

VascuLight™ Experience with over 1,000 Patients: Two Year Study of Cutaneous Vascular Lesion Treatment with an Intense Pulsed Light and Laser Source

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INTRODUCTION

Vascular skin lesions such as facial and leg telangiectasias are a very common concern for the female population. An estimated 41% of American women aged 40 to 50 years old, increasing to 72% between 60 to 70 years of age, suffer from unsightly leg veins. Though the percentage of men afflicted with problematic leg veins is considerably lower, 24% for men aged 30 to 40 years of age, the number of men seeking treatment is still substantial. Generally, patients seek treatment for vascular lesions as a cosmetic concern rather than a symptomatic problem and therefore expect cosmetic improvement without adverse reactions.

Various lasers have been used over the last 20 years to treat telangiectasias and other types of vascular lesions. Early laser use with the Argon laser for treatment of port-wine stains often resulted in scarring and pigmentation. Carbon dioxide use for telangiectasias also resulted in hypopigmented scarring. With the introduction of the pulsed dye laser, good to excellent results have been achieved for the treatment of superficial vascular lesions with small

blood vessels, particularly port-wine stains; however, penetration is not deep enough to address other vessels. Additionally, patients are often disturbed by the resulting purpura.¹⁻⁶

Sclerotherapy has proven to be successful for telangiectasias on the legs, but is generally not recommended for use on the face. The results are contingent on the skill of the physician, since an exact pinpoint technique, using a sufficient concentration of sclerosing solution, is required. Failure to recognize and treat any underlying problematic vein networks can lead to veins that rapidly recur after treatment.⁷ Moreover, pigmentation and telangiectatic matting can impair cosmetic results.^{1,2,7}

The VascuLight system, an extension of the versatile PhotoDerm device (ESC/Sharplan), offers a unique, non-invasive approach for the treatment of leg telangiectasias and reticular veins, as well other vascular lesions. VascuLight integrates the intense pulsed light technology of the PhotoDerm device (operating with a broad wavelength spectrum from



Fig. 1: 70-year-old female with an extensive PWS on the leg. The PWS developed a hemangiomatic component and had grown and darkened over time due to cortisone therapy. Patient had undergone prior treatment, including laser therapy. Results after five VascuLight treatments (2 with the pulsed 1064 nm laser component; 3 with the intense pulsed light component). Three perforating veins were treated.

515 to 1200 nm and a fluence range of 3 to 90 J/cm² for the treatment of leg veins up to 2 mm in depth) with high-energy fluences (up to 150 J/cm²) of a pulsed 1064 nm laser for the treatment of deeper and larger blood vessels. Long wavelength availability, combined with high fluences, allows for even the larger (up to 3 mm) and deeper (up to 5 mm) located vessels to be eradicated. Moreover, multiple pulsing capability (single, double and triple pulsing) with long pulse capacity (2-16 msec) allows for differential heating and cooling of the various sized vessels, located at different depths. Thus, there is sufficient cooling of the epidermis between pulses and minimal thermal damage to the surrounding tissue, so that even dark skin patients can be treated.

In my experience during the past two years, with over 1,000 patients, the VascuLight system was successful in treating leg veins (0.4 to 3 mm diameter), port-wine stains, hemangiomas, and upper body and facial telangiectasias.

INDICATIONS FOR VASCULIGHT TREATMENT

Leg telangiectasias and varicose veins

Leg telangiectasias and varicose veins respond extremely well to the VascuLight system. Generally, more than one treatment is necessary for excellent results. Over 90% (872 patients) of those treated for leg veins achieved 75-100% visual clearance within 3

treatments, observed at the six-month post-treatment mark. Both superficial and deep veins, as well as larger diameter veins respond well.

Hemangiomas and port-wine stains

Small hemangiomas and PWS with less than 5 mm diameter can generally be removed with a single treatment. Some patients will require multiple treatments (2-4). Lymphatic hemangiomas may not respond to therapy. Hemangiomas and port-wine stains larger than 5 mm in diameter ordinarily necessitate multiple treatments (2-4) for total clearance. Extensive hemangiomas and PWS with deep feeder veins and arteriovenous fistula are difficult to treat and may not respond to therapy.

Upper body and facial telangiectasias

Facial telangiectasias, particularly on the nasolabial areas, are difficult to treat and are generally considered to be a contraindication to sclerotherapy. Facial and upper body telangiectasias respond very well to VascuLight treatment. Total clearance was often achieved in male patients after a single treatment (97% of cases). Female patients generally required several treatments for total clearance. Two female patients taking hormonal medication and/or anti-hypertension medication developed new telangiectasias on the face at six months after treatment.



Fig. 2: 54-year-old female with large facial telangiectasias before and 2 months after 2 VascuLight treatments. (1 treatment with the PhotoDerm intense pulsed light component and 1 treatment with the pulsed 1064 nm laser component).

METHOD

Patients

A total of 1,109 patients (226 male, 883 female), ranging in age from 2 to 89 years of age (mean age for female patients of 34.8; mean age for male patients of 44.9) were treated for vascular lesions with the VascuLight device. The clinical indications treated in female patients were: (a) leg veins (0.4 to 3 mm diameter and up to 5 mm deep); (b) port wine stains (PWS) and hemangiomas with diameter less than 5 mm; (c) deep PWS and hemangiomas of diameter greater than 5 mm; and (d) facial telangiectasias (93%, 4%, 2%, and 1% of patients, respectively). Clinical indications for male patients included: (a) leg veins (0.4 to 3 mm diameter and up to 5 mm depth); (b) hemangiomas greater than 5 mm in diameter; (c) cherry hemangiomas; and (d) upper body and facial telangiectasias (64%, 7%, 10% and 19%, respectively). Female patients reported prior treatment of vascular lesions to include the following: stripping (94%), sclerotherapy (98%), and other laser treatment (34%). Previous vascular lesion treatment by stripping, sclerotherapy, and other lasers was significantly less in male patients (40%, 22%, and

17%, respectively). Of the female patients, 83% were taking hormonal medications (estrogen replacement therapy or birth control pills) and 28% were on anti-hypertension medication, while only 2% of the men reported hormone use (steroids for bodybuilding).

Treatment parameters

Fluence, number of pulses, pulse duration and pulse delay can all be customized for treatment. In this series of patients, treatment protocols for larger vessels were the following: triple pulses of 4 msec duration with a 20 msec delay between pulses and fluence up to 145 J/cm²; double pulses (10 msec pulse, followed by 5 msec pulse) with 10 msec delay between pulses and fluence of 140-145 J/cm²; and single pulse of 12-14 msec with 150 J/cm². Telangiectasias on the face were generally treated with the 515 nm cut-off filter (skin types II, III), fluence of 17.5-20.5 J/cm² and single pulses of 3-4 msec duration. Telangiectasias on the legs were generally treated with the 550 or 570 nm cut-off filter, fluence of 44-54 J/cm², and double pulses of 8-30 msec.

Patients who required more than one treatment were treated at 3-week intervals.



Fig. 3: Female with reticular veins before and after VascuLight treatment.



Fig. 4: 42-year-old female with telangiectasias before and after VascuLight treatment.

Long-term follow-up

Closure of the vessels was confirmed with ultrasound and end point of treatment was visual clearance of the vessels. Regular follow-ups were performed at 1 day, 2 weeks, 2 months, and 6 months post treatment. Long distance patients reported irregularly for follow-up, but did report for at least one long-term follow-up, so that average long-term follow-up time was 6.3 months.

Results for female patients

Treatment response for leg veins was categorized as excellent (75-100% clearance), good (50-75%), moderate (25-50%), poor (0%-25%), and no response. Patients received single, double or triple treatments of their leg veins with a 3-week interval between the treatments. An excellent response was noted for 50% of the female patients after a single treatment. Ninety percent of the female patients achieved an excellent response after three treatments. In 5% of the cases, no further response was reported after two treatments (Table 1). Those non-responders were noted to have developed sapheno-femoral junction insufficiency or gained significant weight during the follow up period and were taking hormonal and/or antihypertension medications.

Results for male patients

Responses were categorized in the same manner as for female patients. Follow-ups revealed that male patients generally responded better to treatment than female patients. After a single treatment for leg veins, 76% of patients achieved an excellent response. Ninety-two percent of the male patients achieved an excellent response following three treatments. There were no reported instances of a poor response or no response after the first or second treatment (Table 2).

Complications

Adverse reactions from VascuLight treatment were primarily transient and disappeared with little or no intervention. Complications arose predominantly in female patients and appeared to be related to hormonal medication use, a large body mass index or significant weight gain during treatment. Hyperpigmentation occurred in 32% of female patients and 7% of male patients. This was not of cosmetic concern since the hyperpigmentation resolved, by itself or with topical application of vitamin A or 4% hydroquinone, in most cases within 2 months. Long-lasting hyperpigmentation responded to the PL component of

VascuLight and cleared after 2 or 3 treatments. In 3% of female patients and 0.3% of male patients, telangiectatic matting developed 3 to 4 weeks after treatment of large vessels. Twenty-three (2.6%) female patients developed scars. Scarring occurred early in the study, during the "learning curve" and was the result of an aggressive approach. Patients with extensive vein network should be selected carefully and treated with reduced energy to avoid scarring.

DISCUSSION AND CONCLUSIONS

Overall treatment success rate for the treatment of over 1,000 patients was high for all indications. Over 90% of patients (872) treated for leg veins achieved 75-100% clearance within 3 treatments. Over 98% (57 cases) of small hemangiomas and port-wine stains achieved total clearance. Extensive hemangiomas and port-wine stains were more difficult to treat with 80% (28 cases) achieving total clearance. Facial and upper body telangiectasias were totally cleared in all 53 cases.

The efficacy for treatment of leg veins was observed in vessels with a diameter in the range of 0.4-4 mm. Occasionally leg veins with a diameter greater than 4 mm were treated; however it was observed that while it was possible to close the vessel clinically with VascuLight treatment, the vessel was still visibly evident in the skin at longer-term follow-ups. Thus for aesthetic purposes, the author opted for performing surgical removal of larger diameter veins. This is consistent with performing sclerotherapy treatment in our clinic, where large diameter vessels were found to be contra-indicated.

In this series of treatment, it was noted that male patients generally responded quicker (achieved total or excellent clearance with fewer treatments) and suffered less adverse effects than female patients. It was also noted that the percentage of female patients taking medication (hormonal, anti-hypertension) and having prior experience with sclerotherapy and surgery (stripping) was significantly higher than that of male patients. This is probably the basis for a higher percentage of adverse effects and development of new problematic vessels reported with female patients.

VascuLight appears to offer the optimal parameters for wavelength, timing, and fluence to achieve selective photothermolysis of the various types of vascular lesions with less variability in the treatment results and with fewer adverse effects.^{8,9}

TABLE 1
Clinical results for the 821 female patients treated for leg veins with the VascuLight

	Number of treatments		
	One	Two	Three
Clearance			
75–100%	50% (411 females)	74% (608 females)	90% (739 females)
50–75%	32% (262)	12% (99)	0%
25–50%	16% (131)	8% (65)	5% (41)
0–25%	2% (16)	6% (49)	0%
No response	0%	0%	5% (41)

TABLE 2
Clinical results for the 145 male patients treated for leg veins with the VascuLight

	Number of treatments		
	One	Two	Three
Clearance			
75–100%	76% (110 males)	84% (122 males)	92% (133 males)
50–75%	23% (34)	15% (22)	6% (9)
25–50%	1% (1)	1% (1)	0%
0–25%	0%	0%	2% (3)
No response	0%	0%	0%

REFERENCES

1. Goldman MP, Fitzpatrick R (eds). Cutaneous Laser Surgery. The Art and Science of Selective Photothermolysis. St. Louis: Mosby-Year Book, 1994.
2. Goldman MP, Eckhouse S. Photothermal sclerosis of leg veins. *Dermatol Surg* 1996; 22:323-330.
3. Garden JM, Bakus AD. Clinical efficacy of the pulsed dye laser in the treatment of vascular lesions. *J Dermatol Surg Oncol* 1993; 19:321-6.
4. Schroeter CA, Neumann HAM. An intense light source: The PhotoDerm VL-flashlamp as a new possibility for vascular skin lesions. *Dermatol Surg* 1998; 24:743-48.
5. Dixon JA, Heuther S, Rotering R. Hypertrophic scarring in argon laser treatment of port wine stains. *Plast Reconstr Surg* 1984; 73: 771-7.
6. Apfelberg DB. Progress report on extended clinical use of the argon laser for cutaneous lesions. *Lasers Surg Med* 1980; 1: 71-83.
7. Fronek, HS. Sclerotherapy of reticular veins. In: *Ambulatory Treatment of Venous Disease*. Goldman MP and Bergan JJ (eds.). St. Louis: Mosby-Year Book, 1996.
8. Raulin C, Schroeter CA, Weiss RA, Keiner M, Werner S. Treatment of port-wine stains with a noncoherent pulsed light source: a retrospective study. *Arch Dermatol* 1999;135(6):679-83.
9. Weiss RA, Weiss MA. Early clinical results with a multiple synchronized pulse 1064 nm laser for leg telangiectasias and reticular veins. *Dermatol Surg* 1999; 25:399-402.



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