

FUNDUS AUTOFLUORESCENCE IN CENTRAL RETINAL ARTERY OCCLUSION

Case Report

SANTRAL RETİNAL ARTER OKLÜZYONUNDA FUNDUS OTOFLORESANSI

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ABSTRACT

We describe the fundus autofluorescence (FAF) findings in a case of central retinal artery occlusion (CRAO). A 58-year-old woman presented with acute visual loss in the right eye. Best corrected visual acuity was counting fingers in the right eye and 20/20 in the left eye. Fundus examination revealed retinal edema and pallor in the posterior pole except a localized area corresponding to cilioretinal artery. FAF imaging indicated hypoautofluorescence at the posterior pole except the cilioretinal artery zone having a normal autofluorescence. By microperimetry, a generalized dense scotoma was found except the localized area having a relatively decreased retinal sensitivity, corresponding to cilioretinal artery zone depicted by FAF. At the 3rd month control, FAF imaging revealed relatively increased autofluorescence at the posterior pole and microperimetric evaluation revealed significant improvement in the areas of scotoma. In the present case, FAF imaging and microperimetric examination displayed a good correlation. FAF imaging may reveal characteristic findings and display functional changes in patients with CRAO in the acute and late stage.

Key words: *Central retinal artery occlusion, fundus autofluorescence, microperimetry*

Özet

Bu çalışmada, bir santral retinal arter oklüzyonu (SRAO) olgusunda fundus otofloresansı (FOF) bulguları anlatılmaktadır. 58 yaşındaki kadın hasta, sağ gözünde ani görme kaybı nedeniyle kliniğimize başvurdu. En iyi düzeltilmiş görme keskinliği sağ gözde parmak sayma düzeyinde olup sol gözde 20/20 idi. Fundus muayenesinde arka kutupta silioretinal arter trasesi dışında retina ödemi ve solukluğu olduğu izlendi. FOF incelemesinde silioretinal arter bölgesindeki normal otofloresans sinyali dışında arka kutupta hipo-otofloresans tespit edildi. Mikroperimetrik incelemede,

FOF görüntülemesi ile uyumlu olarak silioretinal arter trasesinde göreceli olarak azalmış retina sensitivitesi dışında yaygın skotom izlendi. 3. ay kontrolünde, FOF görüntülemede arka kutupta artmış otofloresans ve mikroperimetrik incelemede skotom alanlarında belirgin iyileşme olduğu görüldü. Bu olguda FOF görüntüleme ve mikroperimetrik muayene arasında iyi bir korelasyon saptanmıştır. FOF görüntüleme, SRAO olgularının akut ve geç safhalarında karakteristik bulgular sağlamakta ve retinadaki fonksiyonel değişiklikleri göstermektedir.

Anahtar kelimeler: *Santral retinal arter oklüzyonu, fundus otofloresansı, mikroperimetri.*

INTRODUCTION

Central retinal artery occlusion (CRAO) results in severe visual deterioration secondary to anatomical and functional changes. After CRAO, visual function abnormalities such as decreased color discrimination, decreased contrast sensitivity and visual field defects were observed despite improvement in visual acuity (1). In clinical practice, visual function assessment is usually performed by the measurement of visual acuity level. However, visual acuity level does not completely represent the state of visual functions. Herein, we report the fundus autofluorescence (FAF) findings of a case with CRAO.

CASE HISTORY

A 58-year-old woman presented with acute and profound visual loss for the last 5 days in the right eye (RE). Best-corrected visual acuity (BCVA) was counting fingers in RE and 20/20 in the left eye (LE). Anterior segment evaluation was unremarkable in both eyes. Fundus examination of RE revealed significant retinal edema and pallor in the posterior pole except a localized area corresponding to cilioretinal artery (Figure 1A). Posterior segment evaluation was normal in LE. Fundus fluorescein angiography (FFA) was performed with the possible diagnosis of CRAO. There were no signs of delay or blockage in arteriovenous filling time in RE during FFA (Figure 1B and 1C). In the early frames of FFA, nasal and temporal cilioretinal arteries were evident during the transit phase. FAF imaging was performed by a confocal scanning laser

ophthalmoscope (HRA2, Heidelberg Engineering, Germany) and hypofluorescence was observed at the posterior pole except the cilioretinal artery zone having a normal autofluorescence (Figure 2A). Increased thickness and hyperreflectivity in the inner retinal layers were apparent in RE by optical coherence tomography (Stratus-OCT, Carl Zeiss Meditec, Inc, Dublin, California, USA).

Retinal function in the central 20° tested by a novel microperimeter (MP1 Microperimeter, Nidek Technologies, Padova, Italy) with a 4-2 double-staircase strategy was severely distorted in RE (Figure 2B). Mean sensitivity was found to be 3.3 dB and 18.5 dB; mean defect was found to be -13.4 dB and -1.1 dB in RE and LE respectively. A stable and predominantly central fixation was detected in LE. However, fixation was unstable and predominantly eccentric in RE.

No ocular treatment was performed because of the late presentation. She was immediately referred to cardiology and neurology, and the systemic evaluation revealed a patent foramen ovale. The patient underwent hyperbaric oxygen treatment and at the 3rd month follow-up, BCVA was found to be 20/125 in the right eye. Retinal edema and pallor had resolved in fundus examination. There was an overall decrease of 120 µm in central macular thickness detected by OCT. FAF imaging revealed relatively increased autofluorescence at the posterior pole (Figure 2C). Mean retinal sensitivity was found to be 7.9 dB and mean defect was detected as -8.3 dB (Figure 2D). Microperimetric evaluation revealed significant improvement in the areas of scotoma in central 20°, parallel to the changes in FAF.



Figure 1A: Fundus photograph of the right eye reveals significant retinal edema and pallor in the posterior pole except a localized area corresponding to cilioretinal artery.

Figure 1B: In the early phase of the fundus fluorescein angiography, the nasal and temporal cilioretinal arteries are seen.

Figure 1C: Late phase of the fundus fluorescein angiography.

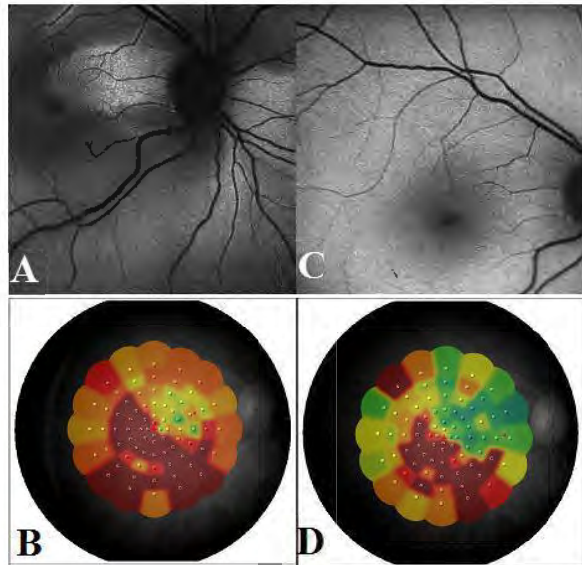


Figure 2A: Decreased fundus autofluorescence in the right eye except the cilioretinal artery zone with normal fundus autofluorescence at the initial presentation.

Figure 2B: Microperimetric evaluation reveals central scotoma except the cilioretinal artery zone.

Figure 2C: At the 3rd month follow-up, fundus autofluorescence imaging reveals relatively increased autofluorescence at the posterior pole possibly related to increased retinal transparency secondary to retinal thinning.

Figure 2D: Microperimetric evaluation at the 3rd month follow-up reveals improvement in the areas of scotoma in central 20°.

DISCUSSION

The etiology of CRAO is various and the risk factors are multi-factorial. The major causes of CRAO are cholesterol and fibrinoplatelet emboli from a carotid source and a calcific emboli from a cardiac source (2). In the present case, a silent patent foramen ovale was considered to be the major source.

FAF imaging has been recently introduced into clinical practice and is a non-invasive technique for the evaluation of retinal pigment epithelium (RPE) layer. FAF imaging reveals functional and/or morphological abnormalities of the retina which may not be discovered during biomicroscopic examination and conventional methods such as fundus photography and angiography. The major source of FAF is the lipofuscin of RPE cells (3,4). Reduction in RPE lipofuscin density; increased RPE melanin content; absorption from structures anterior to

RPE layer are classified as the main causes for a reduced FAF signal (3,4). In this particular case, intraretinal edema in CRAO seems to lead to the blockage of the excited wavelength used during FAF imaging. In the late stage of CRAO, the intraretinal edema resolves and retinal atrophy occurs. The relatively increased autofluorescence detected at the 3rd month follow-up is possibly related to increased retinal transparency secondary to retinal thinning.

Evaluation of retinal functions in retinal artery occlusions such as microperimetric investigations have been studied infrequently. Chalam and colleagues reported the recovery of retinal sensitivity detected by microperimetry in a case of branch retinal artery occlusion(5). MP1 microperimeter is effective for detection of retinal function loss even in cases of severe visual acuity reduction, allowing to quantify retinal threshold and scotoma characteristics with the assessment of the location and stability of retinal fixation (6). In the present case, a generalized dense scotoma was found except the localized area having a relatively decreased retinal sensitivity, corresponding to cilioretinal artery zone depicted by FAF. Although the central retinal artery was found to be totally re-perfused during FFA, retinal sensitivity was severely decreased which was also displayed as a wide-spread absolute scotoma by microperimetry. Fixation pattern was unstable and predominantly eccentric despite maintenance of foveal arterial supply by cilioretinal artery to some extent. Functional changes in the central 20° detected by microperimetric evaluation displayed a good correlation with the changes in FAF findings.

Microperimetric evaluation may indicate supplementary information to the clinical findings and anatomical changes detected by optical coherence tomography in CRAO. In the present case, FAF imaging and microperimetric examination displayed a good correlation. In conclusion, FAF imaging may reveal characteristic findings and display functional changes in patients with central retinal artery occlusion in the acute and late stage.

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