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A Case of a Vitreomacular Traction-Associated Macular Microhole in an Eye with Focal Choroidal Excavation

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Key Words

Focal choroidal excavation · Macular microhole · Spectral-domain optical coherence tomography · Vitreomacular traction

Abstract

Purpose: It was the aim of this study to report a case of a vitreomacular traction-associated macular microhole (MMH) in an eye with focal choroidal excavation (FCE) detected by spectral-domain optical coherence tomography (SD-OCT). **Patients and Methods:** A 38-year-old Japanese female presented to our clinic complaining of metamorphopsia in her left eye. The patient then underwent SD-OCT as well as a routine ophthalmological examination. She had a previous history of a macular hole in her right eye that had been successfully treated by pars plana vitrectomy. **Results:** Upon initial examination, her best-corrected visual acuity was 20/25 in the left eye with a refractive error of –10.25 diopters. Examination by SD-OCT revealed an MMH with an outer retinal defect adjacent to the FCE. SD-OCT also revealed an intraretinal cystoid space in the macula with vitreous attachment around the foveal center. **Conclusions:** The findings of this report show that variable changes are likely to be associated with FCE. However, the etiology of FCE has yet to be fully elucidated and careful observation is necessary in cases of FCE.

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Introduction

Focal choroidal excavation (FCE) is a new disease entity of unknown origin that was first described by Jampol et al. [1] in 2006. The specific features of FCE are characterized by choroidal excavation, preserved visual acuity, and a gradual change of the lesion. Due to re-

cent advancements in spectral-domain optical coherence tomography (SD-OCT), morphological changes involving the retina and choroid can be observed in much greater detail and are well described. It has been reported that the lesion can possibly be accompanied by variable changes in the retina and choroid, including choroidal neovascularization [2, 3] and central serous chorioretinopathy [3].

The term 'microhole' was first coined in 1988 by Cairns and McCombe [4], who described a series of patients with small reddish holes located near the center of the fovea. Clinically, the 'red spots' can be identified reportedly in approximately 50% of the involved eye [5]. Although high-definition images of the retina produced by SD-OCT provide a greater understanding of various retinal diseases, the etiology of the retinal changes associated with FCE remains unclear.

The purpose of this present study was to report a case of a vitreomacular traction (VMT)-associated macular microhole (MMH) in an eye with FCE detected by SD-OCT. To the best of our knowledge, this is the first report of a patient with FCE and an MMH. Thus, an additional aim of this study was to examine and discuss the possible interaction between those two conditions.

Case Report

A 38-year-old Japanese female presented to our clinic complaining of metamorphopsia in her left eye which she had been aware of for a period of >3 months. She had a history of a full-thickness macular hole in her right eye, which had been successfully treated by pars plana vitrectomy 4 years previously (fig. 1d, e). The patient had no history of sun gazing, ocular trauma, or chorioretinal vascular disease. Moreover, her general family medical history was unremarkable. Her best-corrected visual acuity was 0.5 in the right eye and 0.8 in the left eye. Refraction tests revealed a refractive error of -9.5 diopters in her right eye and -10.25 diopters in her left eye. In both eyes, the anterior segment was unremarkable. The left eye fundus showed a well-demarcated 'red spot' lesion in the center of the fovea (fig. 1a). The right eye fundus showed nothing abnormal, thus suggesting full resolution of the previously treated macular hole.

Examination by SD-OCT (SPECTRALIS® HRA-OCT; Heidelberg Engineering, Heidelberg, Germany) revealed a bowl-shaped choroidal excavation which conformed to the full-thickness retina adjacent to the fovea of the left eye (fig. 1b, c). In addition, the SD-OCT findings revealed the attached vitreous elevating the surface of the retina at the top of a cylindrical-shaped MMH (fig. 1b). Moreover, SD-OCT findings demonstrated a resolution of the macular hole and a slightly deformed physiological foveal depression in the right eye.

Discussion

The subtle changes presented on biomicroscopic examination made it difficult to diagnose the MMH and FCE without the use of OCT. Though both diseases are known to occasionally affect the center of the fovea, the majority of patients with either change can present with or without even minimal symptoms. In this current study, we report the discovery of a rare case of FCE associated with an MMH.

It has been reported that vitreous gel is superficially inserted into the surface of the internal limiting membrane. Due to that morphological feature, the fovea is reportedly a part of the location where the vitreous is firmly attached to the retina [6, 7]. The attachment of

the vitreous to the retina is so tenacious that partial posterior vitreous detachment with vitreous adherence to the macula exerts a tractional force on that site. Such adhesion could be a cause of structural distortion of the macular architecture. Based on the recently proposed new VMT classification, our case is classified as concurrent VMT [8]. Reddy et al. [9] speculated that the MMH is likely caused by acute anterior-posterior vitreous traction resulting from the vitreous detachment. Our finding of an avulsed retinal surface at the top of the MMH and a continuing posterior vitreous membrane at that site suggested that the vitreous exerted a tractional force on the macula, which is consistent with the observation made by Reddy et al. [9].

Zambarakji et al. [10] described a series of 22 patients with MMH and reported that OCT presented an MMH bilaterally in 2 (9%) of those patients. Douglas et al. [11] reported bilaterality in one third of the patients in their study. Thus, patients who present with an unilateral macular hole are expected to be at increased risk of developing a macular hole in the fellow eye. In the case presented in our study, the patient had a history of a full-thickness macular hole in her right eye, the eye contralateral to the eye presenting an MMH. Based on these findings, we speculate that a macular hole and an MMH share a common etiology.

Wakabayashi et al. [12] reported two types of choroidal excavation: a conforming and a non-conforming type. In the conforming type, the outer retinal layer appeared to conform to the irregular shape of the choroid. In the non-conforming type, SD-OCT findings showed a hyporeflective space, presumably representing subretinal fluid, between the sensory retina and the retinal pigment epithelium (RPE). As long as the elasticity of the retina is enough to allow it to follow the shape of the choroid, the choroidal excavation could be deemed the conforming type. In our case, the outer retina at the macular lesion suffered two opposite directional tangential forces created by vitreous traction and the protruded choroidal bed, both of which could weaken the attachment of the retina to the RPE. Based on our SD-OCT findings, the patient's FCE was located outside the fovea, which might have prevented the outer layer of the retina from separating from the RPE.

In conclusion, we reported a rare case of FCE associated with an MMH detected by SD-OCT. Our findings suggest that FCE is likely to be associated with various changes. The etiology of FCE has yet to be fully elucidated, and careful observation is necessary in cases of FCE.

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Disclosure Statement

There are no conflicts of interest to report.

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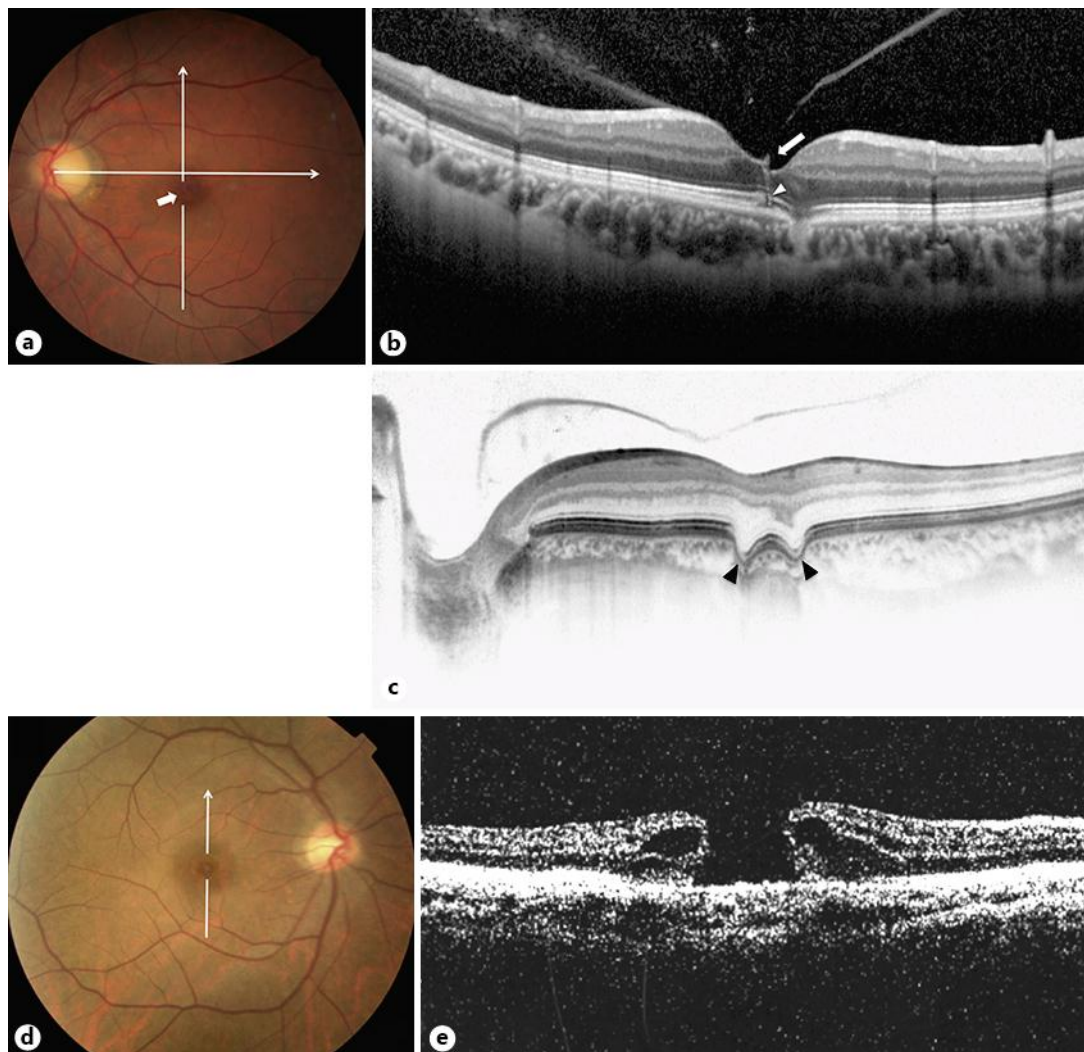


Fig. 1. **a** Color fundus photographs of the patient's left eye showing the MMH as a 'red spot' (white arrow). **b** An SD-OCT vertical B-scan demonstrating a cylindrical-shaped MMH (arrow and arrowhead) with an outer retinal defect adjacent to the FCE and vitreous attachment around the foveal center. The avulsed surface of the retina at the top of the MMH indicates a possible vitreous tractional force. **c** An SD-OCT horizontal B-scan revealing two choroidal excavations (arrowheads) adjacent to the fovea. **d** Color fundus photographs of the patient's right eye showing the macular hole before vitrectomy. **e** An OCT horizontal B-scan of the patient's right eye demonstrating the full-thickness macular hole.