

Case Report

Satisfying result after endpoint management laser in acute central serous chorioretinopathy: a case report

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ABSTRACT

Central serous chorioretinopathy (CSC) is a condition where there is a buildup of fluid under the retina, specifically at the macula, causing neurosensory retinal detachment. This condition affected by many factors, one of them was psychological stress and male gender. CSC is a self-limiting disease, but in acute, chronic, and recurrent CSC in functionally monocular patient also could be considered as giving treatment. We presented a case of a 44 years old functionally monocular patient treated successfully with Endpoint management (EpM) Laser. After EpM laser was done, the subretinal fluid absorbed resolved, no darker spot straight ahead, and central foveal thickness in right eye was decreasing on the 14th day post operative. Treatment of CSC with visual loss is successful and efficient with EpM laser. Without harming retinal pigment epithelium, it accelerates sub-retinal fluid absorption and enhances visual rehabilitation.

Keywords: EpM laser, CSCR, Acute, Surgery

INTRODUCTION

Acute central serous chorioretinopathy (CSC) has a relatively favorable prognosis, which might result in a certain degree of visual acuity loss. Spontaneous remission is commonly found in cases of acute CSC, resulting in the resolution of retinal detachment and restoration of visual acuity.¹ But in some cases, also could be considered as giving treatment. We presented a case of a 44 years old functionally monocular patient whose condition worsen after pharmacological treatment, and referred for EpM Laser treatment and achieved a favourable outcome.²

CASE REPORT

A 44-year-old man who complained of visual disturbance in his right eye since, one month ago. He experienced central blurred vision, make him difficult in reading text and recognizing people's face. There are no reported

visual abnormalities such as photopsia (flashes of light), scotoma (blurred vision resembling tunnels or closed curtains), conjunctival injection (red eyes), ocular discomfort, or purulent discharge. No reports of visual enlargement or reduction or of perceiving distorted lines were made in the left eye. Pain and trauma histories were denied. The patient worked as an employee in private sector and currently got much heavier workload. The patient admitted he had issues in managing his life in a day, and having perfectionist nature that made him felt more burden from his work. There was no history of high blood pressure, diabetes, or high cholesterol level. The patient didn't do exercise regularly because of his job. The patient already had a family. He had bilateral presbyopia (add+0.50 D). The ophthalmology examination revealed visual acuity (VA) 6/12 for the right eye, improvement with glasses 6/7.5 and 6/6 for the left eye BCVA. Intraocular pressure: 10.7 mmHg in the right eye and 12.5 mmHg in the left eye. Anterior segment within normal

limit. Posterior segment shows dome shape macular oedema on the right eye, normal limit on the left eye. Optical coherence tomography (OCT) examination showed central foveal thickness (CFT) was 367 μm on the right eye and 253 μm on the left eye, and subretinal fluid image in right eye with epithelial pigment detachment. The patient was diagnosed with central serous chorioretinopathy. Patient was given Brinzolamide (glopac) eye drops, sodium hyaluronate, vitamin A and vitamin E (Navitae) eyedrops, and eye multivitamin supplement (optimax premio) and instructed to do another OCT in two weeks. The patient was also educated on the impact of stress and their perfectionist tendencies, as well as how to effectively manage their perceived workload. Additionally, he was afforded the chance to discuss the potential solutions to the issues he encountered. After two weeks, the patient still complained blurred vision without pain. The OCT result shows decrease of central foveal thickness to 310 μm on the right eye, 254 μm on the left eye, subretinal fluid image in right eye with epithelial pigment detachment was improved.

The intraocular pressure was 10.7 mmHg on the right eye, and 10mmHg on the left eye. The medication and the observation will be continued for the next 2 weeks. On his third control, the patient sight is improving but still experienced blurry vision with visual acuity 6/7.5 on the right eye, and 6/6 on the left eye. Intraocular pressure was 12mmHg on the right eye, and 13.5 mmHg on the left eye. The observation and the medication still continued for the next two weeks. Three weeks after the third control, patient complained blurry vision with dark spot straight ahead which keep reappearing. The visual acuity still the same as the third control, the intraocular pressure was 10.7mmHg on the right eye, and 10.3 mmHg on the left eye. The OCT examination shows that central foveal thickness (CFT) on the right eye was increasing from 246 to 333 μm , and on the left eye was 251 μm .

The patient was referred to Klinik Mata Nusantara (KMN) Kemayoran for fundus fluorescein angiography (FFA) and EpM laser. Pupillary dilatation was induced by administering both tropicamide and phenylephrine eye drops. Following the application of oxybuprocaine eye drops for local anesthesia of the cornea, a contact lens was inserted onto the eye using 1% methylcellulose as a gel. The laser treatment was conducted using the EpM system equipped with the PASCAL®. Synthesis device (Topcon Healthcare Inc., Tokyo, Japan) operating at a wavelength of 577 nm, following a technique that had been previously reported.³ The treatment commences with a titration process including the application of individual laser spots outside the vascular arcs. The titration power is gradually increased in increments of 10 mW until a lesion becomes scarcely visible. A barely apparent lesion is characterized by a subtle discoloration of the retina that occurs 3 seconds after the injection of energy (100-200 mW) with a pulse duration of 15 milliseconds. The energy is designated as 100% on the EpM scale. Subsequently, the energy is diminished to 30% on the EpM scale for the

current treatment. The treatment utilized a "macular grid pattern" laser with a spot size of 200 μm , a spot spacing of 0.25 $\times$, and a total of 400 spots. The pattern is circular and encompasses the macular region, with an outward radius of 3000 μm and an interior radius of 500 μm , which ensures that the fovea is not affected. During the application process, the pattern is separated into eight "octants" consisting of 50 spots each. A single actuation of the foot pedal is used to apply each octant. Throughout the treatment, the patient was directed to focus on a central point of reference, while the physician closely monitored the patient's fixation using a binocular device called a slit lamp.

During the initial treatment, a single laser spot was administered at the outer edge of each octant using the maximum energy level in order to create a reference point known as a landmark spot. At the first month, the significant locations were observable as hyper auto fluorescent spots on FAF imaging. Subsequently, these spots gradually vanished over the following months due to the reparative actions of the retinal pigment epithelium (RPE).

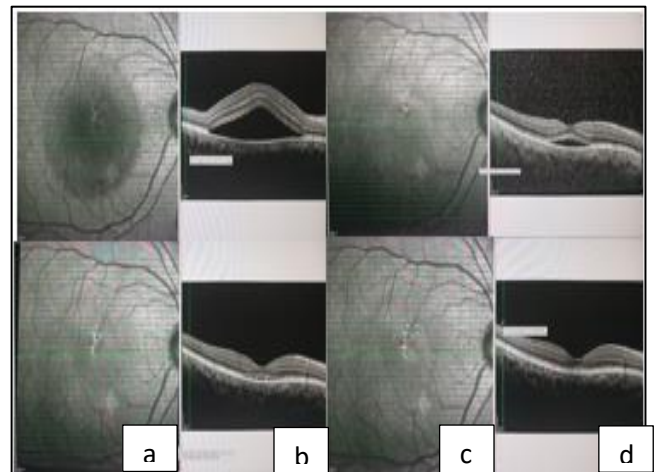


Figure 1: (a) OCT was performed on February 7th 2024, and confirmed the diagnosis of central serous chorioretinopathy. The patient was given Brinzolamide eye drops, sodium hyaluronate, vitamin A and vitamin E eyedrops, and multivitamin PO. (b) OCT was performed on April 22th 2024, the patient currently having blurry sight and dark spot straight ahead which keep reappearing and referred for EpM Laser. (c) OCT was done on May 13th 2024, two weeks post EpM Laser, it shows CSC in remission. (d) OCT was done on May 27th shows fully resolved subretinal fluid (SRF) in RPE.

If the landmark spots were not visible during the control visits, the titration process was repeated during the next treatment to prevent undertreatment. The total count of laser dots applied varied from 400 to 420, depending on the number of titration points. The EpM Laser was done four day after referral, and the patient came for control two weeks after the laser was done. 14th day postoperative

follow-up examination revealed the visual acuity (VA) is at 6/7.5 in the affected right eye. And the OCT result was central foveal thickness in right eye was decreasing to 242 μm , left eye 262 μm , and the subretinal fluid also decreasing. 28th days post-operative follows up examination shows the same visual acuity as the 14th day, but in the OCT, examination shows that subretinal fluid (SRF) was substantially resolved in retinal pigment epithelium (RPE). Intraocular pressure was 11 mmHg on the right eye, and 10.3 mmHg on the left eye. Despite of the blur vision, central foveal thickness already decreasing and the subretinal fluid was resolved.

DISCUSSION

Central serous chorioretinopathy (CSC) is a disorder where there is a buildup of fluid under the retina, specifically at the macula. It's the fourth most common non-surgical retinopathy associated with fluid leakage. This is often accompanied with detachments of the pigment epithelium, dysfunction of the retinal pigment epithelium, and thickening, increased permeability, and excessive blood flow in the choroid.¹ The patient reports a diverse array of symptoms, such as the abrupt onset of blurred or dim vision, micropsia, metamorphopsia, paracentral scotomata, decreased color vision, and prolonged afterimages.

Visual acuity is typically higher than 20/30 in the majority of patients, although it can range from 20/20 to 20/200. Small hyperopic corrections can frequently enhance visual acuity that has been reduced.² CSC primarily impacts males in the age range of 20 to 50 years. The documented male to female ratio varies between 2:1 and 6:1, mostly develop in male.^{1,3} CSC mostly impacts individuals in their working years. Vision impairment resulting from this disorder can result in a substantial decrease in patient autonomy, a greater loss of productive work years, and a higher overall burden on healthcare services.⁴ In our case, the patient gender is male and in the working age.

Central serous chorioretinopathy (CSC) is linked to stress and those with a highly strung and ambitious personality, competitive and have sense of urgency.^{1,3} Narcissistic personality also became a risk factor. Stress can trigger an elevation in cortisol levels, leading to a reduction in choroid function and an increase in pressure inside the choroid capillaries surrounding the macula. This can result in the leakage of serum and the blockage of blood vessels. As a result of all these factors, fluid builds up and ultimately leads to the development of CSC.⁵

The predominance of CSC in working-aged males has led to the theory that higher levels of androgens such as testosterone may be associated with its pathogenesis.¹ In our patient, none of these are noticed expect he has perfectionist nature that leads to more burden in work, lack of sleep, and stress. Systemic relationships encompass endogenous hypercortisolism (Cushing syndrome), primary hyperaldosteronism (Conn's syndrome),

hypertension, sleep disturbance and sleep apnea, the utilization of psychopharmacologic drugs, pregnancy, organ transplantation recipients, genetics and family history, the use of phosphodiesterase-5 inhibitor (sildenafil), hyperopia, *Helicobacter pylori* infection.^{1,5} The use of systemic corticosteroids, whether through intramuscular, topical, inhalational, epidural, or intra-articular routes, is linked to the development of CSC. However, it is interesting to note that the use of intraocular corticosteroids does not seem to be connected to this syndrome.²

Acute episodes of CSC show a high rate of spontaneous resolution, within 3-6 months (up to 84% in 6 months).^{1,3,7} However, the disease has a strong tendency to become chronic manifesting in frequent recurrence or persistent subretinal fluid which can then lead to sight-threatening long-term complications such as progressive damage of the outer retina, disruptions of the retinal pigment epithelium and secondary choroidal neovascularization, cystoid macular degeneration, poorer long-term visual outcome.^{4,6} In case of chronic CSC, estimated time for subretinal fluid complete resolution without treatment is 458 days.¹

In our case the patient still classified as acute episodes of CSC but the manifestation is worsening as he experience central scotomata on his fourth control (10 weeks after the first onset), thus he was referred for EpM Laser and FFA. Central serous chorioretinopathy typically heals on its own without treatment, and most patients get satisfactory visual outcomes. Nevertheless, in certain chronic instances, it might have a detrimental effect, resulting in visibly prominent scotomata.² Treatment may reduce risk of recurrence of CSC. Acute, chronic, and recurrent CSC in functionally monocular patient also could be considered as giving treatment. In a study with 291 cases, sub retinal fluid recurrence was present in 29% of cases. The recurrence rate was found to be higher in untreated cases (24%) compared to cases with early treatment (4%) using photodynamic therapy (PDT, 134 cases), conventional thermal laser (3 cases), or subthreshold micropulse diode laser (4 cases) at the clinician's discretion.⁷

Subthreshold laser therapy is now being used as a treatment option instead of traditional laser photocoagulation for specific eye diseases such as central serous chorioretinopathy (CSC), diabetic macular oedema (DME), macular oedema caused by branch retinal vein occlusion (BRVO), and age-related macular degeneration (AMD). The therapeutic uses of subthreshold laser and the mechanisms of various subthreshold laser techniques, such as subthreshold micropulse laser (SMPL), selective retina therapy (SRT), subthreshold nanosecond laser (SNL), EpM, and transpupillary thermotherapy (TTT), are discussed.⁸ The laser power is titrated to a marginally visible retinal burn (threshold) at the edge of the macula to initiate the EpM strategy for retinal treatment. This establishes a consistent baseline and guarantees that the results are consistent across patients. The treatment pulse

energy is defined as a percentage of the threshold pulse energy, which is set to 100 percent in the EpM parameters. It has been determined that a 30 percent energy level is a safe and non-damaging level for the retina through clinical trials on animals. Therefore, EpM treatment optimizes the therapy to induce HSP expression while preventing thermal damage to the RPE by adjusting laser intensity and pulse duration to this level. A substantial quantity of spots can be rapidly positioned due to the fact that each spot in the high-density laser spot pattern is subjected to a discharge that is less than 10 ms in duration. The visible titration endpoints may be positioned at the corners of a pattern and utilized as reference lesions during the treatment process. This offers visible feedback on the dosage and positioning of the treated areas.⁹

After the treatment was performed, the patient came for post operative control. The visual acuity is still same as the previous VA before treatment, but there's a full resolution of subretinal fluid and the decrease of central foveal thickness. Study done by Shekoh, et al shows that after EpM laser, in seven patients, SRF resolved in 52.9%, improved in 23.5%, and remained stable in 23.5% of patients. Visual Acuity improved in 52.9%, deteriorated in 17.6%, and remained stable in 29.4% of patients. The absence of RPE scarring or atrophy attributable to laser was confirmed on OCT in all patients.¹⁰ Endpoint management is a highly efficient and successful approach for addressing the needs of individuals with visual loss in a CSC treatment center. It enhances the rate at which subretinal fluid is absorbed and enhances vision recovery without causing harm to the retinal pigment epithelium.¹⁰

CONCLUSION

In our case report, the treatment for CSC included ocular vitamin A and E drops, Brinzolamide, sodium hyaluronate, and eye multivitamin supplement, but the condition worsening 8 weeks after the first treatment. After EpM laser was done, the subretinal fluid absorbed resolved, no darker spot straight ahead, and central foveal thickness in right eye was decreasing on the 14th day post operative. Treatment of CSC with visual loss is successful and efficient with EpM laser. Without harming retinal pigment epithelium, it accelerates sub-retinal fluid absorption and enhances visual rehabilitation.

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