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Recurrence of central serous chorioretinopathy following laser therapy - case report

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ABSTRACT

Introduction: Serous separation of the neurosensory retina is a hallmark of central serous chorioretinopathy. It is mainly caused by choroidal vascular dysfunction, which consequently leads to retinal pigment epithelium damage. While spontaneous resolution may be possible, relapses occur frequently, especially following focal laser photocoagulation. This is due to the fact that the basic choroidal pathology in the course of CSC is not effectively treated. *Case presentation*: A 47-year-old patient presented to the outpatient department with blurred vision and dyschromatopsia in his right eye. Due to the unavailability of photodynamic therapy at the facility, focal laser photocoagulation was performed, achieving clinical improvement. Six months after the treatment, the patient was admitted again with a relapse. *Discussion*: The observed recurrence points to the validity of the use of photodynamic therapy that affects the excessive permeability of choroidal vessels. Unfortunately, access to this treatment method remains limited in many countries, which affects the long-term outcomes. *Conclusions*: The case underlines the importance of selecting a treatment modality that targets the root pathophysiology of central serous chorioretinopathy. It also stresses the need to increase access to photodynamic therapy to improve patient care.

Keywords: photodynamic therapy, laser photocoagulation, retinal pigment epithelium, central serous chorioretinopathy, recurrent serous retinal detachment

1. INTRODUCTION

Central serous chorioretinopathy (CSC) is a chorioretinal disorder with incompletely understood pathogenesis, resulting in serous elevation of the neurosensory layer of the retina. Attention is focused on enhanced permeability of choroidal blood vessels or on injured pigmented epithelial cells (Zhang et al., 2023). One-sided vision blurring and decline, metamorphopsia, micropsia, and a change in refraction towards hyperopia are most commonly reported clinical symptoms in individuals with this condition (Kaye et al., 2020; Daruich et al., 2015). CSC predominantly impacts young to middle-aged males, who represent the majority of diagnosed cases (Fung et al., 2023). What cannot be forgotten corticosteroid use, psychological stress, type A personality characteristics, pregnancy, systemic hypertension, and Helicobacter pylori infection are also risk factors responsible for

the development of the disease or its severity (Zhang et al., 2023; Fung et al., 2023; Zhong et al., 2025). Fluorescein angiography (FA) is an important element in the diagnosis of CSC The typical finding consists of a solitary focal leakage point, appearing as mottled hyperfluorescence in an ink-blot pattern and corresponding to detachment of the neurosensory retina. Other patterns include "smokestack" patterns and window defects in the retinal pigment epithelium (RPE). The serous retinal fluid is seen by optical coherence tomography (OCT), mostly between the neurosensory retina and the RPE (Zhong et al., 2025).

Despite the fact that the condition frequently resolves on its own, early therapeutic action may still be necessary in its active stage due to the possibility of significant visual deterioration (Zhong et al., 2025). Left untreated, CSC leads to at least one recurrence in as many as 43-51% of patients (Radke et al., 2025).

The presented case report emphasizes the importance of targeting the underlying cause of CSC, namely choroidal dysfunction. Considering PDT as a preferred treatment choice over traditional laser photocoagulation (LPC), which targets only focal RPE leakage, is emphasized in current evidence. Improving global access to PDT should be a priority to avoid CSC recurrence and further visual decline.

2. CASE PRESENTATION

Patient history

A 47-year-old male patient presented to the ophthalmology department with a gradual visual decline, blurred vision, and dyschromatopsia in the right eye. The symptoms had been gradually worsening over several weeks. The patient denied any other accompanying comorbidities (Table 1) and had no clinically significant family history of eye diseases.

Table 1. Risk factors associated with primary and recurrent central serous chorioretinopathy. The table outlines established risk factors for central serous chorioretinopathy and recurrence, indicating their presence or absence in the presented patient.

Risk factor	Association with primary CSC + recurrence	Presence in this patient
Male sex	Male predominance	Yes
Age	Typical onset in middle-aged adults (20-50)	Yes (47 years old)
Stress	Chronic stress may increase risk via elevated cortisol	Not reported
Steroid use	Strongly associated, more aggressive course	No
Systemic diseases	HT, Cushing, CVD increase risk	Yes (newly identified during follow-up)

Initial diagnostics

Standard ophthalmological evaluations were used to start the diagnostic process, which showed a best-corrected visual acuity (BCVA) of 20/30 in the right eye and 20/25 in the left eye. Each eye's intraocular pressure was 17 mmHg. A slit-lamp examination showed opalescent lenses, while fundus examination of the posterior segment revealed a pale-pink optic disc, normal blood vessels, and adherent retina in both eyes.

Imaging

Macular OCT was performed, displaying subretinal fluid in the right eye. The image of the left eye appeared normal. The central retinal thickness (CRT) measured 461 μm in the right eye and 189 μm in the left eye (Figure 1). FA imaging of the right eye presented normal optic disc, blood flow and vessel caliber. Superonasally from the fovea there was a spot of dye leakage resembling an ink-blot (Figure 2). Superotemporally, several smaller spots of hyperfluorescence corresponding to window defects of the RPE were noted. In the left eye, the optic disc, blood flow and vessel caliber remained within normal limits. Hyperfluorescence below the optic disc, characteristic of pigment epithelium damage, was observed. These findings were consistent with active CSC in the right eye and epitheliopathy in the left eye.

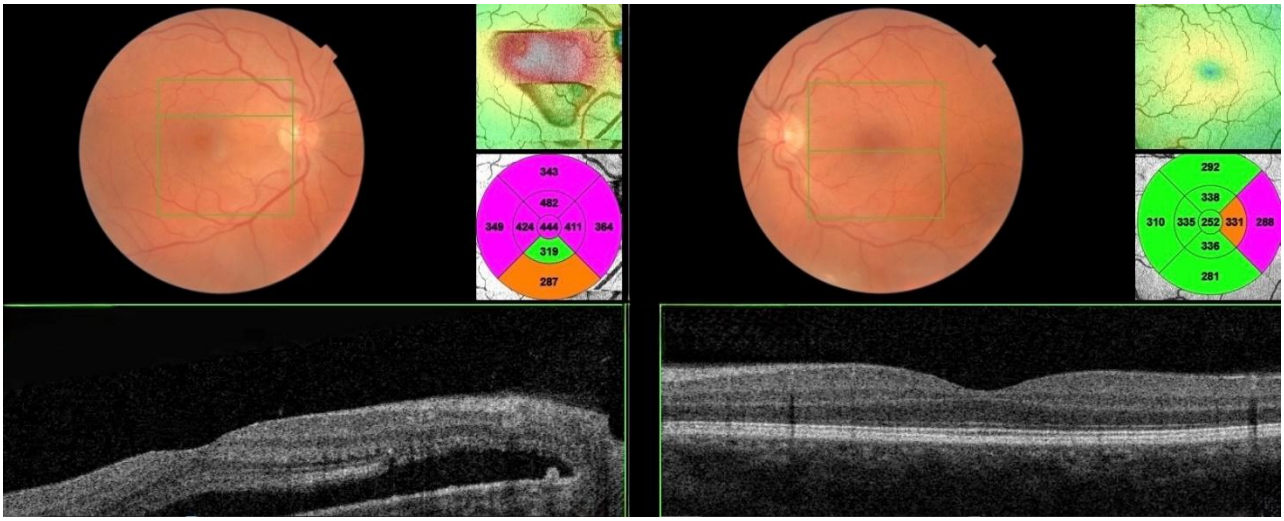

Figure 1. Optical coherence tomography at initial presentation. The left panel (right eye), reveals subretinal fluid, while the right panel (left eye), shows no serous fluid buildup.

Figure 2. Fluorescein angiography of the right eye at initial presentation. It demonstrates a focal point of hyperfluorescence superonasal to the fovea, consistent with an ink-blot pattern.

Treatment

After obtaining the results of the appropriate tests, clinicians recommended LPC therapy, as PDT was not available at the treating center. Subsequently, the patient underwent LPC in the right eye, resulting in notable initial improvement. At short-term follow-up, the BCVA in the right eye improved from 20/30 to 20/25, and OCT demonstrated a marked reduction of subretinal fluid, with CRT decreasing from 461 μm to 250 μm. The patient was then followed up regularly by an ophthalmologist.

Follow-up

A recurrence of CSC was noted in the right eye at a follow-up visit six months later (Table 1), with OCT indicating a CRT of 342 μm, while the left eye was steady at 184 μm (Figure 3, Table 2). BCVA further dropped to 20/30. Clinicians referred the patient for another session of LPC therapy. Upon admission for planned LPC therapy, previously undiagnosed arterial hypertension was identified, which led to modification of the treatment plan. Therapy with eplerenone (Nonpres) was started, and laser treatment was postponed. At a

follow-up visit one month later, clinical improvement was observed: arterial blood pressure returned to normal values, and OCT showed a partial reduction in subretinal fluid. BCVA remained unchanged at 20/30. Due to the unavailability of PDT, it was decided to use subthreshold micropulse laser. At the next follow-up, OCT showed resolution of subretinal fluid, and the BCVA has returned to baseline. The patient continues to undergo clinical monitoring due to the possibility of recurrence.

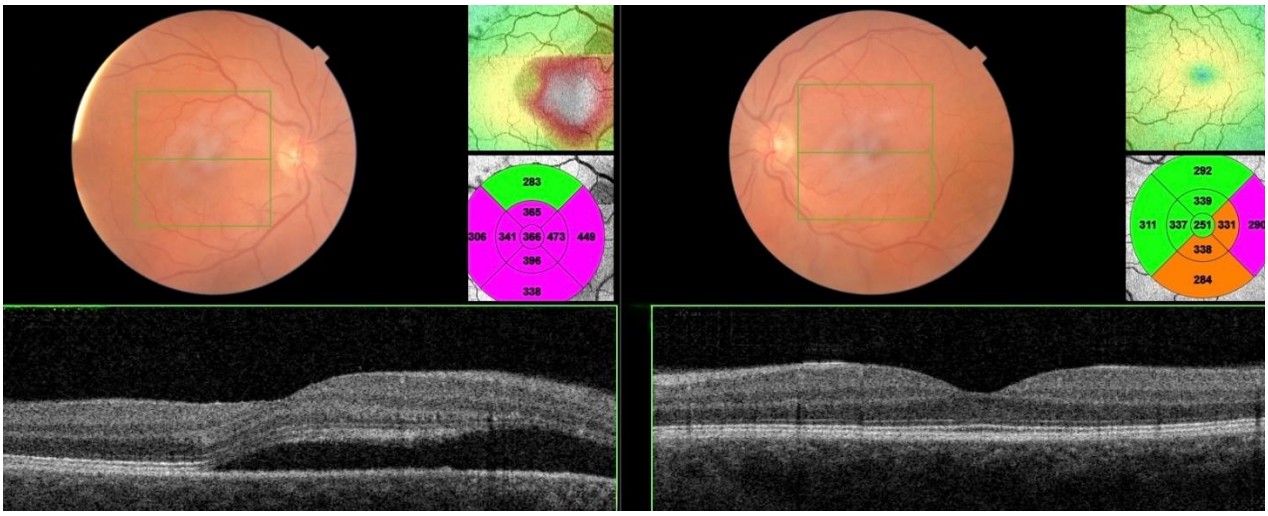

Figure 3. Optical coherence tomography obtained 6 months after the first presentation. The left panel (right eye) demonstrates re-accumulation of subretinal fluid, suggesting a relapse. The right panel (left eye) with no visible changes.

Table 2. Structural and functional results before/after laser photocoagulation and during follow-up. Changes in best-corrected visual acuity and central retinal thickness in the right eye were taken into account: at baseline, after laser photocoagulation, at six-month follow-up (recurrence), and after the initiation of treatment with epleronone. The data illustrate initial improvement followed by disease recurrence.

Parameter (right eye)	Before Laser Photocoagulation	After Laser Photocoagulation	Follow-up (recurrence 6 months later)	After Treatment with Eplerenone
BCVA	20/30	20/25	20/30	20/30
CRT	461 μm	250 μm	342 μm	290 μm

3. DISCUSSION

In the described case, it can be seen that the patient exhibits both the clinical and epidemiological characteristics of CSC. The main group of cases concerns middle-aged males, presenting with unilateral visual symptoms such as blurred vision, metamorphopsia, or dyschromatopsia (Zhang et al., 2023; Kaye et al., 2020; Fung et al., 2023). Our patient had all of the above-mentioned symptoms. The course of the disease also corresponds to that described in the literature, manifesting with initial subretinal fluid accumulation, response to LPC, and recurrence (Daruich et al., 2015; Semeraro et al., 2019).

CSC is first and foremost driven by dysfunction of choriocapillaris microcirculation. Congestion, hyperpermeability, and regions of impaired perfusion occur in the choroid, which in turn increase the choroid's hydrostatic pressure, leading to the destruction of the protective outer blood-retinal barrier within the RPE and the accumulation of fluid under the retina (Semeraro et al., 2019). This mechanism was confirmed by structural and angiographic studies performed in our patient. OCT revealed accumulation of subretinal fluid within the neurosensory retina. In the affected areas, the FA presented an inkblot-type leak along with smaller hyperfluorescent window defects, consistent with RPE damage.

Long-term detachment can lead to ischemic injury and development of chronic illness, even though photoreceptors normally survive due to constant nutrition from choriocapillaris. In these instances, widespread RPE decompensation and the possible secondary

CNV may lead to irreversible vision loss (Semeraro et al., 2019). PDT has been shown to directly influence the pathogenesis of CSC by reducing vascular hyperpermeability, clearly reducing choroidal thickness. LPC does not significantly affect choroidal thickness and, therefore, does not address the underlying pathology of CSC. Semeraro et al., (2013) reported that LPC can induce an inflammatory response, leading to worsening of serous retinal detachment. In the presented case, recurrence probably occurred due to untreated choroidal dysfunction, as LPC focused solely on the leakage site, leaving the underlying pachychoroid changes unaltered (Semeraro et al., 2013). In addition, the patient presented several risk factors increasing the risk of recurrence. Male sex, middle age, hypertension, and prior CSC episode- all of which have an impact on CSC recurrence.

Systemic arterial hypertension might contribute to the development of CSC through hemodynamic impacts on the choroidal structure. According to current studies, CSC is associated with choroidal vascular hyperpermeability together with blood flow disturbances that are worsened by systemic diseases such as uncontrolled hypertension is supported by current studies (Zarnegar et al., 2023). A recent study indicated that patients with CSC display abnormal choroidal vascular responses to temporary increases in blood pressure, as evaluated through choroidal thickness and vascularity index on OCT when compared to healthy controls. This suggests that proper regulation of systemic blood pressure may be relevant in the management of CSC (Samanta et al., 2024).

Therapeutic decision-making in CSC continues to be challenging, especially regarding the recurrence of the disease. In this instance, focal LPC was chosen mainly because of its availability and a clearly defined focal leakage area. Additionally, laser therapy has the potential to cause lasting damage and scarring to the RPE, which may lead to functional impairments and increased risk of recurrence (Battaglia et al., 2020). After stabilization of the patient's arterial blood pressure with eplerenone, clinicians chose subthreshold micropulse laser therapy due to its safer retinal profile compared with LPC (Zhou et al., 2021). In some cases, subthreshold micropulse laser therapy may be an option. However, despite its safety, it appears to be less effective than PDT (Getahun and Apte, 2025). This case thus reinforces the increasing evidence indicating that PDT should be strongly considered in recurrent CSC to achieve more sustained anatomical and functional outcomes. PDT appears superior to other treatment modalities (Radke et al., 2025). PDT, however, was not accessible at our clinic, and continues to be limited in availability, presenting a global issue.

4. CONCLUSION

The presented case shows that LPC might be an inadequate treatment choice for CSC due to the underlying choroidal damage. PDT specifically targets the root pathology of this condition and could lead to longer-lasting anatomical and functional results. Early OCT and FA assessment is pivotal for appropriate management. A structured treatment algorithm for CSC is necessary to avoid recurrence and maintain visual acuity. Although PDT was not used in this instance, existing evidence indicates that it continues to be an important treatment choice for selected patients with CSC.

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Authors' Contributions

Concept and design: Daria Valipur Kolti, Julia Kierner

Analysis and interpretation of data: Daria Valipur Kolti, Julia Kierner, Dariusz Valipur Kolti

Drafting of the manuscript: Daria Valipur Kolti, Dominik Chrzanowski, Kacper Cholewiński

Critical review of the manuscript for important intellectual content: Daria Valipur Kolti, Julia Kierner, Dariusz Valipur Kolti, Dominik Chrzanowski, Kacper Cholewiński

Informed consent

Written & Oral informed consent was obtained from individual participants included in the study.

Ethical approval

Not applicable. This article does not contain any studies with human participants or animals performed by any of the authors.

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Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data and materials availability

All data associated with this study will be available based on the reasonable request to corresponding author.

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