Choroidal melanoma is a malignant tumor of the eye that is typically treated with some form of radiotherapy, such as plaque radiotherapy.\(^1\) This treatment can lead to cataract, retinopathy, or maculopathy, all of which may result in reduced visual acuity.\(^2\) One of the most common causes of visual acuity loss following radiation therapy is radiation retinopathy or maculopathy, a condition that often develops when radiation exposure continues beyond tissue tolerance,\(^3\) which can lead to irreversible blindness.\(^4\)

Treatment for radiation maculopathy typically includes scheduled intravitreal anti-VEGF injections, usually either bevacizumab (Avastin, Genentech) or ranibizumab (Lucentis, Genentech).\(^5\) Studies have shown intravitreal bevacizumab injections to decrease macular edema and produce moderate increases in visual acuity; however, lasting effects have not been demonstrated.\(^6\) Focal laser therapy may also moderately improve visual acuity, but, again, studies have shown benefits to be short term.\(^7\)

Unlike conventional laser therapy, in micropulse laser technology a continuous-wave laser beam is broken into short bursts of low energy pulses interspersed with brief rest periods. These rest periods allow the tissue to cool between laser bursts, which prevents tissue damage and produces outcomes that are equal or superior to conventional laser treatment.\(^8\)–\(^11\) Because the tissue remains viable, it is possible that the treatment stimulates a restorative response, triggering regeneration in healthy cells and creating longer-lasting positive outcomes. Consider the following patient case.

### AT A GLANCE

- Treatment of choroidal melanoma with radiotherapy can lead to other conditions, such as cataract, radiation maculopathy, or radiation retinopathy.
- Both radiation maculopathy and retinopathy can be treated with anti-VEGF injections and/or focal laser therapy.
- Micropulse laser delivers short bursts of low energy pulses divided by rest periods; the cooling period prevents tissue damage, and the treatment may stimulate a restorative response.
In November 2009, the patient underwent focal laser treatment in her right eye. Fluorescein angiography at this time showed florid macular edema. She subsequently received two additional bevacizumab injections over the next 2 months, but her vision never demonstrated improvement. By August 2010, her central retinal thickness (CRT) was 510 μm (Figure 1). She was again treated with focal laser and bevacizumab. Her CRT showed minimal improvement, remaining in the mid to high 400-μm range.

In September 2014, the patient’s CRT measured 386 μm. She was treated with the IQ 577 laser (Iridex) with a standard slit-lamp adaptor using the parameters 400 mW power, 200 μm spot size, 200 ms exposure duration with 100 ms intervals, and 5% duty cycle. A Goldmann 901 macular lens (Haag-Streit) was used for visualization.

At 1 month after the procedure, her CRT had decreased to 316 μm (Figure 2). Since this last treatment, the patient has shown a significant improvement in vision, and the edema is no longer present.

During her most recent visit in June 2015, her CRT was 307 μm. Fluorescein angiography showed no leakage, although her visual acuity was still 20/400, most likely due to the degeneration of photoreceptors prior to treatment. However, for the first time, the patient perceived improved vision. She has received no further treatment.

**CONCLUSION**

The success of the treatment in this case could be due to the fact that the patient’s edema was subfoveal and had been difficult to reach with conventional laser. With micropulse laser, we were able to maneuver much closer to the fovea. The significant improvement in anatomy and in her perception of vision was dramatic. Despite years of treatment with traditional laser and anti-VEGF agents, this patient’s condition had continued to deteriorate. One micropulse laser treatment has left her retina in an anatomically near-perfect state.