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ORIGINAL ARTICLE

Bilateral central serous chorioretinopathy resolving rapidly with treatment for obstructive sleep apnea

ATul Kumar Jain · Andrew Kaines · Steven Schwartz

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Abstract
Background Central serous chorioretinopathy (CSR) is a common disorder that affects many individuals, often for unknown reasons; we present a case of bilateral CSR that rapidly resolved with treatment of obstructive sleep apnea (OSA).
Methods Observational case report.
Results Bilateral decreased vision to 20/30 OD and 20/40 OS due to typical CSR lesions. Systemic evaluation led to a diagnosis of OSA, which was treated and resulted in rapid resolution of the CSR and improvement of visual acuity in both eyes.
Discussion We present the first case of rapidly resolving bilateral CSR due to the treatment of OSA.

Keywords Central serous chorioretinopathy (CSR) · Obstructive sleep apnea (OSA)

Introduction

Central serous chorioretinopathy (CSR) is an idiopathic serous detachment of the neurosensory retina that was first described in 1866 by Von Graefe [1]. While the precise pathogenesis is still disputed; there exist two main theories, the first being a reversal in polarity of retinal pigment epithelial (RPE) cells such that fluid is pumped into rather than away from the retina. The second theory is a hyperpermeability of the choroidal circulation, resulting in excess fluid accumulation in the RPE. CSR is associated with Type A personality, pregnancy, Cushing's syndrome, corticosteroids, sympathomimetics, and increased levels of circulating serum catecholamines [2]. The condition typically occurs in middle-aged, myopic males. The natural history of CSR is that most resolve within 6 months with partial return of vision [2, 3].

The most important factor in changing the natural history is to address and/or remove the inciting risk factors. Other treatments to change the natural history include argon and photodynamic laser therapies [4, 5]. However, neither is undertaken regularly because of modest benefit and potentially significant side-effects.

Obstructive sleep apnea (OSA) is a syndrome characterized by numerous episodes of sleep disruption due to upper airway closure, leading to a lack of continuous restful sleep and increased levels of serum catecholamines [6, 7]. The incidence of OSA in the US is estimated to be 5–10%, with as many as 25% of individuals at risk of having OSA [8]. Thus, it becomes important to address the recent suggestion of a correlation between CSR and OSA [6, 7]. We report a case of a patient with acute bilateral CSR which led to the diagnosis of OSA; subsequent treatment of the OSA led to complete and rapid resolution of the CSR.

Case history and results

A 45-year-old male presented to the retina clinic with acute blurring of vision in both eyes (OU) for about 1 week in duration. Vision in the right eye (OD) was

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A. K. Jain (✉) · A. Kaines · S. Schwartz
Jules Stein Eye Institute, Retina Division,
University of California,
David Geffen School of Medicine, Los Angeles (UCLA),
100 Stein Plaza,
Los Angeles, CA 90095, USA
e-mail: atuljain@ucla.edu

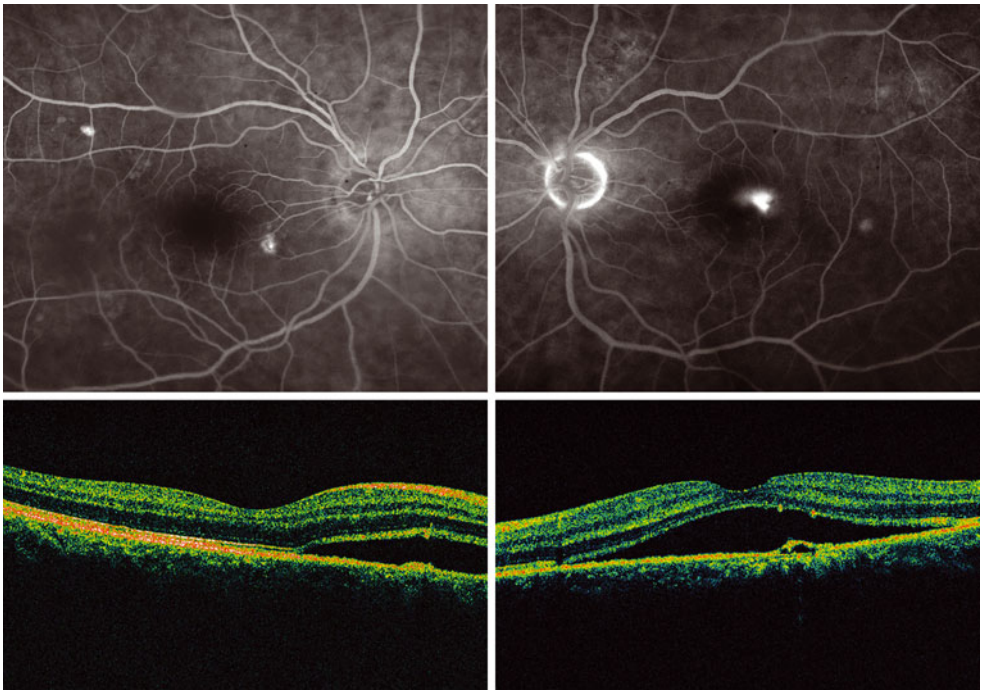

Fig. 1 Fluorescein angiogram demonstrating leakage in the nasal macula (*top left*) of the right eye and central macula (*top right*) of the left eye. Corresponding OCT images demonstrating nasal serous macular detachment in the right eye (*bottom left*) and a central pigment epithelial detachment with associated serous macular detachment in the left eye (*bottom right*)

20/30, and vision in the left eye (OS) was 20/40. Retinal examination revealed bilateral central serous macular detachments. Optical coherence topography (OCT) and fluorescein angiography (FA) confirmed the diagnosis of CSR. (Figure 1) The rest of the ocular examination was unremarkable, with no evidence of floppy eyelids.

The patient did not want to wait for the natural history, as his decreased vision was affecting his career; thus, photodynamic therapy laser treatment (PDT) was performed OS, and the patient was referred for a sleep study. He was referred for a sleep study due to a self-reported history of poor sleep, but no history of snoring. The patient was diagnosed with OSA and started on treatment 2 weeks after diagnosis; it is noteworthy that at this time the lesion had not changed with PDT treatment, and the vision was the same OU.

The patient was started on CPAP (continuous positive airway pressure) machine treatment at home while sleeping, and reported that almost immediately he noticed an improvement in his vision. At the 1-week follow-up after starting CPAP, his visual acuity was 20/20 OD and 20/25 OS; the serous detachments had resolved both on examination and OCT. At the 2-week follow-up, the visual acuity was 20/20 OU without any metamorphopsia. (Figure 2)

Discussion

To our knowledge, our report is the first description of bilateral CSR resolving rapidly after initiation of therapy for OSA. While the natural history of CSR is to spontaneously regress in many cases, it is likely that treating the underlying cause (i.e., OSA) led to resolution of CSR in our case for several reasons. Firstly, the left eye did not respond to PDT treatment, but the CSR did immediately and symmetrically resolve with initiation of CPAP machine therapy. While spontaneous regression of CSR does occur, if this was to be spontaneous, it is likely that the PDT-treated eye would have regressed before the fellow eye (as PDT treatment has been shown to hasten the

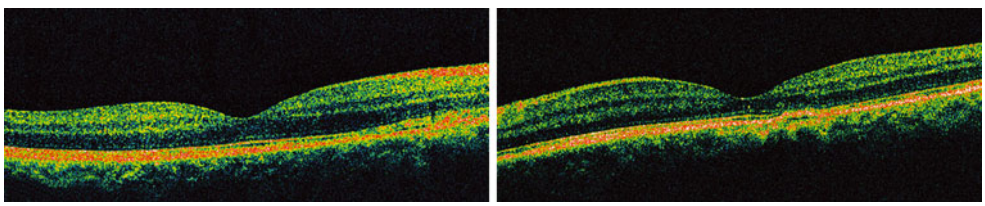

Fig. 2 Follow-up OCT taken 2 weeks after starting CPAP treatment for OSA, demonstrating resolution of the serous detachments seen in Fig. 1 of both eyes (right eye is seen on *left* and left eye seen on *right*)

rate of recovery in CSR) [5]. Furthermore, resolution over just 2 weeks is unusually fast.

As mentioned above, the etiology and pathogenesis of CSR is still unclear; however, associations between the development of CSR and Type A personality, pregnancy, corticosteroids, and sympathomimetics are well-described [2]. The common link between these conditions are increased levels of adrenergic and sympathetic innervation. OSA is associated with increased catecholamine levels and enhanced sympathetic activity [6, 7]. This might be the reason for an association between CSR and OSA. Treatment of OSA with CPAP machine therapy results in reduction of the elevated serum catecholamines, as well as far fewer episodes of sleep disruption, which are believed to be a cause of physiologic stress [6, 9].

A survey undertaken by Leveque et al. showed that there is almost a 2-fold increase in the risk of developing OSA if an individual has CSR [6]. Similarly, a survey by Kloos et al. found that, in patients with CSR, a significantly higher percentage (22%) suffered from actual OSA compared to the general population (2–4%) [7].

While this is only one case, it supports a growing pool of evidence that indicates the diagnosis and treatment of OSA might be important in some patients with CSR.

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