

8.1 Impaired mfERG is associated with suspected cone loss on adaptive optics in patients treated with hydroxychloroquine

Carl Arndt, Chemseddine Ramoul, Mickael Afriat

Université Reims Champagne Ardenne, Reims, France

Purpose: Hydroxychloroquine (HCQ) has an excellent efficacy and systemic tolerance in various inflammatory diseases such as rheumatoid arthritis and lupus erythematosus. The most serious side effect is an irreversible retinal toxicity. MfERG is a second line test if

the currently recommended screening tests for HCQ toxicity are abnormal. However, the sensitivity of mfERG in detecting photoreceptor loss remains to be evaluated. Adaptive optics (AO) enables measurement of cone density. The purpose of the present study was to compare cone density on AO with mfERG responses in patients on HCQ.

Methods: The setting was a monocentric retrospective analysis performed in the Department of Ophthalmology at Reims University Hospital (France). Patients treated with HCQ and screened for retinal toxicity were evaluated between January 1, 2017 and December 31, 2018. Spectral domain OCT (SD OCT) and Ophthalmic Monitor central static perimetry (FAST 12) were routinely performed. In case of abnormalities in either test, mfERG was recorded and photoreceptor density was obtained using an AO camera (RTX1, Imagine Eyes). Cone density within a square of $0.3^\circ \times 0.3^\circ$ placed 1.5° superiorly and 1.5° inferiorly from the fovea was evaluated.

Results: 142 eyes of 71 patients were screened in the pre-defined time frame. Ninety-one eyes from 47 patients could be analyzed (64%) with AO. The majority were women (64/71). The mean age was 48.5 years (16–77), the mean cumulative HCQ dose was 1016 g, and the average duration of treatment was 6.7 years. The photoreceptor density decreased with the patients age ($R^2 = 0.1323$). There was a significant correlation between abnormal *en face* OCT and mean photoreceptor density (4668.86 ± 667.48 cells/ m^2 , $p < 0.05$). Patients with an abnormal mfERG had a significant decrease in mean photoreceptor density adjusted on age and cumulative dose in a predictive multivariate analysis (3256.53 ± 1508.17 cells/ mm^2 , $p = 0.0474$). All the patients with decreased cone density were detected with mfERG.

Conclusions: In patients with suspected toxicity in a routine screening procedure, a correlation between function and structure could be demonstrated, as a reduced mfERG was associated with decreased cone density measured with AO. In addition, mfERG had 100% sensitivity in detecting photoreceptor loss.