Clinical course of focal choroidal excavation in Vogt–Koyanagi–Harada disease

Yuko Nishikawa1,3,* Kaoru Fujinami1,2,4,5,* Ken Watanabe1,2 Toru Noda1,2 Kazushige Tsunoda1,2 Kunihiko Akiyama1,2
1Department of Ophthalmology, National Hospital Organization, Tokyo Medical Center, Tokyo, Japan; 2Laboratory of Visual Physiology, National Institute of Sensory Organs, National Tokyo Medical Center, Tokyo, Japan; 3Department of Ophthalmology, Osaka Medical College, Takatsuki, Osaka, Japan; 4Department of Ophthalmology, Keio University School of Medicine, Tokyo, Japan; 5UCL Institute of Ophthalmology, London, UK
*These authors contributed equally to this work

Abstract: We describe focal choroidal excavation (FCE) in a case of Vogt–Koyanagi–Harada (VKH) disease and compare the findings with different chorioretinal conditions. A 55-year-old man was diagnosed with VKH based on panuveitis and exudative retinal detachments. Spectral-domain optical coherence tomography demonstrated a dome-shaped protrusion with a nonconforming pattern at the fovea, which had been detected as a conforming pattern 1 year before the onset. The FCE pattern returned into a conforming pattern following corticosteroid therapy. These findings suggest that the natively existent FCE could be affected by pathophysiological changes of VKH as well as other chorioretinal conditions.

Keywords: choroidal excavation, focal choroidal excavation, Vogt–Koyanagi–Harada disease, optical coherence tomography

Introduction

Focal choroidal excavation (FCE) was first described by Jampol et al1 as an anomalous excavation of the chorioid; it is typically observed by optical coherence tomography (OCT).2–12 This condition has been associated with several chorioretinal conditions and asymptomatic status, including central serous chorioretinopathy, choroidal neovascularization, and best vitelliform macular dystrophy.1–12 However, the mechanisms underlying the formation of FCE remain uncertain.

Wakabayashi et al2 described two patterns of FCE: 1) conforming pattern—excavations that involved the outer retinal layers up to and including the external limiting membrane; and 2) nonconforming pattern—excavations that involved only the retinal pigment epithelium (RPE).

Recently, a case report of FCE associated with Vogt–Koyanagi–Harada (VKH) disease has been published,13 which documented cross-sectional observation. Here we describe a clinical course of FCE associated with VKH before and after treatment and compare the morphological findings of FCE in four subjects with different chorioretinal conditions.

Case report

A 55-year-old man (subject 1) presented with bilateral metamorphopsia, with decimal visual acuity being 0.8 in the right eye and 1.2 in the left. The clinical diagnosis of VKH was made based on bilateral panuveitis and multifocal exudative retinal detachments at the posterior poles (Figure 1). High-dose corticosteroid therapy with gradual tapering was initiated 3 days after presentation. The serous detachments entirely resolved within 9 weeks and visual acuity in the right eye improved to 1.2.

Serial spectral-domain OCT (SD-OCT) images obtained at the preuveitic, uveitic, and posttreatment phase are shown in Figure 2. SD-OCT obtained 1 year before

Correspondence: Kaoru Fujinami Laboratory of Visual Physiology, National Institute of Sensory Organs, National Tokyo Medical Center, 2-5-1 Higashigaoka, Meguro-ku, Tokyo 152-8902, Japan Tel +81 3 3411 0111 Fax +81 3 3411 0185 Email kfj21kfj21kfj21@kmf.biglobe.ne.jp

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Figure 1 Fundus photographs, fluorescein angiograms, and indocyanine green angiograms of a case with Vogt–Koyanagi–Harada disease (subject 1).

Notes: (A) Fundus photography at preuveitic phase (1 year before the onset of uveitis) showed subtle RPE disturbance at the fovea in the right eye with normal findings in the left eye. (B) At the onset, fundus photography revealed bilateral multifocal exudative retinal detachments throughout the posterior pole in each eye, with the subtle RPE disturbance unchanged in the right eye. (C) Nine weeks after treatment, the exudative detachments had resolved in each eye. (D) Fluorescein angiography at the onset demonstrated multiple punctate hyperfluorescent lesions and multilobular pools of subretinal dye in each eye. (E) Indocyanine green angiography at the onset identified multiple hypofluorescent spots in each eye with a hyperfluorescent lesion at the superior nasal fovea.

Abbreviation: RPE, retinal pigment epithelial.

the onset of VKH due to symptoms of a floater and visual disturbance demonstrated a dome-shaped posterior protrusion of the RPE and outer retinal layers into the choroidal cavity (ie, conforming FCE) at the fovea in the right eye. SD-OCT at the uveitic phase identified multiple bilateral sensory retinal detachments, with the FCE now involving only the RPE (ie, nonconforming FCE). Nine weeks after the treatment, the nonconforming FCE returned into a conforming pattern.

The FCE pattern and its alteration during treatment of the case with VKH were compared to those of four subjects with FCE associated with other chorioretinal conditions (Figure 3). This comparison group consisted of two patients with age-related macular degeneration (AMD; subjects 2 and 3), one subject with a macular hole (MH; subject 4), and one asymptomatic individual (subject 5). Treatment with intravitreal ranibizumab injections and vitrectomy had been performed in the patients with AMD and MH, respectively. A conforming FCE was observed in three patients (subjects 2, 3, and 5) and pattern alteration from nonconforming to conforming FCE was found after treatment in one subject (subject 4). In the two subjects with AMD, a hyperreflective material around the FCE was absorbed, resulting in a well-demarcated conforming FCE after treatment.

Discussion

A detailed clinical course of FCE at the fovea was documented in a case with VKH disease. SD-OCT images obtained at the preuveitic, uveitic, and posttreatment phase suggested the preexistence of FCE before the onset of VKH, and the FCE pattern change (from conforming to nonconforming pattern during the period of choroidal inflammation) was observed during the follow-up.

The FCE identified at the preuveitic phase in our case supported the congenital/acquired posterior pole
malformation, as previously suggested.\textsuperscript{1,4,9,11,12} On the other hand, Hashida et al\textsuperscript{13} speculated that a direct pressure effect on the choroidal layer by subretinal fibrin disrupted the choroidal integrity and focal choroidal atrophy/thinning following inflammation and resulted in a formation of FCE in a case with VKH.\textsuperscript{4,7,13} Although such a remarkable subretinal fibrin was not detected, the association between the FCE formation and choroidal inflammation could not be excluded entirely in our case, considering other possible subclinical inflammatory events prior to this disease history.

Figure 2 Serial spectral-domain optical coherence tomographic images of a case with Vogt–Koyanagi–Harada disease (subject 1).

Notes: (A) Spectral-domain optical coherence tomography at the preuveitic phase (1 year before the onset) showed a dome-shaped posterior protrusion of the hyperreflective bands of the RPE and outer retinal layers into the choroidal cavity (ie, conforming pattern of FCE) at the fovea in the right eye, with normal findings in the left eye (FCE asterisked). (B) At the onset, multiple bilateral sensory retinal detachments were demonstrated in each eye, with the FCE involving only the RPE (ie, nonconforming FCE) (FCE asterisked). (C) Two weeks after treatment, the serous detachments had partially resolved, with residual subretinal fluid at the fovea in each eye, with a nonconforming FCE at the right fovea (FCE asterisked). (D) Nine weeks after treatment, the serous detachments had entirely resolved, resulting in the reappearance of a conforming FCE at the right fovea (FCE asterisked).

Abbreviations: FCE, focal choroidal excavation; RPE, retinal pigment epithelium.
An alteration of the FCE pattern observed in VKH was also found in the comparison group with other chorioretinal conditions. In subject 4 with an MH, the nonconforming FCE at presentation associated with vitreomacular traction changed to conforming FCE after treatment. In two subjects with AMD, a hyperreflective material around the FCE was observed to be absorbed, resulting in a well-demarcated conforming FCE via treatment (subjects 2 and 3). These findings suggest that the cavity within FCE can be filled with subretinal fluid associated with inflammation and exudative material generated by choroidal neovascularization. The decreased adhesion within the FCE between RPE and photoreceptor could complicate MHs. Given the proximity between the FCE and the active lesions, the involved retina around the active lesion may well show disorganization of retinal layers in the pathological process; then the conforming pattern is hard to maintain, unsurprisingly. In addition, it is possible that the cavity within FCE may potentially accelerate the pathophysiological changes of chorioretinal disorders.

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