1:30pm - 2:00pm (Invited)
LMB5.1 Room B1

Treatment of Leg Veins: A Comparison of Laser Therapy with a Noncoherent, Multiwave Light Source

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Various lasers (CO_2 laser, Nd:YAG, argon, tuneable dye, and flash-lamp pulsed dye lasers) have been used for treatment of leg veins with minimal benefit and various adverse sequelae. A phototherapy device producing pulsed (100 μsec to 20 msec) incoherent light as a continuous spectrum 550 nm to 1200 nm has been developed to target both oxygenated and deoxygenated hemoglobin and to reach larger and deep vessels.

Unsightly or symptomatic venulectases occur on the legs of approximately 35% of women and 10% of men in the United States. These leg vein telangiectasias are 40 to 60 microns in diameter in the upper dermis, enlarging to 100 to 400 microns in the deeper dermis, and up to several mm in diameter in the subcutaneous tissues. These vessels are venous in origin and are composed of endothelial cells covered with collagen and muscle fibers. Telangiectasia initially appear as red streaks, but eventually turn blue in color and larger in diameter. It is important to realize that these telangiectasia are connected to the high pressure vascular flow from feeding reticular and varicose veins.

Though up to 50% of patients with these venulectases have associated symptoms (aching pain, swelling), the most common reason for seeking treatment is for cosmetic improvement. Therefore, it is important that treatment should be as free from adverse sequelae as possible. Treatment of varicose veins by first closing off the high pressure reflux points with either surgical ligation or sclerotherapy followed by sclerotherapy of the remaining abnormal vessels forms the basis for rational therapy.

Though treatment with the CO_2 and Nd:YAG lasers has been attempted, these lasers produce too much nonspecific thermal damage to be useful in treatment of leg veins and invariably result in healing with scar tissue.

The argon laser and tuneable dye laser have had limited success in treatment of leg telangiectasia, with scarring, epidermal hyperpigmentation, hemosiderin hyperpigmentation and unresponsiveness to treatment being more common than a good response.

The flash-lamp pulsed dye laser is targeted to the superficial 10 to 40 μm vessels of portwine stains, and though the 585 nm wavelength may penetrate 1.5 mm effectively, the larger vessels and higher pressure venous flow of venulectases make these vessels more difficult to treat. We have found vessels less than 200 μm in diameter which persist following sclerotherapy to be responsive to therapy. However, hemosiderin pigmentation is a troubling side effect.

The ESC pulsed flash-lamp can be shuttered from 100 μsec to 20 msec and its spectrum can be varied by the use of absorptive filters. Experimental studies of treatment of the dorsal marginal rabbit ear vein ranging in size from 0.4 to 0.8 mm in diameter revealed a pulse duration of 5 msec and fluence of 15 J/cm^2 with a spectrum of 510 nm to 1200 nm producing the most specific vascular damage.

This system may be useful in treatment of leg venulectases 0.4 mm to 2.0 mm in diameter and clinical studies are now in progress to determine the most specific treatment parameters for these lesions.