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SubLiminal Laser Therapy for CSC

In the treatment paradigm for central serous chorioretinopathy (CSC), this technology is appropriate for chronic CSC.

By Lebriz Altay, MD

Central serous chorioretinopathy (CSC) is a common posterior pole disease with a high recurrence rate and etiology. Its pathogenesis is ambiguous; however, it is characterized by the decompensation of the retinal pigment epithelium (RPE) and usually results in serous detachment of neuroretina, serous pigment epithelium detachment (PED), and RPE atrophy. CSC is usually unilateral and presents as thickened pachychoroidal vessels with hyperpermeability.[1-4] The effect on the retina—sudden loss of central vision—is usually self-limited unless CSC is accompanied by progressive and irreversible photoreceptor damage or RPE atrophy.[5] CSC affects mainly young or middle-aged (25-50 years) men, and patients often complain of blurred vision; a dark spot in the central visual field; and metamorphopsia, micropsia, mild dischromatopsia, and reduced contrast. Other risk factors include stress, corticosteroids use, and certain genetic susceptibilities.

Clinical routine diagnosis and differentiation of CSC subtypes can be challenging. Until recently, clinicians hadn't reached an agreement about the different subtypes. Acute CSC was commonly diagnosed if the duration of the individual symptoms was less than 3 to 6 months. Spontaneous resolution occurs in around 80% of acute CSC cases.[6] If no resolution was observed within 4 to 6 months, CSC was regarded as chronic, and therapeutic intervention was recommended.[7] In most studies, signs of chronic CSC include diffuse leakage and extensive RPE changes.

Recently, a novel nomenclature system was proposed for the grading of CSC. This classification system is based on clinical symptoms and multimodal imaging[8] and allows the differentiation between various subgroups. Hereby, CSC is defined either as simple (RPE alterations ≤ 2 disc area [DA]) or complex (RPE alteration > 2 DA). Furthermore, this classification takes into account the onset of the disease (primary, recurrent, or resolved), the duration of the symptoms (persistent, if activity > 6 months), the morphological changes in the outer retina (with or without outer retinal atrophy), and the presence of neovascular membranes. Atypical bullous CSC can be graded as a further CSC subtype. I believe that this new classification will allow better consensus and patient selection in future CSC trials.

TREATMENT OPTIONS

Over the years, a variety of treatment options have been proposed for CSC, including mineralocorticoid receptor antagonists (eg, eplerenone and spironolactone), photodynamic therapy (PDT) and half-dose (HD-PDT), intravitreal injection of anti-VEGF agents, laser photocoagulation, and subthreshold pulse laser therapy. Before initiating any treatment for CSC, it's important to consider all contraindications, including steroid use, pregnancy, Cushing syndrome, and even initiation of a new medication. I also recommend performing an OCT angiography to exclude choroidal neovascularization.

Of the treatments mentioned, HD-PDT is the most established option for CSC. Its safety and effectiveness are supported by high-quality evidence.[9] A PDT treatment, however, requires intravenous injection of photosensitive medication verteporfin and longer time to perform, and it is not universally applicable due to the higher costs of the drug. Additionally, contraindications to PDT include pregnancy, porphyria, and poor liver function. After repeated use, very rarely, side effects including choroidal ischemia and RPE atrophy may occur.

Subthreshold laser therapy is a safe alternative that can be repeated as needed to treat the areas of choroidal hyperpermeability, especially in cases where PDT is contraindicated or not available. Subthreshold laser is not associated with scars or choroidal ischemia. The recent landmark PLACE trial emphasized the superiority of the HD-PDT compared to 810-nm subthreshold laser therapy.[9] There is, however, a possible undertreatment in this trial linked to the laser settings. In the PLACE trial, no individual energy titration was applied, and there was no pattern application, which could complicate a homogenous application of invisible laser spots (Table).

TABLE: PLACE TRIAL—HD-PDT VS SUBLIMINAL LASER THERAPY FOR THE TREATMENT OF cCSC

	HD-PDT (n = 67)	Subthreshold 810-nm Laser (n = 66)	
Completely dry	67.2% (45/80)	28.2% (19/66)	*P* <.001
BCVA Change in ETDRS Letters	+6.78 ± 8.54	+4.48 ± 7.29	0.099

- Different settings: 810-nm laser, non-multispot delivery, no titration (fixed energy)
- Possible inclusion of patients with subclinical CNV
- In the final visit: no significant difference in BCVA change

Subthreshold laser therapy with the 577-nm SubLiminal fiber laser (Quantel Medical) allows multispot delivery and individual titration to avoid an undertreatment. The treatment should be guided by fluorescein or indocyanine green angiography (FA or ICGA) and performed as a dense, multispot treatment. In order to achieve a homogeneous application of the spots, I use a 160-µm spot size, a fixed duty cycle of at least 5%, and a laser lens (Volk Area Centralis 0.94x).

TREATMENT GUIDELINES

SubLiminal laser therapy is an appropriate option for chronic CSC (cCSC). The two steps of the procedure are outlined here.

Step No. 1: Power titration. The energy level is chosen individually by applying a single spot in SubLiminal mode in 5% duty cycles in the periphery. The power level is then increased incrementally until a barely visible threshold burn is observed in that region. The energy is then reduced by 50%, and the power dose is evaluated in a healthy area of the peripheral macula rather than in the pathological area. During the titration phase, the power should not exceed 1.2 W. If no visible threshold occurs at 1.2 W, this power is used as a reference level and halved (ie, 600 mW) for the treatment.

Step No. 2: Dense multispot SubLiminal treatment. The dense multispot treatment is performed on the hyperfluorescent areas on mid-phase ICGA for full application or on mid-phase FA for hot spots. Transfoveal application is not recommended, and treatment should therefore avoid the area within 500 µm from the center of the fovea.

During the laser treatment, no visible reaction should be observed, and application of the laser spots should be homogenous. We recommend monitoring patients for 6 to 8 weeks after the initial treatment in order to determine if subsequent treatment is indicated. Three case presentations are outlined in the accompanying sidebar.

CONCLUSION

The use of SubLiminal laser therapy is a safe alternative for the treatment of cCSC. We recommend the application of the SubLiminal laser in a dense multispot pattern after individual titration and the monitoring of patients for at least 6 to 8 weeks after the initial treatment. If persistent CSC occurs, retreatment should be considered. Based on the novel classification, a new study and better patient selection practices could help practitioners to reconsider the role of subthreshold laser for CSC. ■

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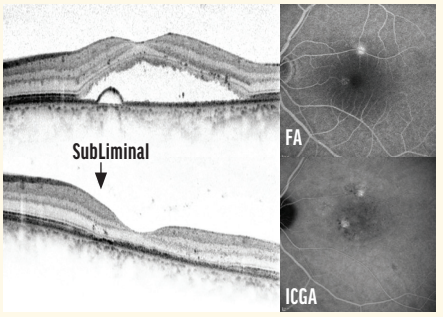
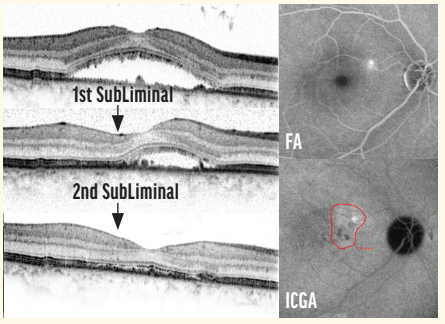
Case Examples

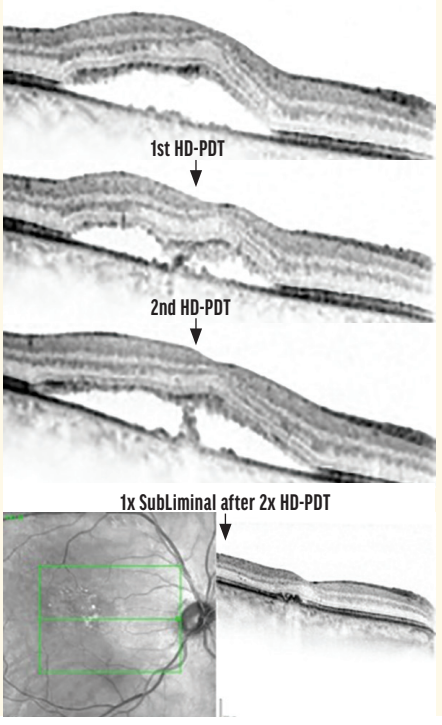
Case No. 1. A 45-year-old man presented with persistent subretinal fluid for the past 5 months. His baseline BCVA was 0.8 Snellen. The patient was scheduled for SubLiminal laser therapy. Eight weeks later, the retina was completely dry, and BCVA was 0.8 Snellen.



Case No. 2. A 38-year-old man presented with persistent subretinal fluid for the past 11 months and a BCVA of 0.5 Snellen. The patient was scheduled for SubLiminal laser therapy. After the first laser treatment, a reduction in the subretinal fluid was noticeable, but we recommended a retreatment. Six weeks after the second therapy, the retina was completely dry. BCVA was 0.8 Snellen.



Case No. 3: A 60-year-old woman presented with persistent subretinal fluid for the past 4 months and a BCVA of 0.6 Snellen. The patient was scheduled for HD-PDT. After the first treatment, the subretinal fluid persisted. A second HD-PDT was performed, but again after the treatment subretinal fluid was present. A third intervention, this time SubLiminal laser therapy, was performed. Eight weeks after SubLiminal laser therapy, the retina was completely dry, and BCVA was 0.8 Snellen.



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