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MicroPulse Laser Therapy in the Management of Diabetic Macular Edema

BY ALLEN C. HO, MD; ROBERT L. AVERY, MD; LAWRENCE S. MORSE, MD, PHD; AND ELIAS REICHEL, MD

This article summarizes topics discussed during an educational webinar on MicroPulse laser. To view the complete webinar, go to http://bit.ly/2dKWVic.

Laser Yesterday is Not the Same as Laser Today

There remains an unmet need in the treatment of diabetic macular edema, and laser therapy is still a relevant option.

By Allen C. Ho, MD

Retinal laser therapy has evolved both in hardware and in treatment protocols. Hardware has transformed from water-cooled, tube-based energy sources to smaller solid-state photocoagulators. Treatment has changed from thermal laser burns to low-intensity laser burns to nonvisible, sublethal protocols that result in no laser burn during or after treatment, such as MicroPulse laser therapy (IRIDEX).

MicroPulse technology differs from continuous-wave (CW) lasers in that it divides the power into trains of microsecond "on" pulses with longer "off" times that allow a complete relaxation of energy to avoid thermal buildup. There is no thermal necrosis.[1] Instead, there is a stress response to induce a biological effect.

Increasing evidence demonstrates MicroPulse to be safe and effective[2-5] for diabetic macular edema (DME) and other macular conditions with leakage and edema, such as central serous retinopathy (CSR). I believe it is an underutilized tool, and its benefits should be considered as a relevant option in the management of DME.

MicroPulse and Your Clinical Practice

The benefits of incorporating MicroPulse laser therapy into your practice.

By Robert L. Avery, MD

MicroPulse laser therapy is a safe, repeatable treatment that is easy to perform in the examination lane, and well-tolerated by patients. It reduces the cost for many patients, practices, and the health care system because it may eliminate other more expensive treatments for DME. In addition, MicroPulse can be used as monotherapy or in combination with other interventions.

Patient Selection

In my experience, MicroPulse is a valuable tool for patients who refuse injections, and for initial treatment of clinically significant edema that is just threatening or involving the fovea, as these patients can often avoid injections. I use MicroPulse before anti-VEGF agents for juxtafoveal edema of any thickness, or mild foveal edema when the vision is good. When there is moderate edema or worse, I tend to start with anti-VEGF as it seems to work more rapidly. The beauty of MicroPulse is that it does not leave laser scars in and around the fovea and can be used safely and repeatedly.

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>
> —*Robert L. Avery, MD*

What to Expect During Treatment

There are no visible tissue changes during or after MicroPulse. Treatment response is usually slower than pharmacotherapy, but it is more durable. Patients experience no discomfort compared to intraocular injections, and some

A Variety of Uses for MicroPulse

By Robert L. Avery, MD, and Elias Reichel, MD

Robert L. Avery, MD: I prefer to use MicroPulse laser as first-line treatment for patients with CSR over CW laser or photodynamic therapy. A recent randomized trial[6] compared MicroPulse to photodynamic therapy and found similar results. I find MicroPulse laser to be easier to perform, and it is less expensive for the patient and health care system.

Elias Reichel, MD: MicroPulse has a role in treating patients with branch retinal vein occlusion.[7] Patients with radiation retinopathy also are good candidates, especially those who have not had success with prior corticosteroids or anti-VEGF injections. However, these patients need to be observed closely and require re-treatment with MicroPulse for 4 to 6 months.

Practical MicroPulse Tips for Retina Applications

By Elias Reichel, MD

One advantage of MicroPulse is that you get clinical efficacy without damage, and the results of reduction in DME are comparable to the modified grid focal laser therapy[3] promoted by the ETDRS, with the benefit of no or limited tissue damage seen at any time point postoperatively, and it can be used to treat the fovea. In studies by Vujosevic,[4,5] it is apparent that there is significant improvement in retinal sensitivity with MicroPulse therapy, which is not observed in CW laser. Clinical results with MicroPulse for DME suggest that high-density spots are important,[3] which means that you must have confluent or near confluent therapy of the macula to treat DME.

A few practical tips for using MicroPulse for retina applications:

- Choose the right preset. The IQ 577 laser offers 10 presets where you can set, for instance, MicroPulse, CW panretinal photocoagulation, and CW for retinal tears and holes.
- Confirm MicroPulse is on.
- Confirm 5% duty cycle.
- Confirm audio is enabled when using the wireless footswitch.
- Place confluent high-density applications: think hundreds of spots, not tens of spots.
- Be aware of eye landmarks since you will not visualize laser changes in the retina. I usually choose a landmark on the retina for the top right-hand corner of the TxCell grid so that I know where I am treating.
- Have patience and look for a therapeutic response over time.
- Be aware of different pigmentation. For a lightly pigmented patient, or one with a dense cataract, I use 400 mW. If I have a more darkly pigmented patient, I will start at 280 to 320 mW. You will visualize a therapeutic response over time and titrate that way as opposed to titrating at the time that you are doing the procedure.

report a subjective improvement in VA even in the absence of significant improvement in central retinal thickness.

MicroPulse as an Adjunct Significantly Reduces Anti-VEGF

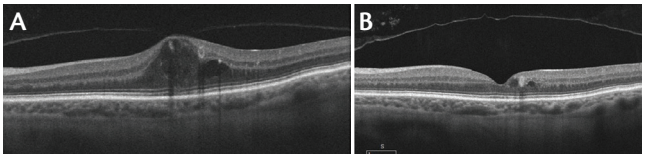
Clinical evidence shows a synergistic effect that significantly reduces the burden of anti-VEGF.

By Lawrence S. Morse, MD, PhD

I participated in a retrospective chart review of patients with subfoveal DME and a history of MicroPulse laser therapy and/or anti-VEGF injections.[8] There was a total of 14 patients: 7 in group 1, who received both MicroPulse laser and anti-VEGF injections; and 7 in group 2, who received anti-VEGF injections only.

Patients who received anti-VEGF injections had approximately nine injections over a 12-month period. Patients who had a combination of MicroPulse and anti-VEGF injections received, on average, four injections over the same time period. That is approximately a 60% reduction in treatment burden, which is statistically significant ($P = .0016$). ■

Case Example. A 68-year-old man with noninsulin-dependent diabetes mellitus presented with extrafoveal edema and a history of an unsuccessful anti-VEGF injection; he was resistant to another injection.



Courtesy of Elias Reichel, MD

His pretreatment VA was 20/50 (A). After 16 months and two MicroPulse treatments, his VA is 20/40 (B).

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