Treatment of Facial Telangiectasia with a Small Spot Broadband Pulsed Light Source

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As presented by Arielle N.B. Kauvar, MD at the American Society for Laser Medicine and Surgery Twenty-Seventh Annual Meeting in Grapevine, Texas, April 2007

Introduction:
Facial telangiectasias are treatable with a variety of lasers and intense pulsed light (IPL) sources. While IPLs are equally efficacious as lasers in treating vascular disorders such as facial erythema, flushing, and poikiloderma, they typically require a greater number of treatment sessions than lasers to clear discrete linear or arborizing telangiectasia. Lasers that specifically target vascular lesions are built with wavelengths close to the absorption peaks of oxyhemoglobin. IPLs emit broad-spectrum visible and near-infrared light, with emission spectra controlled by filters. As a result, only a portion of the delivered fluence is specifically absorbed by hemoglobin. Additionally, most IPLs are equipped with large spot sizes which are ideal for treating large surface areas but are difficult to maneuver in tight concave spaces, such as the nasal crease and firm structures such as the nasal dorsum. Additionally, a large area of skin is treated to target a small diameter structure such as a blood vessel, increasing the risk of side effects. This study was undertaken to evaluate the safety and efficacy of a narrow band, small spot IPL handpiece specifically designed to overcome some of the limitations of traditional IPL devices in the treatment of telangiectasia.

Methods:
This was an IRB-approved prospective study of fifteen subjects treated for facial telangiectasia. Facial telangiectasia of the face, including the nose, cheeks, and chin were treated up to 3 times at 3-4 week intervals, and follow-up visits were performed at 3 and 6 months after the last treatment.

A 500-635 nm band IPL handpiece with a 6.35 mm spot size (AcuTip 500™, Cutera) was used. It is equipped with a water-cooled sapphire tip set to 10°C. Individual vessels were traced with contiguous light pulses, with up to 3 passes of the light source, to achieve an endpoint of blanching or intravascular thrombosis, manifested by a transient purple discoloration. Fluences of 20-22 J/cm² were used with a pulse duration of 14 ms.

Subjects were assessed for immediate side effects, including pain, erythema, edema, bruising, blistering, and crusting as well as long term side effects including pigmentedary alteration and scarring. Pain was graded by the patient on a scale of 1 (least pain) to 10 (most pain). The degree of improvement was assessed by comparing standardized digital photographs, which were rated on a quartile scoring system: 0 no change, 1 < 25%, 2 < 50%, 3 < 75%, and 4 up to 100% clearance.

Results:
At the time of this presentation, preliminary results are available for the first 10 subjects, with a total of 29 treatment sites, who have completed 3 treatment sessions, five of whom had their 3 month follow-up evaluation. The first 10 subjects were composed of 6 females and 4 males, ages 48-69. There were 3 chin regions, 9 cheek regions, and 17 nose regions treated and evaluated. The average pain score was 3.0. The average degree of lightening 3 weeks after 1 treatment session was 2.4 (sites, n=28). Three weeks after 2 treatments, the average lightening score was 3.0 (sites, n= 28). The average improvement score 3 months after the last treatment was 3.8 (n=9). Of these, complete clearance was achieved in 4 out of 9 sites. At the 3 month follow-up visit, all subjects who had not previously achieved >75% clearance had improved clearance of their telangiectasia. Erythema and edema occurred in all subjects immediately after treatment and lasted up to 4 days. There was no occurrence of blistering, crusting, pigmentary alteration, or scarring.
Discussion:
This report describes the clinical trial results of the use of a small spot size, narrow band IPL handpiece specifically designed for the treatment of telangiectasia. The patients tolerated the treatment well without the need for a topical anesthetic, and were all very satisfied with their treatment. The degree of clearance and incidence and type of side effects were comparable to data reported for vascular lasers, including the 585 and 595 nm pulsed dye, 532 nm KTP, and 1064 nm Nd:YAG lasers. This IPL device can achieve tissue effects similar to vascular-specific lasers by providing millisecond pulse durations, a small spot size, and a narrow bandwidth emission that closely approximates the absorption peaks of oxyhemoglobin.

Figure 1. Improvement in facial telangiectasia at 1 month after the first and second treatment visits and 3 months after the third treatment visit.

Figure 2. AcuTip 500™ handpiece with an output wavelength range of 500 to 635 nm delivered through a chilled (10°C) sapphire window 6.35 mm in diameter.

Figure 3. Results of a 49-year-old female treated three times separated by 4 weeks between treatments. a) pre-treatment, b) three months after the third treatment. This subject was rated to have >75% clearance of telangiectasia on the left cheek.
Figure 4. Treatment results of a 63-year-old male. a) pre-treatment, b) one month after second treatment. This subject was rated to have >75% clearance of the left cheek.

Figure 5. Treatment results of a 48-year-old female. a) pre-treatment, b) immediately post first treatment, c) 1 month after the first treatment. This subject was rated to have >75% clearance of the right nasal sidewall.
Figure 6. Treatment results of a 51-year-old male. a) pre-treatment, b) 1 month after first treatment, c) 1 month after second treatment. This subject was rated to have 50-75% clearance of the chin after two treatments.

Figure 7. Treatment results of a 61-year-old female. a) pre-treatment, b) one month after second treatment, c) three months after third treatment. This subject was rated to have >75% clearance of the right cheek after three treatments.