Improvement of Microperimetry and Optical Coherence Tomography Findings in Hemi-Central Retinal Artery Occlusion

Hemi-Santral Retina Arter Oklüzyonunda Mikroperimetri ve Optik Koherens Tomografi Bulgularındaki Düzelme

Umut Aslı DİNÇ[1], Sinan TATLIPINAR[2], Levent ALİMGİL[3]

Case Report   *Olgu Sunumu*

ÖZ

The microperimetry and optical coherence tomography (OCT) findings of a case with hemi-central retinal artery occlusion are described. A 49-year-old woman presented with blurred vision and visual field defect in the inferior field of the right eye for the last 5 days. Best-corrected visual acuity (BCVA) was 20/32 at the initial visit. Mean sensitivity detected by microperimetry was 10.7 dB in the central 20° and mean macular thickness detected by OCT was 267 μm. At 3rd month's visit, BCVA increased to 20/20 in the right eye. Mean sensitivity increased to 11.5 dB and mean macular thickness decreased to 174 μm. The areas of scotoma temporal to the fovea and at the fovea showed progress during the serial microperimetric evaluations. Microperimetry may be useful for the detection of improvement in retinal function and may provide supplementary information to anatomical progress detected by OCT during the recovery of hemi-central retinal artery occlusion.

Key Words: Retinal artery occlusion, microperimetry.

ABSTRACT

Hemi-santral retina arter oklüzyonu gelişen bir olgunun mikroperimetri ve optik koherens tomografi (OKT) bulguları anlatılmaktadır. Son 5 gündür sağ gözünde bulanık görme ve alt yarıda görme alan kaybı ile kliniğimize başvuran 59 yaşındaki kadın hastada en iyi düzeltilmiş görme keskinliği (EİDK) 20/32 olarak bulundu. Santral 20°'de mikroperimetri ile ölçülen ortalama sensitivite 10.7 dB olup OKT ile ölçülen ortalama makula kalınlığı 267 μm idi. Üçüncü ayda EİDK'nin 20/20'ye yükseldiği görüldü. Ortalama sensitivite 11.5 dB'e yükselirken ortalama makula kalınlığı 174 μm'a azaldı. Seri mikroperitmerik incelemelerde fovea ve temporalindeki skotom alanlarında iyileşme olduğu görüldü. Mikroperimetri, hemi-santral retina arter oklüzyonunun iyileşme sürecinde retina fonksiyonlarında düzelmeyi göstermeye yardımcı olmakta olup OKT ile tespit edilen anatomik düzelmeye ilave bilgiler sağlamaktadır.

Anahtar Kelimeler: Retina arter oklüzyonu, mikroperimetri.

1-   Yeditepe Üniversitesi Tıp Fakültesi Hastanesi, Göz Hast. A.D., İstanbul, Yard. Doç. Dr.
2-   Yeditepe Üniversitesi Tıp Fakültesi Hastanesi, Göz Hast. A.D., İstanbul, Doç. Dr.
3-   Yeditepe Üniversitesi Tıp Fakültesi Hastanesi, Göz Hast. A.D., İstanbul, Prof. Dr.

1-   M.D. Assistant Professor, Yeditepe University Eye Hospital, İstanbul/TURKEY
     DİNÇ U.A., umutdinc@yahoo.com
2-   M.D. Associate Professor, Yeditepe University Eye Hospital, İstanbul/TURKEY
     TATLIPINAR S., statlipi@yahoo.com
3-   M.D. Professor, Yeditepe University Eye Hospital, İstanbul/TURKEY
     ALIMGIL L., levalim@ttnet.net.tr
Correspondence: M.D. Assistant Professor, Umut Aslı DİNÇ
     Yeditepe University Eye Hospital, Şakir Kesebir Sk.İstanbul/TURKEY

INTRODUCTION

Residual visual function abnormalities such as decreased color discrimination, decreased contrast sensitivity and visual field defects were reported despite improvement in visual acuity after retinal artery occlusion (RAO).[1] The general tendency for visual function assessment is the measurement of visual acuity level in clinical practice. However, visual acuity determination does not solely enlighten the state of visual functions. Evaluation of retinal functions in RAO by microperimetry has been studied infrequently.[2] Herein, we report the evaluation of functional changes in central retinal sensitivity assessed by microperimetry and anatomical changes detected by optical coherence tomography (OCT) during the recovery period of hemi-central RAO .

CASE REPORT

A 49-year-old woman with hypertension presented with blurred vision and visual field defect in the inferior field of the right eye for the last 5 days. Best-corrected visual acuity (BCVA) was 20/32 in the right eye and 20/20 in the left eye. Anterior segment evaluation was unremarkable in both eyes. Fundus examination revealed retinal edema and pallor in the superior half with optic disc edema in the right eye (Figure 1a). There was apparent delay and blockage in arteriovenous filling time during fundus fluorescein angiography (FFA, HRA2, Heidelberg Engineering, Germany), (Figure 1b).

Retinal function in the central 20° was tested by microperimetry (MP1 Microperimeter, Nidek Technologies, Padova, Italy) with a 4-2 double-staircase strategy. Mean sensitivity was 10.7 dB, 11.3 dB, 11.4 dB and 11.5 dB; mean defect was -3.4 dB, -2.4 dB, -2.2 dB and -1.6 dB in the right eye at the initial visit, 2nd week, 1st month and 3rd month follow-up visits respectively (Figure 2a and 2b). In microperimetric evaluation, fixation parameters were classified as stable and predominantly central throughout the follow-up of the patient.

Central macular thickness was 267 μm, 224 μm, 184 μm and 174 μm at the initial visit, 2nd week, 1st month and 3rd month follow-up controls in the right eye by OCT (Stratus-OCT, Carl Zeiss Meditec Inc, CA-USA).

Increased retinal thickness and hyperreflectivity of the inner retinal layers in the acute phase developed into areas of retinal atrophy with decreased retinal thickness and hyperreflectivity in the choriocapillaris-retina pigment epithelium layer (Figure 2c and 2d).

At 3rd month's visit, BCVA increased to 20/20 and retinal edema has completely resolved together with optic disc pallor in the superior portion.

DISCUSSION

MP1 microperimeter is effective for detection of retinal function loss, allowing to quantify retinal threshold and scotoma characteristics with the assessment of the location and stability of retinal fixation.[3] Visual outcome in branch RAO was reported to be better at presentation and at the final visit when compared with central RAO.[4]

In the present case, the foveal sensitivity improvement was followed by the increase in BCVA during follow-up period. Although the dense and absolute scotoma in the superior half of the retina persisted, the absolute scotoma at the fovea progressed to a relative scotoma and the relative scotoma temporal to the fovea also returned to normal during the serial microperimetric evaluations. Fixation parameters do not seem to be affected due to foveal sparing and recovery of foveal sensitivity.
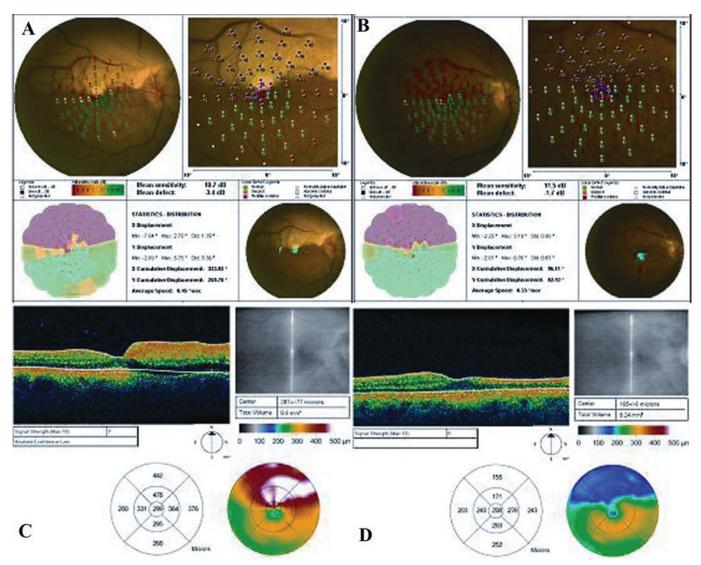
The significant retinal edema in the superior half demonstrated by OCT turned into severe retinal atrophy. In the acute phase, outer retinal layers showed hyporeflectivity related to the shadowing effect which in the chronic phase became hyperreflective secondary to atrophy of neurosensory retina. As previously reported, our OCT findings supports the denaturation and breakdown of intracellular protein and the subsequent increase in the intracellular fluid which cause ischemic pallor of retina.[5] At the 3rd month's visit, microperimetry and OCT evaluations displayed an excellent correlation.

In conclusion, microperimetry may be useful for the detection of improvement in retinal function and may provide supplementary information to anatomical progress detected by OCT during the recovery of hemi-central RAO.

Resim 1a: Color fundus photograph of the right eye at the initial examination reveals retinal edema in the superior retina.

Resim 1B: Fundus fluorescein angiography reveals delayed filling of the retinal arterioles in the early arterial phase.

Resim 2: 2a. Microperimetric evaluation reveals the areas of absolute scotoma as red areas and relative scotoma as yellow areas. **2b.** Note the recovery of foveal absolute scotoma to relative scotoma and temporal relative scotoma to normal in microperimetry evaluation at the 3rd month visit. **2c.** OCT demonstrates the significant retinal thicknening superiorly at the presentation. **2d.** Retinal atrophy is noteworthy corresponding to previous areas of retinal edema in OCT evalaution at the 3rd month visit.

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