

# *Steroid-induced cataracts in patients with autoimmune hepatitis*

## SUMMARY

**Background:** Posterior subcapsular cataract (PSC) has been reported in patients on corticosteroids therapy for various pathologies. Autoimmune hepatitis (AIH) is a progressive inflammatory hepatic disease for which corticosteroids are recommended but PSC has not yet been reported in AIH patients on corticosteroids therapy.

**Methods:** The AIH patients at our service underwent an ophthalmological assessment and their files were analyzed establish the dosage and duration of medication, the presence of visual complaints and the type of AIH, in order to correlate these with the ophthalmological findings. Patients were examined with a slit lamp following pupil dilation.

**Results:** 17 AIH patients evaluated, only one patient had PSC.

**Conclusion:** Although the frequency of PSC was low (1/17) in AIH patients on corticosteroid therapy, these individuals should undergo occasional ophthalmological assessment for the presence of cataracts since their visual acuity and quality of life may be adversely affected.

**Index:** cataract; autoimmune hepatitis;  
corticosteroids.

## INTRODUCTION

The lens is a biconvex, avascular and almost totally transparent structure (1). The lens serves to focus the light rays as well as B (295–315nm) and A (315–400nm) ultraviolet radiation on the retina (2). The possible changes that may occur with the lens include dislocation and opacity. Patients affected by either of these alterations complain of blurred vision without pain or other symptoms. The lens is normally evaluated by doing a visual acuity test and by examination with a slit lamp and ophthalmoscope when the pupils are dilated (3).

Cataract formation varies in intensity and causes, but is more common with increasing age. In most cases, both eyes are affected, although the progress varies between eyes. Cataracts are classified as cortical, nuclear or posterior subcapsular, depending on the region affected (3). Several classifications have been proposed for defining the intensity of the cataract. The Crew

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(4) and LOCS (apud 5) classifications are examples. In 1989, Chylac et al proposed a second version of the LOCS classification, based on the use of the slit lamp and retro-illumination (5).

Posterior subcapsular cataracts (PSC) can occur in any age group and in association with pathologies such as diabetes mellitus, or chronic drug use, especially topical and systemic corticosteroids (6). The patient complains of glare and reduced vision in ambients with bright light. PSC may also be related to trauma, inflammation and ionizing radiation exposure (3).

In 1960, Black et al (7), were the first to describe the relationship between systemic corticosteroids use and PSC. In a study of patients with rheumatoid arthritis, the characteristic alterations were seen only in patients who received moderate or high doses for more than a year (8).

Corticosteroids are now considered to be cataractogenic, especially for PSC. However, there is still controversy regarding the alterations which occur as well as about the intensity, duration and total dosage used (8-12).

PSC regression has been related to the substitution or reduction in corticosteroid dosage (12,13). In contrast, PSC has been reported to progress regardless of whether the drug is discontinued or the dose reduced (14).

Many pathologies require use of corticosteroids, despite the potential side effects, and many authors have reported the appearance of PSC in patients on such therapy (10-13,15,16,18).

Children are believed to be more susceptible than adults to the cataractogenic effects of corticoids, however, individual susceptibility has been assessed by various authors (8).

Kollarits et al (19) found PSC in 32 of their 33 patients who underwent a renal transplant followed by long-term corticotherapy. Six patients had fifth degree PSC (Crew's classification (4)). Of these, four patients had HLA-A1, which suggested a correlation with this form of PSC.

Adhikary et al (20), also evaluated HLA in patients who underwent renal transplants, but there was no significant correlation with HLA (classes A and B). HLA-B7 was observed in 16% of the group with cataracts and in 14% of the group without cataracts.

A correlation between HLA-CW3 and the absence of PSC was reported by Fournier et al (9) suggesting that this condition was a protective factor.

Autoimmune hepatitis (AIH), one of the many patholo-

gies for which corticoids are an effective therapy, is an inflammatory liver disease which involves the progressive destruction of the hepatic parenchyma. AIH occurs predominantly in females and its etiology is unknown. The disease may be diagnosed between 6 months and 75 years of age with a peak between 10-30 years. The current classification is based on the presence of antibody and there are two classes: type 1 – antinuclear and /or smooth muscle antibodies, and type 2 – liver-kidney microsomal antibodies (21). A scoring system used to assess the diagnosis and the response to treatment (22) has recently been revised (23). The treatment recommended is prednisone (1-2 mg/kg/day, maximum 60 mg) and azathioprine (1-2 mg/kg/day, maximum 100 mg) (24).

Since there are no reports of PSC in AIH, we have assessed the prevalence of these cataracts in AIH patients on corticotherapy. We also examined the correlation between the frequency of PSC and the duration of corticotherapy, the total corticoid dose and the period during which high doses of corticoids (>0.5 mg/kg/day) were used.

## PATIENTS AND METHODS

Autoimmune hepatitis patients attended at the Pediatric Hepatology Unit of the University Hospital (UNICAMP), gave their written informed consent to participate in this study which was approved by the hospital's ethics committee. All of the patients underwent an ophthalmological evaluation.

The medical records were used to collect data on the patients' sex, age, first consultation, beginning of treatment, medication and dosage, duration of high dosage and type of AIH. None of the patients had any previous ophthalmological complaints or any other systemic disease. The ophthalmological examination consisted of a visual acuity test, biomicroscopy and funduscopy. Tropicamide (1%) was used to dilate the pupils and all the patients were assessed by the same professional (P.N.). The cataracts were graded using the LOCS II classification (5).

## RESULTS

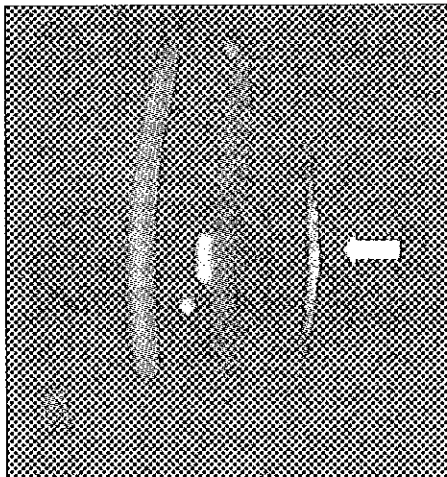
Twenty five AIH patients were under treatment at the unit and 17 (12 F, 5 M) of these underwent an ophthalmological examination. Eight patients were excluded from the study because of a recent diagnosis (2), loss

of follow up (3) and failure to attend an examination after being summoned (3). None of the patients complained of visual problems, except for two who complained of blurred vision (associated with a headache in one). The age at the first consultation and the beginning of treatment varied from 1 year to 13 years and 11 months (median 12 years). The period during which the patients had used high doses of corticosteroids ( $> 0.5$  mg/kg/day) varied from 1 month to 40 months (median 5 months). The classification of AIH was type I in 11 patients and type II in 4 patients. The remaining patients were not classified.

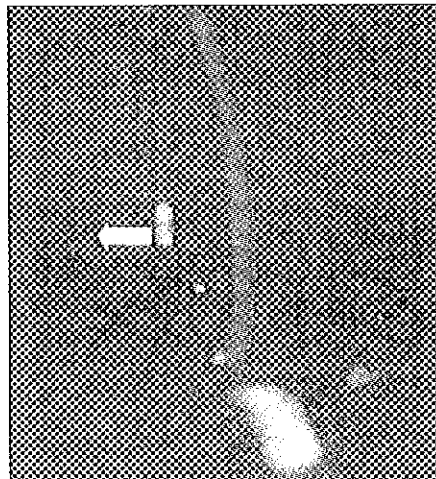
Only one patient out of the 17 patients was found to have PSC. The patient, a white male 17 years old at the time, was 14 years and 2 months old when began treatment. He has type I (smooth muscle antibody) AIH and the initial dosage of prednisone was 1.3 mg/kg/day which was reduced ( $< 0.5$  mg/kg/day) after the sixth month of treatment.

After one year of treatment and a prednisone dose of 0.17 mg/kg/day, the patient began complaining of fron-

tal headache and blurred vision. He was on 0.12 mg prednisone/kg/day when he underwent an ophthalmological examination which confirmed the presence of PSC classified as grade 2 according to LOCS II (Figure 1). The visual acuity was 0.7. Due to this finding, the prednisone dose was reduced from 15 to 10 mg/kg in alternated days. A clinical follow up revealed that the headache and blurred vision disappeared spontaneously after 6 months. Based on reports in the literature regarding the regression of PSC after substituting or removing medication (12,13), and since an increase in the patient's weight and reduction of daily dose lowers the dosage required, we repeated the ophthalmological examination. The extent of the cataract still remaining classified as grade II by LOCS II classification, (Figure 2) but the severity of the opacity seemed (subjectively) to have diminished, comparing figure 1 and figure 2. The visual acuity improved to 1,0, measured in the same conditions as the first visual acuity. The corticosteroid dose being taken at the time of this second examination was 0.07 mg/kg/day. The time between the two examinations was 1 year and 9 months.



*Figure 1: PSC seen during the first examination. The arrow shows the opacification in the posterior cortical layer.*



*Figure 2: PSC seen during the second examination. The arrow shows the opacification in the posterior cortical layer.*

## DISCUSSION

Ever since Black et al (7) described PSC, its appearance has been associated with high doses and/or the prolonged use ( $\geq$  one year) of corticosteroids. However, in recent years, several studies have failed to establish a correlation between PSC with the total dose, cumulative dose or duration of corticosteroid use (9-11). On the other hand, some studies have attempted to correlate the appearance of PSC with HLA (19, 20). Fournier et al (9) reported a correlation between HLA-CW3 and the absence of PSC, which suggested that this condition could be a protective factor. It would be interesting to study this factor in our patients.

Based on literature reports, the patient in this study had not been using high doses of prednisone for a long period, and at the time of the ophthalmological assessment, the dosage was considered low. The spontaneous disappearance of the headaches and blurred vision and the increase in visual acuity from 0.7 to 1.0 while the PSC classification remained unchanged, were interesting features. The only change that occurred was an adjustment in the corticosteroid dose because of the increase in the patient's weight. Although PSC regression has been linked to drug removal (12) or substitution (14), the improved visual acuity seen here was probably related to reduction in dosage.

In conclusion, although PSC secondary to the use of

corticosteroids appeared in only one patient, the use of low doses for a short period, cause visual alterations and affect the quality of life in such individuals. Since PSC can regress, an effective follow up and a reduction in the corticosteroid dose are important measures to adopt.

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## Resumen

**ANTECEDENTES:** La catarata subcapsular posterior (PSC) ha sido descrita en pacientes en terapia de corticosteroides para varias patologías. La hepatitis autoinmune (AIH) es una enfermedad hepática inflamatoria progresiva para la que los corticosteroides son recomendados, aunque la PSC no ha sido todavía descrito en pacientes con AIH en terapia de corticosteroides.

**MÉTODOS:** Los pacientes con AIH fueron evaluados desde el aspecto oftalmológico y sus antecedentes eran analizados para establecer la dosis y duración del tratamiento, la presencia de problemas visuales y el tipo de AIH, para correlacionarlos con los hallazgos oftalmológicos. Los pacientes eran examinados después de la dilatación de la pupila.

**RESULTADOS:** De los 17 pacientes con AIH evaluados, sólo un paciente tenía PSC.

**CONCLUSIÓN:** Aunque la frecuencia de PSC era baja (1/17) en pacientes en terapia de corticosteroides, esos individuos podrían ocasionalmente ser sometidos a una evaluación oftalmológica para detectar la presencia de catarata ya que su agudeza visual y calidad de vida puede ser afectada negativamente.

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