foam sclerotherapy, the higher the air ratio (not greater than 1:4, liquid:air ratio), the drier the solution is considered. The lower the proportion of air in the solution, the more humid it is considered. Wetter solutions tend to navigate less within the blood vessel, being more restricted to the vein puncture site. In foam sclerotherapy, the higher the air ratio (not greater than 1:4, liquid:air ratio), the drier the solution is considered. The lower the proportion of air in the solution, the wetter it is considered. Wetter solutions tend to navigate less within the blood vessel, being more restricted to the puncture site of the vein.

Case study

Patient P.B.C, female, 43 years old, dancer, without previous comorbidities. She sought outpatient medical care with a vascular surgeon in February/2022 with a complaint of non-aesthetic discomfort due to vessels in her forehead, with significant dilation after physical exertion. On physical examination, she had a dilated supratrochlear vein, right and left (Figure 2a).

Initially, treatment with LASER Nd:Yag 1064nm Long pulse was indicated. 2 sessions were performed, with intervals of 15 days, using a 6mm tip with 20ms of pulse time and 60-70cm² joules of energy (3 passes along its entire length, in each of the sessions). On the third consultation, we observed that there was no regression of the frontal vein, maintaining visual discomfort. Due to the initial resistance, we opted for an association of techniques, being indicated the combination of sclerotherapy with 0.5% polidocanol foam with QS Nd:YAG 1064nm laser, in that order. Patient was positioned in frontal decubitus, Trendelenburg position, followed by puncture of the respective RSV and LSV (Figure 3a). Sclerotherapy was performed with 0.3ml of 0.5% polidocanol foam, 1:1 dilution, in each puncture. During the procedure, manual compression was performed in the glabella region (Figure 3b), in order to close the drainage to the Angular Vein. Next, the QS Nd:YAG 1064nm laser was used, with 3 passes, along the entire length of the vein, using energy of 50J/cm², pulse time of 20ms, in the 6mm spot size. At the end, a compressive dressing (Figure 3c) was applied in the course of the veins. On return, after 15 days, he presented resolution of the left Frontal Vein, which is not visible either during sports practice or after the Trendelenburg maneuver. The right Frontal Vein was still present. Opted for a new session of the proposed treatment. Therefore, a new puncture of the right Frontal Vein with the scalp was performed and sclerotherapy was performed with 0.3ml of 0.5% polidocanol foam, 1:1 dilution, with manual compression on the glabella. Then, we again used QS Nd: YAG laser 1064nm 40-50J/cm², pulse time 20ms, spot size 6mm and compressive dressing in the vein path.

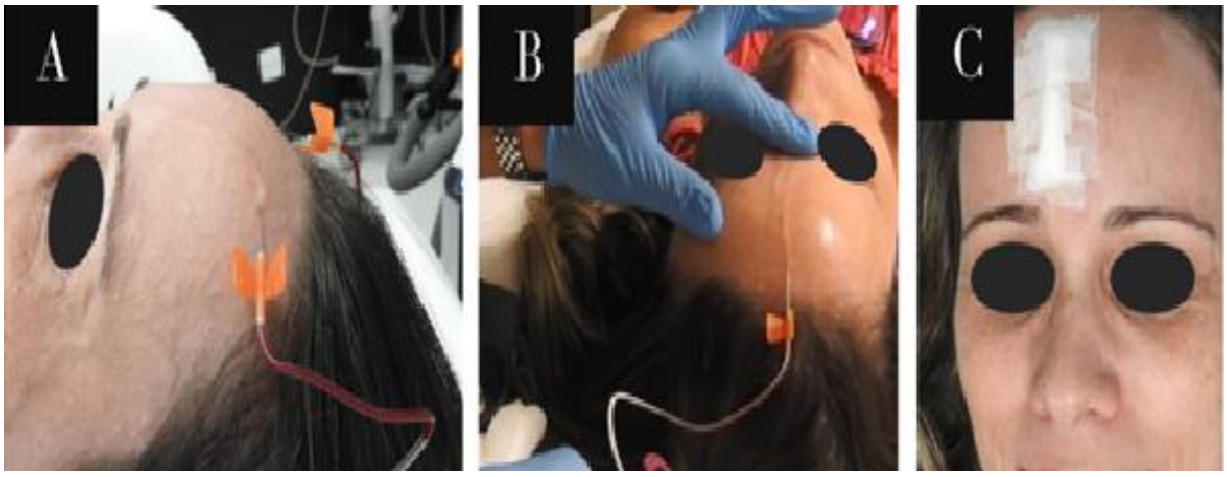

Figure 3: Puncture of the left and right supratrochlear veins. a) This puncture should be as close to the scalp as possible, and in the Trendelenburg position. b) Manual compression in the glabella region. c) The appearance of the dressing at the end of the procedure.

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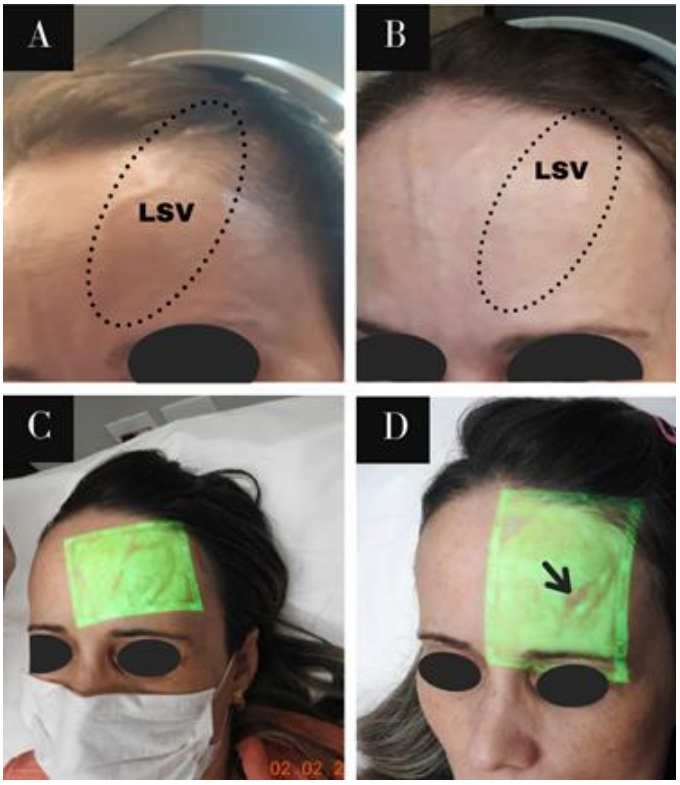

Figure 4: Comparison of the final appearance of the Left Supratrochlear Vein. a) Before treatment and 7 days after the first session of combined therapy (b). In photo (c) aspect using augmented reality, pre-treatment and in (d), also with augmented reality, 7 days after treatment, where residual sclerus (thrombus can be identified, see it the arrow).

Discussion

The transdermal laser performs selective photo thermolysis, based on three essential requirements: wavelength that penetrates to the appropriate depth and is preferably absorbed by hemoglobin; exposure time less than or equal to the thermal relaxation time of the target structure and time of exposure to radiation sufficient to generate irreversible damage to the tissue to be treated [4]. As previously mentioned, polidocanol foam is a sclerosant that produces endothelial damage by multiple mechanisms. Its mechanism of action is due to the decrease in the surface tension of the endothelial cell, damage to the lipids of the cell surface, in addition to damaging the cell structure by action on the protein and structure of its wall [5].

The mechanism of interaction between the vessel wall, polidocanol foam and laser irradiation is still not well established. The most accepted hypotheses, for a synergy, in the combined action of the two techniques, are that there is a greater action of the LASER, directly on the endothelium previously damaged by the action of the polidocanol foam, the effect of the LASER is expanded when associated with sclerotherapy with foam of polidocanol, because the absorption of the LASER becomes greater in addition to the scattering of light in the tissue becomes wider, that is, "the LASER improves its efficacy by light Scattering" and also, by a possible increase in drug potency under exposure to LASER light [5]. The objective of a combination therapy is to increase the effectiveness of the treatment and decrease

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the treatment time, using lower concentrations of polidocanol associated with more conservative energies in the parameters of the 1064nm Nd:Yag LASER, thus reducing the incidence of complications. In 2019, Moreno-Moraga carried out a longitudinal, observational, controlled and retrospective study, 5 years after the proposed treatment, to evaluate the safety, efficacy and durability of the results obtained after the treatment of patients with sclerotherapy with polidocanol foam and Nd:Yag LASER 404 legs were analyzed. The results detailed in this study concluded that the combined treatment of Nd:YAG 1064nm LASER and polidocanol foam sclerotherapy is effective and has good resolution after 5 years.

Conclusion

The veins in the frontal region of the face can become exaggeratedly dilated in situations of emotion, stress, physical exertion, lowering the head and other situations. When dealing with facial veins, telangiectasias and reticular veins, 1064nm Nd:Yag LASER should be indicated as a first option and as an isolated treatment. Combination treatment with other sclerosing agents should only be considered for resistant cases. For reticular varicose veins and telangiectasias in the lower limbs, if the option is treatment with monotherapy, liquid or foam sclerotherapy remains the gold standard. However, the combined treatment with Nd:Yag LASER should always be considered because it reduces the number of visits to the doctor's office, uses a smaller volume of sclerosant and increases the efficiency of the treatment of varicose veins.

Conflict of interest

None declared.

Consent to publication statement

Authors declare taking informed written consent for the publication of clinical photographs/material (if any used), from the legal guardian of the patient with an understanding that every effort will be made to conceal the identity of the patient, however it cannot be guaranteed.

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