Journal Article Review

Quantitative evaluation of photoreceptor density in chronic central serous chorioretinopathy using the SPECTRALIS High Magnification Module

Background and Purpose

Central serous chorioretinopathy (CSC) is a common retinal condition characterized by the presence of pigmentary changes and subretinal fluid accumulation associated with specific choroidal features. This subretinal fluid may resolve spontaneously (acute CSC), but in some cases it may remain at least 4-6 months (chronic CSC). The chronic form can be sight-threatening, with diffuse disruption of the retinal pigment epithelium and the outer retinal layers. The SPECTRALIS High Magnification Module (HMM) allows for detailed visualization of retinal structures, including the photoreceptor mosaic, using confocal scanning laser ophthalmoscopy (cSLO). In this study, the authors used the HMM to visualize and quantify photoreceptor density in cases diagnosed with chronic CSC with resolved subretinal fluid. These cases were compared to unaffected and control eyes.

Methods

24 affected eyes and the fellow eyes from 24 patients with chronic CSC were included. Near infrared reflectance (NIR), optical coherence tomography (OCT), and HMM images were acquired using the Heidelberg Engineering SPECTRALIS HRA+OCT with OCT2 Module. Furthermore, microperimetry was acquired using the MAIA device (iCare). A control group of sex- and age-matched control eyes was also included. The fovea was located on the HMM images using the NIR and OCT images as a reference, and photoreceptor density was manually assessed at four different positions located 500µm away from the fovea (superior, inferior, temporal and nasal).

Results

- Mean age of the patients included was 42.79 years, with a mean logMAR visual acuity of 0.126 and a mean duration of the disease of 19 months.
- At 500µm from the fovea, significantly lower photoreceptor densities were found in both the affected eyes (mean, 9721 cells/mm^2; p<0.001) and fellow eyes of cCSC patients (15667 cells/mm^2; p<0.002) as compared to control eyes (17217 cells/mm^2).
- The mean visual acuity in affected eyes was significantly lower compared to control eyes (0.126 vs -0.050, p<0.001, which was not the case in fellow eyes (-0.026 vs -0.050 in controls, p=0.588)
- There was a significant correlation between photoreceptor density and duration of symptoms (r= -0.432, p=0.007), retinal sensitivity (r= 0.430, p=0.036) and fixation stability P2 (r= 0.420, p=0.041).

Conclusions

- Although adaptive optics ophthalmoscopy can provide microstructural analysis of the retinal anatomy, these highly specialized and complex devices have limited implementation in clinical practice.
- Furthermore, this method is not commonly used in clinical practice as it is costly and time-consuming.
- In comparison to adaptive optics, HMM provides detailed imaging of retinal structures in larger areas. Variability in the quality of the acquired images is associated with variable ocular optics in patients and unpredictable cooperation, as seen in adaptive optics devices.
- HMM imaging provides complimentary and valuable information in patients with chronic CSC with resolved subretinal fluid, showing decreased photoreceptor density compared to control eyes.
- Duration of disease was directly associated with the photoreceptor density, suggesting that early intervention in these cases might be considered to reduce the negative effect of subretinal fluid.

HEIDELBERG ENGINEERING

HEIDELBERG
ENGINEERING

HEIDELBERG
ENGINEERING