Bilateral Refractive Changes in Vascularized Pigment Epithelial Detachment Treated by Anti-VEGF Therapy

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Key Words

Bevacizumab · Aflibercept · Age-related macular degeneration · Acquired vitelliform lesions · Retinal pigment epithelial detachment · Refractive changes · Spectacles · Hypermetropization · Myopization

Abstract

We report the case of a patient bilaterally treated with anti-VEGF compounds for bilateral massive vascularized retinal pigment epithelial detachment (PED). During the years prior to treatment, PED growth was accompanied by gradual hypermetropization. After right intraocular injection of bevacizumab followed by three bilateral aflibercept injections, the PED flattened resulting in a rapid relative myopization. This case illustrates ocular refractive properties associated with PED and its response to treatment. This case also highlights the importance of assessing refraction in age-related macular degeneration patients experiencing substantial PED amplitude changes.

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Introduction

Serous pigment epithelial detachments (PEDs) are sharply demarcated, smooth, dome-shaped elevations of the retinal pigment epithelium, which are often associated with age-related macular degeneration (AMD). Some of the PEDs are associated with an identifiable choroidal neovascularization (CNV) [1, 2].

Patients with serous PEDs and CNV are most effectively treated with VEGF inhibitor therapy [1]. When CNV is not documented, PEDs often show poor response to anti-VEGF therapy [2].

The switch to aflibercept in patients with neovascular AMD insufficiently responding to prior anti-VEGF therapy has been shown to have a beneficial anatomical effect, even on long-persisting PEDs [3].

Case Report

A man in his early 60s had been followed up in the retina clinic for 5 years, complaining of bilateral central visual changes reported as static since their apparition. When he first presented, visual acuity bilaterally corrected by +0.75 dpt was 20/25 for each eye. PEDs were found in both eyes and confirmed by optical coherence tomography (OCT) that did not show subretinal nor intraretinal fluids; hyperreflective material was observed in the subretinal space (fig. 1a, b). Clinically, no vitelliform lesion was reported then. The patient was regularly followed, reporting overall visual stability. During that period, during which the lens remained clear, the PEDs steadily expanded. No subretinal nor intraretinal fluids were detected by iterative OCTs, and the subretinal hyperreflective material remained unchanged. Fluorescein angiography was performed twice during those years and did not demonstrate any leakage. He was also followed up by an optometrist who changed his prescription to RE +1.25, LE +1/–0.50 × 38 1 year after his first visit to our clinic, as bilateral PED growth started to be documented. At 2 years of follow-up, his refractive correction need was RE +2, LE +1.75/–0.50 × 50, the visual acuity still being 20/25 for each eye. The PEDs continued to expand, his correction being RE +2.5, LE +2.25/–1.00 × 60 at 3 years of follow-up. During the following 2 years, as the maximal height of the PED was stable as per OCT, the patient did not need new spectacles but the best corrected visual acuity he could reach decreased to 20/30. The patient then reported new right metamorphopsia, visual acuity being measured at 20/40 on the right and 20/32 on the left. On examination, the fundus aspect looked similar to previous descriptions without hemorrhage or visible CNV. OCT demonstrated subretinal fluid (SRF) at the top of the right PED (fig. 1c) and fluorescein angiography, showing changes from previous imaging, was highly suggestive of vascularized PED (fig. 2a, b). The patient received an injection of bevacizumab into his right eye, without clinical or OCT improvement. He then also complained of visual changes in his left eye, his measured visual acuity being 20/40. OCT could not clearly demonstrate the presence of SRF or intraretinal fluids (fig. 1d) and fluorescein angiography was inconclusive. Indocyanine green angiography revealed a focal source of leakage (fig. 2c). The patient was then treated with bilateral aflibercept injections, PEDs gradually shrunk and SRF disappeared from the right eye. After 3 injections in each eye, the visual acuity with his current glasses was RE 20/125 with pinhole improvement to 20/80, LE finger counting at 3 m only, not improved through pinhole. OCT did not show a retinal pigment epithelium rip, as the PED had completely flattened (fig. 1e, f). The patient was then referred to his optometrist. With RE +1.25, LE +1.25/–0.50 × 60, his visual acuity was RE 20/32, LE 20/40.

Discussion

The presence of subretinal hyperreflective material on the top of the PEDs may indicate that this patient suffers from acquired vitelliform lesions. The excellent response to anti-VEGF questions this diagnosis, as AMD cannot be ruled out.

In any case, PED expansion resulted in hypermetropization, while their flattening thanks to anti-VEGF therapy led to a rapid relative myopization.

To our knowledge, this is the first time significant refractive changes are reported as related to PED dynamics. For decades, clinicians have been aware of such a phenomenon related to changes in effective ocular axial length in central serous chorioretinopathy [4]. More recently, resolution of retinal thickening was not found to be associated with an increased risk of a myopic shift [5].

Despite the uncommon amplitude of the involved PEDs, this case illustrates the impact of their natural history as well as their response to treatment on ocular refractive properties. Prospective studies of cases involving substantial serous PEDs could help to establish how common refractive changes are in such patients. Moreover, comparison of refractive changes induced by various chorioretinal conditions could improve our understanding of which cells within the retina actually determine the functional axial length of the eye.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

The authors report no conflicts of interest.

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Fig. 1. PED growth and regression. OCT was more useful than clinical examination in capturing PED changes. Pictures of the right eye are presented in the right column, and those of the left eye in the left column. PED features at 2 years of follow-up (**a, b**) with hyperreflective material in the subretinal space, at the diagnosis of CNV (**c, d**) and resolution after anti-VEGF treatment (**e, f**).

Fig. 2. Vascularization of the PEDs. Fluorescein angiography demonstrated possible vascularization of the right PED (**a**: at 8 s, **b**: at 1 min and 7 s), while in the left eye indocyanine green was required to observe leakage (**c**: at 42 s).