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Using MicroPulse Technology for Central Serous Chorioretinopathy

BY PROF. DR. SASCHA FAUSER

Central serous chorioretinopathy (CSCR) is a difficult disease. In its acute phase, there is often a spontaneous resolution of fluid where you do not have to treat. But if it becomes chronic, CSCR can result in permanent vision loss with extensive RPE changes.

Observation and anti-VEGFs are not the only treatment option, and are not the best option in many cases. For the majority of patients with CSCR, there are really only two viable treatment options: 577 nm MicroPulse laser and photodynamic therapy (PDT). I prefer using the Supra Scan 577 laser (Quantel Medical) because it is easier to perform than PDT. If the patient does not improve after two treatment sessions, we will then consider PDT.

We use indocyanine green angiography (ICGA) and fluorescein angiography (FA) to identify the areas of hyperfluorescence and the corresponding "hot spots" that are going to need a dense treatment. Clinicians need to titrate the power level at a normal area of the retina, near the affected area in micropulse mode (160-µ spot size, 0.2 s and duty cycle 5%), then increase the power until there is a small effect, and subsequently decrease the power to 50% of that for treatment (Figure 1). The MicroPulse laser spots are delivered in a confluent manner thanks to the multispot delivery system.

Clinical Study

In our study, we compared 577 nm MicroPulse and half-dose PDT treatment options in chronic CSCR. We included 38 patients with chronic CSCR (defined as a disease duration of more than 4 years). At last follow-up (about 5 months post-treatment), 24% were dry, 50% showed some improvement, and 26% had no change. Since these patients were chronic cases, the nonresponders were then provided full-dose PDT.

Of the patients who were refractory to PDT therapy before our study, 61% responded to MicroPulse laser with a decrease in central retinal thickness (CRT). We continue to believe that both options are necessary to have in our armamentarium and can benefit from both MicroPulse laser and PDT therapy. The patients in our study who were resistant to PDT but responsive to laser had a reduction in CRT from more than 400 µm to 287 µm and a visual acuity increase from 0.36 logMAR to 0.30 logMAR; given the long disease duration, this was somewhat surprising.

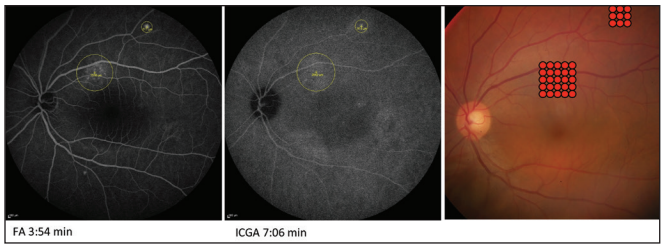

Figure 1. A patient with chronic central serous chorioretinopathy who underwent 577 nm MicroPulse laser treatment.

Figure 2 shows survivor curves; the left image shows the reduction of the CRT (the morphological response), in terms of time. Most patients responded quickly. We have found this to be typical—if patients are going to respond to 577 nm MicroPulse laser, it is a quick response. However, the image on the right shows visual acuity response time, where there is a time lag. This tells us that the macula needs to dry before vision can improve.

In summary, the 577 nm MicroPulse laser is a safe and efficacious treatment option in patients with CSCR. It should be considered for both chronic cases or after full-dose PDT treatment failure.

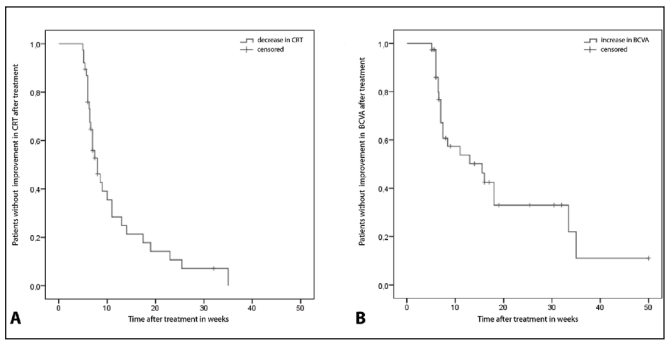

Figure 2. Survivor curves in central retinal thickness (A) and visual acuity (B).

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Consider MicroPulse to Treat CSCR

BY EMIN ÖZMERT, MD

Central serous chorioretinopathy (CSCR) can be considered chronic when there is a persistent subretinal fluid accumulation for at least 6 months. If the disease becomes chronic, it can result in irreversible vision loss. There are numerous treatment options for CSCR. For example, photodynamic therapy (PDT) is often considered, but the method is invasive and known for adverse effects. At our clinic, we prefer to use the 577 nm MicroPulse laser therapy (Supra Scan 577, Quantel Medical). This laser "photostimulates" the retinal pigment epithelium layer and induces biological effects that are primarily anti-angiogenic and restorative.

Clinical Study

Our clinical study compared the efficacy and safety of the 577 nm MicroPulse laser (n=15 eyes) versus the low-fluence PDT (n=18 eyes) in the treatment of chronic CSCR. This prospective, comparative study followed patients for at least 1 year after treatment.

The 577 nm MicroPulse arm used the treatment parameters in Table 1. After the power titration, we ensured a proper application and placement of the subthreshold laser spots while using the multispot delivery system for the MicroPulse laser application.

Figures 1 and 2 show the results: the MicroPulse laser was as effective as low-fluence PDT in mean BCVA and subretinal fluid reduction, but without the visible scarring that is typically present after PDT. After a single session in most cases, we found more cases with ≥ 5 ETDRS letter increase and less cases with a decrease in ETDRS letters in the MicroPulse group compared with the PDT group (Figure 1); a higher rate of complete resolution of subretinal fluid in the laser group compared with the PDT group (Figure 2); and no unresponsive cases in the MicroPulse group.

When treating CSCR, be aware the SRF effect with the laser may be a bit slower than we traditionally expect with PDT. However, published studies suggest the MicroPulse laser results are superior to injection and thermal laser.[1-3] Our 1-year results appear to add to that body of work, and suggest that the 577 nm MicroPulse laser should be considered a first-line treatment for chronic CSCR.

In summary, the 577 nm MicroPulse laser is a noninvasive procedure, it has a tissue-sparing effect, and there is no thermal damage. It can also be repeated after 4 to 6 months, without fear of damaging the foveal avascular zone. ■

TABLE 1. TREATMENT PARAMETERS/ PROCESS SUMMARY

Step 1	Step 2
TITRATE POWER USING MONOSPOT & MICROPULSE	**MULTISPOT & MICROPULSE TREATMENT SETTINGS**
-Spot Size: 160 µm	-Resume function activation
-Exposure Time: 0.2s (200ms)	-Spot Size: 160 µm
-Duty Cycle: 5%	-Spacing: 0
	-Exposure Time: 0.2s (200ms)
Increase of the power level (step by step) until reaching a just visible endpoint (barely visible threshold burn).	-Duty Cycle: 5%
	-Use **50%** of the power level reached during the titrate step for treatment.

BCVA Change	Low-fluence PDT n (%)	MPL n (%)
Increases ≥ 5 ETDRS letters	6 (33.3%)	10 (66.7%)
Stable (within ± 4 ETDRS letters)	6 (33.3%)	1 (6.7%)
Decrease ≥ 5 ETDRS letters	6 (33.3%)	4 (26.7%)
Total	**18**	**15**
P = 0, 101		

Figure 1. BCVA change differences between the 577 nm MicroPulse laser therapy and photodynamic therapy groups.

Treatment Response	Low-fluence PDT n (%)	MPL n (%)
Complete resolution of SRF	13 (72.2%)	12 (80%)
Incomplete resolution of SRF	1 (5.6%)	1 (6.7%)
Unresponsive	3 (16.7%)	None
Recurrence	1 (5.6%)	2 (13.3%)
Total	**18**	**15**
P = 0, 486		

Figure 2. Subretinal fluid resolution between the 577 nm MicroPulse laser therapy and photodynamic therapy groups.

1. Koss MJ, Beger I, Koch FH. Subthreshold diode laser micropulse photocoagulation versus intravitreal injections of bevacizumab in the treatment of central serous chorioretinopathy. Eye (Lond). 2012;26(2):307-14.
2. Yadav NK, Jayadev C, Mohan A, et al. Subthreshold micropulse yellow laser (577 nm) in chronic central serous chorioretinopathy: safety profile and treatment outcome. Eye (Lond). 2015;29(2):258-64.
3. Kim JY, Park HS, Kim SY. Short-term efficacy of subthreshold micropulse yellow laser (577-nm) photocoagulation for chronic central serous chorioretinopathy. Graefes Arch Clin Exp Ophthalmol. 2015;253(12):2129-35.

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