VALUE OF OCTOPUS AUTOMATED PERIMETRY IN PATIENTS ON HYDROXYCHLOROQUINE TREATMENT

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Abstract

Hydroxychloroquine retinopathy is a well-known toxic manifestation of a commonly used systemic medication. The aim of this study was to evaluate the role of automated perimetry in detecting early retinal involvement related to hydroxychloroquine therapy. The study group was made up of 25 patients (21 females and four males, average age 34.5 years) affected by rheumatological diseases treated with hydroxychloroquine. All patients underwent an ophthalmological examination and computerized perimetry (Octopus 2000R), using a static Full Threshold Program (31 Program) prior to and 12 and 18 months after treatment. For visual field evaluation, the authors considered perimetric indices (MD: mean defect) and the presence of scotomas, in relation to their depth and extension. They discuss perimetric defect variations in relation to dose of drug used and duration of therapy. The results confirm the sensitivity of Octopus perimetry in determining the first signs of hydroxychloroquine retinal toxicity and its important role in the follow-up of patients using this drug.

Introduction

Antimalarials are systemic drugs commonly used for the long-term therapy of patients affected by rheumatological diseases. The ophthalmological follow-up of these patients is important for detecting ocular involvement from the underlying disease, as well as early signs of hydroxychloroquine retinal toxicity.

Antimalarial drugs often used in rheumatological patients are chloroquine and hydroxychloroquine. Retinal involvement caused by these drugs is well known[1,2].

This damage is represented by functional retinal disturbance due to macular damage or optic nerve toxicity. Toxicity may be related to the daily dose of the drug used and to the duration of therapy[3,4]. Many studies have shown the influence of chloroquine and its derivatives on retinal protein synthesis and lipid peroxidation. Ophthalmologi-

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back

cal findings in patients on hydroxychloroquine treatment are represented by macular retinal pigment epithelial changes, narrowed retinal vessels, scotomatous visual field defects and electrofunctional damage[5,6].

The aim of this study was to evaluate the role of automated perimetry in detecting early retinal involvement related to hydroxychloroquine therapy.

Material and methods

The study group was made up of 25 patients (21 females and four males; average age 34.4 years) with rheumatological diseases who were on antimalarial drug treatment. Eighteen of the examined patients were affected by rheumatoid arthritis and seven by systemic lupus erythematosus. All were being treated with hydroxychloroquine twice a day by a total daily dose of 400 mg.

All the patients underwent evaluation of visual acuity, biomicroscopy, tonometry and fundus examination; computerized visual field and electro-oculographic evaluation examinations were performed prior to and 12 and 18 months after beginning treatment. All examined eyes had a visual acuity of 20/25 (corrected or uncorrected) with refractive errors of <3D. The anterior segment was intact in all cases, and none of the patients had intraocular pressures of >17 mmHg. The fundus was examined with an indirect and direct ophthalmoscope. There were no retinal alterations that could have influenced perimetric evaluation.

Visual field examination was performed with an automated Octopus 2000R Interzeag perimeter. All the eyes were examined using Full Threshold Program 31 with a Goldmann III stimulus. This program evaluates the central visual field (0-30°) by means of a grid containing 73 test points (resolution 6°) aligned with the vertical and horizontal axes. All subjects had undergone automatic perimetry at least once before this study. Throughout the examination, the diameters of the pupils remained >3 mm. For visual field evaluation, we analyzed perimetric indices (mean defect: MD), and the presence of scotomas, their extension, depth, distribution and possible variation during the entire follow-up period.

Results

None of the patients showed any ophthalmoscopic or electro-oculographic impairment during follow-up.

Evaluation of average visual field MD in rheumatological patients (50 eyes tested) showed a gradual increase after 18 months of follow-up. Average MD was equal to 1.2dB before the beginning of treatment, 3.9dB after one year, and 4.5dB after 18 months of therapy (Fig. 1).

Extension of visual field defects in the eyes examined and evolution during follow-up are reported in Figure 2.

The perimetric findings showed early optic nerve functional impairment manifested by the presence of a slight global depression of central retinal sensitivity or paracentral scotomas, in most cases localized to the superior hemifield. An increase in the frequency of visual field defects was seen after 18 months of treatment.

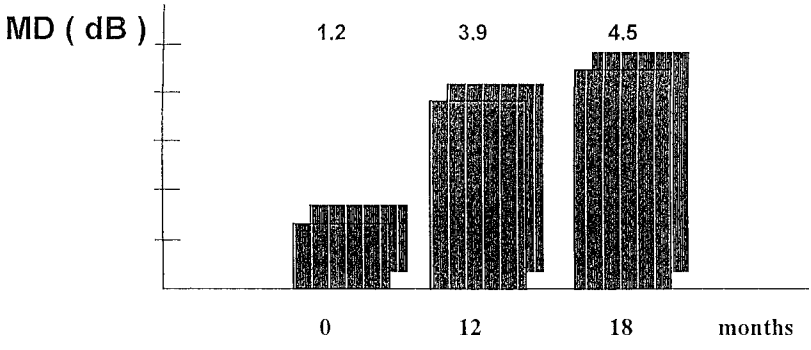
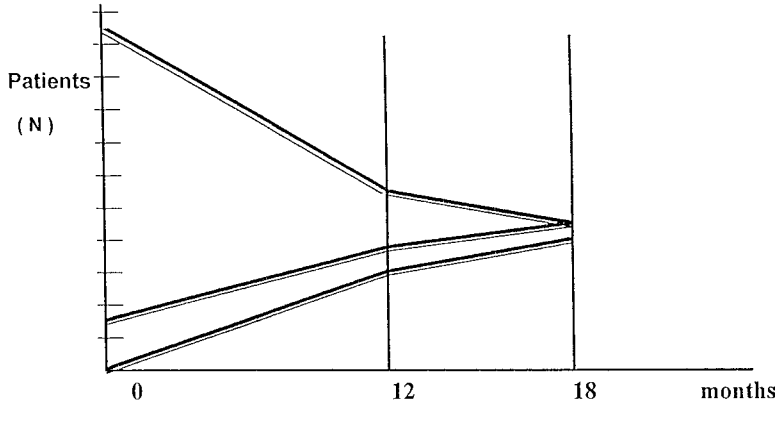


Fig. 1. Mean defect variation in all patients examined prior to and 12 and 18 months after beginning treatment.



global depression central sensitivity	0	6	8	A
localized perimetric defects	3	8	9	B
normal visual field	22	11	9	C
	0	12	18	months

Fig. 2. Extension of perimetric defects in rheumatological patients examined (50 eyes tested) during 18 months of follow-up.

Discussion

Early diagnosis of the retinotoxic effects of antimalarial drugs can be established by a thorough history, ophthalmoscopy and routine simple functional tests. In case of suspected macular or optic nerve damage, electrophysiology, angiography, automated perimetry and color vision tests are recommended. Studies have shown a high percentage of early perimetric deficits, most commonly a paracentral scotoma that is deepest on the superior vertical meridian, just above the fixation point. No significant correlation has been found between perimetric indices (MS, MD, CLV, SF) and drug type, average daily dose or cumulative dose[6,7].

Our study findings underline the usefulness of full threshold static perimetry in the

early detection of retinal or optic nerve impairment caused by hydroxychloroquine in the absence of ophthalmoscopic or electofunctional alterations. The presence of paracentral scotomas or of a slight generalized depression of central sensitivity could be related to early optic nerve toxic impairment rather than to macular damage. The possible reversibility of this functional impairment if treatment is stopped, confirms the important role of automated perimetry in monitoring of therapy to prevent the appearance of hydroxychloroquine maculopathy.

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