Evaluation of KTP/532® nm Laser with StarPulse™ for Treatment of Leg Telangiectasia

David Goldberg, M.D. *Chief, Dermatologic Surgery, New Jersey Medical School*
Director, Skin Laser Center of New Jersey, Westwood, New Jersey

Background: Leg telangiectasia is a cosmetic problem in a large segment of the female population. Current treatment methods include sclerotherapy, flash lamp pulsed dye lasers, and light sources. We have evaluated a recently introduced KTP/532 nm green laser with StarPulse modality.

Objective: The purpose of this study was to evaluate the effectiveness and any side effects in treatment of leg telangiectasia in 10 patients.

Methods: Ten patients with leg telangiectasia were treated with the Laserscope KTP/532 nm laser with StarPulse. The fluences used varied between 15 and 22 J/cm2 at pulse durations between 12 and 18 msec. Patients were treated three times with 6 to 8 weeks between treatments.

Results: Six months post three treatments, 30% of patients showed moderate improvement, 40% of patients showed good improvement and 20% exhibited excellent improvement. In this small study of the StarPulse KTP/532 nm laser for leg veins, we found that generally longer post-operative time is required to assess true clinical results.

Leg telangiectasias are unsightly and occur in up to 40% of the female population. Sclerotherapy is the most popular and effective method of treatment for leg telangiectasia. However, because of the side effects associated with sclerotherapy, such as pigmentary changes, ulceration and telangiectatic matting, various lasers have also been evaluated for this treatment.

The use of lasers for vascular applications is based on the Theory of Selective Photothermolysis developed by Drs. R. Anderson and J. Parrish in 1983. This theory states that the properties of laser light, in combination with the energy levels and exposure duration, must be optimized to achieve desirable results. Until recently, pulsed dye lasers emitting light in the range between 577 nm and 595 nm (which specifically target oxyhemoglobin) were used for vascular lesions.

Although quite effective on smaller vessels (less than or equal to 1 mm), these lasers emit energy within a very short period of time (.45 msec and 1.5 msec), which causes rapid coagulation of blood causing purpura, which may take up to three weeks to resolve on lower extremities. This side effect is highly undesirable in cosmetic treatment.

Recently introduced long pulsed KTP/532 nm wavelength lasers have high absorption in oxyhemoglobin and offer the advantage of pulse durations that are close to the thermal relaxation time of the target blood vessels. This evaluation was performed with the Laserscope KTP/532 nm StarPulse laser. As reported earlier, this laser is quite effective on facial telangiectasia offering complete resolution with little to no side effects on patients with Fitzpatrick skin types I, II and III. The purpose of this investigation was to evaluate the efficacy of the KTP/532 nm laser with StarPulse on lower extremity telangiectasia less than or equal to 1mm in size.

Materials and Methods

Ten female patients with Fitzpatrick skin type I and II were treated with the Orion KTP/532 nm laser with StarPulse. Leg vessels treated in this study were less than or equal to 1 mm in size. StarPulse is a high energy pulse with a duration adjustable between 1 msec and 50 msec to match the thermal relaxation time of the treated vessels. The repetition rate of pulse delivery can be adjusted between 1 and 20 pulses per second to trace vessels at a comfortable speed. In this study, patients were treated at 5 pulses per second, which allowed for a uniform tracing of vessels without overlap.

Figure 1. *Before treatment*

Figure 2. *Scabbing effect observed four to fourteen days post-operatively, gradually disappearing.*

All patients were treated with a 2 mm spot size at energy levels varying between 15 and 22 J/cm2 and at 12 to 18 msec pulse duration. The clinical trial objectives were to determine the extent of vein clearance and describe the occurrence of any adverse effects. The clinical end point during treatment was complete visual disappearance of vessels. If vessels did not completely disappear, the pulse duration was extended and the energy fluence was increased until visual vessel disappearance was achieved.

Patients were treated three times with six to eight weeks between each treatment.

No pre-operative regime was prescribed to the patients. Post-operative treatment included topical antibiotics, complete avoidance of sun exposure for up to two weeks and complete avoidance of exercise for three days.

All patients were photographed before each treatment, after each treatment, one week, one month and six months after the last treatment. Results were graded as poor (25% clearance), moderate (25-50% clearance), good (50-75% clearance) and excellent (75-100% clearance).

Patients were observed for pain, hypo- or hyperpigmentation, as well as any other side effects during each follow-up visit.

Results

Six months following final treatment with the StarPulse KTP/532 nm laser, two patients showed excellent clearance, four patients exhibited good clearance and three patients showed moderate improvement.

Improvement was not usually seen initially following the treatment and became more evident six months after the last treatment.

Immediately following each treatment there was some noticeable redness, which turned into scabbing on the fourth day after the treatment and then gradually sloughed off over a two-week period. There were no textural or pigmented changes observed. There was no pain at any of the treated sites.

Discussion

This evaluation was conducted to determine the effectiveness of the Laserscope KTP/532 nm StarPulse laser in the removal of lower extremity telangiectasia. The role of long pulsed KTP/532 nm lasers in the treatment of vascular lesions is currently being evaluated. However, its high absorption in oxyhemoglobin and the long pulse duration make this laser quite effective in the treatment of vessels up to 1 mm in size.

The longer pulse durations emitted by the Laserscope KTP/532 nm StarPulse laser are consistent with the Thermal Relaxation Time of larger vessels, which allows for gentle intravascular coagulation of blood followed by collapse and sealing of vessels. Using long pulse durations in combination with high energy levels led to the clinical improvement seen in this study. As noted above, greater improvement was noticed at 6 months following the final treatment than at 1 month. The extended healing process led us to believe that the destruction of the vessels was greater than we could visually observe.

Overall, the KTP/532 nm laser with StarPulse proved effective in the treatment of lower extremity telangiectasia of up to 1mm in size with low side effect occurrence.

Figure 3. Before treatment

Figure 4. Six weeks post first treatment

Figure 5. Post second treatment

Figure 6. Six months post third treatment

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LASERSCOPE®

Corporate Headquarters
3052 Orchard Drive
San Jose, CA 95134-2011
(800) 356-7600 Customer Response Center
(408) 943-0636 Corporate Office
(408) 943-1051 FAX

Laserscope France S.A.
Parc Technologique
18 rue du Bois Chaland
91090 LISSES
France
33/1 60 86 20 49 TEL
33/1 60 86 14 88 FAX

Laserscope (UK) Ltd.
Raglan House
Llantarnam Park
Cwmbran
Gwent, NP44 3AX
United Kingdom
44/1633-838081 Office
44/1633-838161 FAX

NWL-Laser-Technologie GmbH
A Laserscope Company
Bräunleinsburg 18
D-91242 Ottensoos
Germany
49/9123/96720 Office
49/9123/967244 FAX

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