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Unilateral Multifocal Focal Choroidal Excavation

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Abstract

Aim: To describe an unusual OCT image of FCE.

Methods: This is retrospective research. 23 cases (25 eyes) of FCE were observed by SD-OCT and en-face OCT angiography (OCTA). Among all patients, there were 16 males and 7 females, and the age range is from 19 to 77 years old. Institutional review board approval and informed consent from patient was obtained.

Results: Among the 23 patients assessed, unilateral multifocal focal choroidal excavation was found in 2 eyes of 2 patients. Multiple FCEs were distributed outside the fovea at varying distances from the fovea however did not involve the fovea. Unilateral multifocal FCEs can occur relatively far from the fovea and vary in size and depth. Unilateral multifocal FCEs correspond to each other on SD-OCT and en-face OCT images.

Conclusion: FCE can appear simultaneously in the same fundus in a multifocal form and does not involve the fovea, which is rare in FCE.

Keywords: Focal Choroidal Excavation; Unilateral Multifocal FCEs; SD-OCT; OCTA; Fovea

Abbreviations: FCE: Focal Choroidal Excavation; SD-OCT: Spectral-Domain Optical Coherence Tomography; UMFCE: Unilateral Multifocal Focal Choroidal Excavation; OCTA: OCT Angiography; PCV: Polypoidal Choroidal Vasculopathy; BCVA: Best Corrected Visual Acuity; LP: Light Projection; BNN: Branching Neovascular Network; DLS: Double-Layer Sign; PCO: Posterior Capsular Opacification; PPA: Peripapillary Atrophy; CSCR: Central Serous Chorioretinopathy; CNV: Choroidal Neovascularization

Introduction

Focal choroidal excavation (FCE) is defined as an area of choroidal excavation without evidence of a posterior staphyloma or scleral ectasia, detected on spectral-domain optical coherence tomography (SD-OCT) [1]. First described by Jampol in 2006, focal choroidal excavation is an idiopathic choroidal excavation either in the macula or the perifoveal retina [2]. In the present study, the unusual image changes with FCE were observed. In most patients, the presence of FCE is isolated alone in the same eye. However, in this study an unusual image was observed that unilateral multifocal focal choroidal excavation (UMFCE) is in the fundus of same eye and such cases are rare.

Subjects and Methods

This is retrospective research. 23 cases (25 eyes) of FCE were observed by SD-OCT and en-face OCT angiography (OCTA) (Spectralis OCT, Heidelberg Engineering, Heidelberg, Germany. Cirrus HD-OCT 5000, Germany). Among all patients, there were 16 males and 7 females, and the age range is from 19 to 77 years old. Institutional review board approval and informed consent from patient was obtained.

Results

Among the 23 (25 eyes) patients assessed, unilateral multifocal focal choroidal excavation was found in 2 eyes (8%) of 2 patients. A 66-year-old male patient was referred to our hospital for a suspicious lesion in the left fundus found incidentally during a routine eye exam. His right eye suffered from the polypoidal choroidal vasculopathy (PCV). His best corrected visual acuity (BCVA) was light projection (LP) in the right eye and 1.0(decimal) in the left. Intraocular pressure was 13 mm Hg in both eyes. The external and anterior segment exams were within normal limits bilaterally. Examination of the right fundus demonstrated PCV with branching neovascular network (BNN) and double-layer sign (DLS) and sub-RPE ring-like lesion (Figure 1 A,B).

Supertemporal to the fovea, en-face OCT revealed 3 FCEs in the left eye and the distance from the fovea was respectively 1949μm, 1334μm and 2588μm. Area and perimeter of 3 FCEs were respectively 470μm2/2790μm, 80μm2/1150μm and 50μm2/914μm. On SD-OCT, the width/depth of 3 FCEs was respectively 845μm/131μm, 476μm/99μm, and 301μm/60μm, however there was no obvious abnormality in the fovea. There was no evidence of flow signal on OCTA (Figure 1 C,D).

A 68-year-old female presented with complaints of blurring of vision in both eyes for more than one year. Patient was diagnosed and operated for age-related cataract in both eyes

elsewhere. Best-corrected vision at presentation was 0.8 and 0.8 in left eye and right eye, respectively. On anterior segment examination, the mild posterior capsular opacification (PCO) was present in both eyes. Intraocular pressure was within normal limits. Patient was advised regular follow-up and counseled to report earlier in case of metamorphopsia and blurring of vision. Peripapillary atrophy (PPA) was noted in the left eye, however the fovea was within normal limits (Figure 2 A, B).

Superonasal and inferotemporal to the fovea, en-face OCT revealed 2 FCEs in the right fundus and the distance from the fovea was respectively 1836μm and 1600μm. Area/perimeter of 2 FCEs was respectively 1120μm2/4900μm, 290μm2/2360μm. However, there was no obvious abnormality in the fovea. The width/depth of 2 FCEs was respectively 391μm/431μm and 509μm/191μm by SD-OCT. There was the low flow signal on OCTA (Figure 2 C, D).

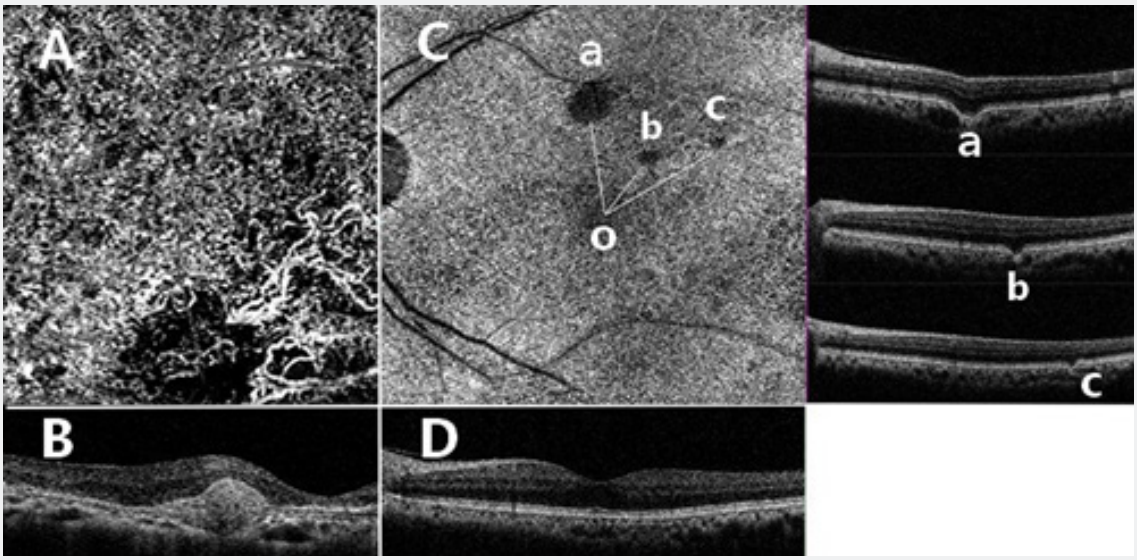

Figure 1: OCTA showing BNN(A), SD-OCT showed DLS and sub-RPE ring-like lesion(B) in the right eye. In the left eye, en-face OCT showed 3 FCEs(a,b,c) and the distance from the fovea(o)(C), SD-OCT showed 3 FCEs corresponding to en-face OCT(a,b,c). The fovea was normal(D).

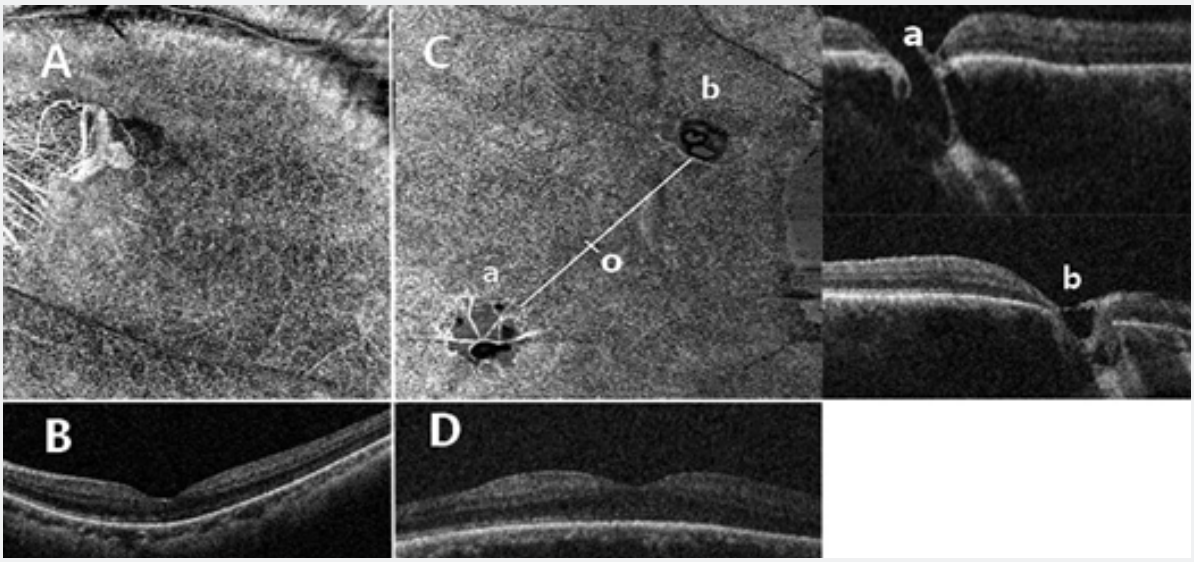

Figure 2: En-face OCT showed PPA (A) and a normal fovea on SD-OCT in the left eye(B). In the right eye, en-face OCT showed 2 FCEs(a,b) and the distance from the fovea(o)(C), SD-OCT showed 2 FCEs corresponding to en-face OCT(a,b). The fovea was normal(D).

Discussion

FCE was first described by Jampol et al. [2] in 2006, Wakabayashi et al. described three cases of "unilateral choroidal excavation," which was later on termed as "FCE" by Margolis et al. [3,4]. Using multimodal imaging, Dolz-Marco et al. defined the characteristics of caverns, which are: (a) nonreflective

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spherical to polyhedral structures visible on en face and cross-sectional OCT; (b) posterior tail of hyper transmission; (c) in cases of RPE loss, frequently hyperreflective on near-infrared and rarely reflective on color photographs or hyperfluorescent on ICGA; (d) not visible on fluorescein angiography or fundus autofluorescence; and (e) no evidence of flow signal on en face or cross-sectional OCT angiography (OCTA) [5].

In most patients, the presence of FCE is not evident on routine clinical examination. It is more evident on SD-OCT. It is a relatively common entity and frequently associated with macular pathologies such as central serous chorioretinopathy (CSCR), choroidal neovascularization (CNV), and polypoidal choroidal vasculopathy (PCV). However, there was no statistically significant correlation between the morphological type of FCE and macular pathology [1].

It is more common for FCE to exist in isolation. However, it is rare to see unilateral multifocal FCEs in the same fundus and the fovea is not affected. The etiology of FCE remains unclear. Some investigators speculated that FCE may be a congenital posterior segment malformation; in contrast, others mentioned that FCE found in adults is more likely to involve an acquired type [2,4,6]. FCE is usually located unilaterally within the fovea, although they have also been reported to present extra foveally [7,8]. Unilateral multifocal FCEs can occur relatively far from the fovea and vary in size and depth. Foveal and extrafoveal FCE has been regularly reported, but monocular multifocal focal choroidal excavation rare was reported.

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