Antimalarials and The Eye

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ANTIMALARIAL THERAPY AND THE EYE

Following the first reports in 1954 of the beneficial effects of chloroquine in cases of lupus erythematosus[1], this drug and its numerous derivatives have been used extensively in the treatment of systemic and discoid lupus erythematosus and rheumatoid arthritis. The small dosage of chloroquine used in the prophylaxis of malaria is comparativley free from any serious side effects; higher dosage administered over a prolonged period of time for chronic connective tissue disorders gives rise to concern and requires careful monitoring.

Chloroquine is rapidly absorbed from the digestive tract but elimination is slow and pronounced accumulation of the drug in cellular tissues occurs. The highest concentration is reached in melanin containing tissues such as the iris, choroid and the retinal pigment epithelium[2]. The incidence of corneal changes varies from 30% - 70%[3]. The pattern of corneal deposits varies from diffuse punctate opacities which may aggregate into isolated maculae, to radial and whirling lines that converge and coalesce in a zone just beneath the centre of the cornea. They are best visualised on slit-lamp examination. They give rise to little subjective symptoms apart from photophobia or observation of haloes around lights. These minor symptoms tend to disappear on dose reduction since corneal changes are largely reversible and the visual acuity remains unaffected. Detection of these changes should alert the physician to the possibility of the onset of retinal changes at a later stage. Corneal sensation is reduced in 50% of patients receiving antimalarials with no definite relationship to the corneal opacities[4]; this may account for fewer patients requiring artificial tear substitutes.

A reduction in the amplitude of accommodation is not uncommon - most patients complain of difficulty focusing from near objects to far or vice-versa.

Tiny white opacities beneath the posterior capsule of the lens have been observed in 20% - 40% of patients on chloroquine but not on hydroxychloroquine[5].

The development of retinopathy is however the most serious and potentially blinding complication of long term antimalarial therapy. Following the first suspected case reported by Cambiaggi in 1957[6], retinal toxicity was confirmed in a later study.[7]. The usual presenting symptoms of chloroquine retinopathy are difficulty in reading with inability to pick out words or single letters which may be missing, blurred vision and absent areas in the central and peripheral visual fields.

The earliest fundus appearances show fine pigmented stippling at the macula of both eyes, which are often difficult to distinguish from other causes of pigmentation. If the drug is discontinued at this premaculopathy stage, the macula may return to normal.

The classic syndrome shows a bilateral symmetrical oval pigmentation surrounded by a clear zone of depigmentation which is encircled by a further ring of pigment; the whole pattern resembles a dough-nut or the bull's eye of a target. In later stages the disc turns pale, the arterioles show generalised attenuation and segmental constriction. 'Bone corpuscle' type of peripheral pigmentation is a late feature. The diagnosis is confirmed by plotting characteristic pericentral or paracentral scotomas and by fluorescein angiography which shows transmission defects of the retinal pigment epithelium with the typical bull's eye lesion. These fundus changes may progress after cessation of treatment[8], or the onset delayed as late as seven years after withdrawal of the drug.[9] Histological examination shows destruction of rod and cone elements, with accumulation of pigmented cells in the outer nuclear and outer plexiform layers. Phototoxicity may be relevant since retinopahty is retarded if experimental rats are kept in the dark. Albino rats also develop the condition, casting doubt on the importance of the pigment epithelium.

How can this condition be prevented? Any patient being considered for long term antimalarials should have regular ophthalmological supervision, with an initial baseline assessment prior to commencing therapy in order to record any existing abnormalities, preferably recorded by colour fundus photography. The selection of drug is important since hydroxychloroquine (Plaquenil) is less toxic than chloroquine. Toxicity is related to exceeding the maximum allowable daily dose (400 mg. hydroxychloroquine or 250 mg. chloroquine) rather than the total dose administered or duration of therapy[10]. Safe and practical dosage limits are 4 mg/kg. body weight/day for chloroquine and 6 mg/kg./day for hydroxychloroquine[11]. The risk of retinopathy increases significantly above a total dose of 100 gm (representing one year's therapy). A simple and inexpensive method of early detection is the use of an Amsler Grid Chart on which the patient may observe any early scotoma, which correlates well with more sophisticated perimetry[12]. The electroretinogram and electrooculogram are normal when only the macula is affected; both responses drop progressively with more diffuse damage. Changes in thresholds to red and white lights can be detected by the Friedman visual field analyser[13]. Changes in visual evoked potentials after photostress may precede clinically detectable macular change[14].

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