LIGHTMED
Enlightening Vision

Clinical Case Report

Choosing the Right Wavelength: Effectiveness of Yellow

By: Tarek Alasil, MD

Key Points:

- Compared to Green laser, Yellow laser provides a superior safety profile when treating macular pathology/edema.
- The LIGHTMED Yellow laser with SP-Mode® Microsecond Laser Technology is effective and safe in treating central macular edema.

Diabetic retinopathy is one of the leading causes of blindness worldwide. Diabetic Macular Edema (DME) has been well established as an important cause of vision loss in diabetic patients [1-3]. Since its introduction to the clinical practice more than 50 years ago, laser treatment has proven to be an important tool in the armamentarium to fight diabetic retinopathy and diabetic macular edema.

Lasers with sub-threshold microsecond laser technology play an essential role in the treatment of DME. When compared to the conventional laser burns, sub-threshold laser technology can certainly provide the advantage of delivering precise treatment to the target areas while sparing the photoreceptors within the outer retina. SP-Mode® Microsecond Laser Technology improves the visual outcome in selected DME cases and improves the safety profile with the ability to repeat treatments. SP-Mode® delivers the laser power in short bursts (ON and OFF phases), which allows the retinal pigment epithelium (RPE) to cool down during the OFF phase; and thus, prevents the formation of laser burns and scars. This selective treatment delivered during the ON phase induces photo-stimulation of the tissue rather than photocoagulation.

When considering wavelengths, LIGHTMED has the widest range of choices in a single laser system (green 532nm, yellow 561nm or 577nm, red 670nm and infrared 810nm). This LIGHTLas TruScan laser system can be customized to meet the retina specialist's needs for selective tissue targeting. For example, the yellow laser is proven as a safe wavelength that is easily penetrable through cataracts, with high absorption in melanin and hemoglobin, and is less absorbed by xanthophyll (the protective pigment within the macula). Lower energy is required with yellow (compared to green), and less energy is spread with minimal scattering of light.

Furthermore, the yellow wavelength is directly absorbed by the oxyhemoglobin within the microaneurysms and the inner retinal circulation in patients with DME. It will target the treatment area without destroying the underlying outer retinal layers (specifically the photoreceptors) and the RPE. Therefore, the yellow wavelength proves to be a safer treatment option for macular edema.

CASE 1:

A 71 year old woman with severe non-proliferative diabetic retinopathy and significant diabetic macular edema as well as optic nerve cupping in

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the right eye (Figure 1). The long-term effects of anti-VEGF agents on intraocular pressure and glaucoma progression are still unknown. After discussing the risks and benefits of different treatment modalities, the right eye underwent treatment with the LIGHTMED TruScan 577 Yellow Laser, using the following parameters: 100 microns spot size, 100 ms exposure time, 120 mW power, and 85 spots of focal laser. Her vision in the right eye improved from CF (counting fingers) to 20/400. Within 4 weeks after a single session of yellow laser treatment, the central macular thickness of 659 microns decreased to 574 microns, and the swelling reduced significantly (Figure 2).

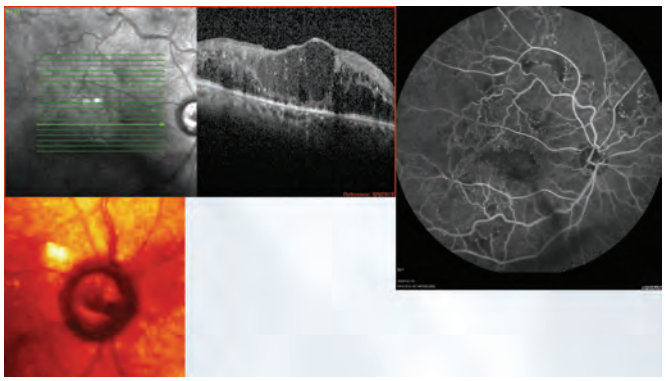

Figure 1.

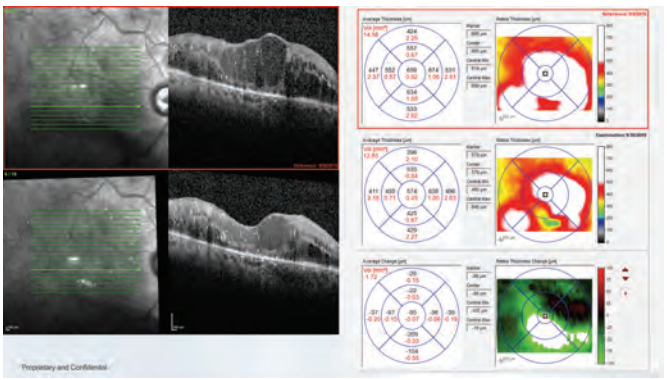

Figure 2.

CASE 2:

A 50 year old man with severe non-proliferative diabetic retinopathy and persistent diabetic macular edema in both eyes who had received multiple intravitreal injections with bevacizumab in both eyes. The left eye was treated with focal laser at 110 mW, 100 microns spot size, 100 ms duration, and 207 SP-Mode® shots (duty cycle of 5%). Within 10 weeks, the patient's visual acuity in the left eye improved from 20/50 to 20/30. The macular edema improved, as shown on the thickness map, where the central macular thickness decreased from 384 microns to 344 microns, and a big island of swelling shrunk significantly after only one session of treatment (Figure 3).

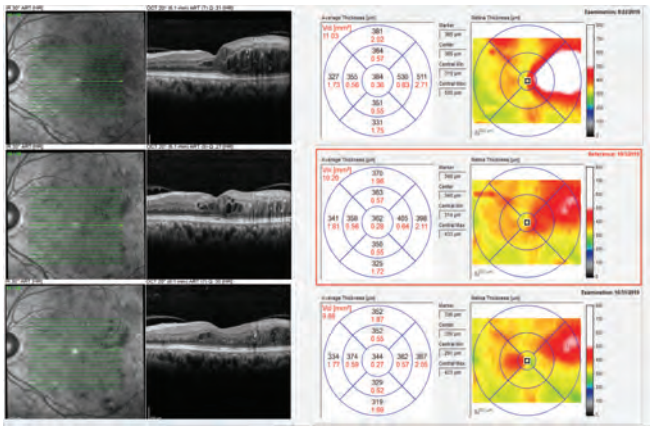

Figure 3.

CONCLUSION:

In addition to its applications in panretinal photocoagulation and laser retinopexy, the yellow wavelength is effective and safe in the treatment of macular edema. The SP-Mode® Microsecond Laser Technology has a better safety profile when treating the central macula. SP-Mode® is a viable treatment option in glaucoma patients with macular edema.

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