Frequency of Posterior Subcapsular Cataracts Due to Corticosteroid Usage in Asthma Patients

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Abstract

Study objective: To evaluate the prevalence of posterior subcapsular cataracts (PSCC) in asthmatic patients receiving corticosteroid therapy

Design: The cases were examined by the same ophthalmologist who didn't know the group patient allocated. Examination was performed by slit-lamb biomicroscopy following pupillary dilation with tropic-amid 0.5%. The clinical files of the patients receiving corticosteroid therapy were analyzed.

Patients: This study included three groups. Group I included 25 healthy subjects [mean age: 22.8 (range: 8-48). Group II included 25 asthmatic cases mean age:23.1 (range:10-50) receiving specific immunotherapy and/or sodium cromoglycate for at least a year. Group III included consecutive 110 asthmatic patients mean age: 22.9 (range: 5-48) receiving inhaled corticosteroid for at least a year.

Interventions: All of the cases were examined by slit lamb biomicroscopy. The 3 child cases having PSCC were examined by roentgenograms of the digital and wrist bones.

Measurements: We studied the prevalence of PSCC in asthmatic patients receiving corticosteroid therapy and compared it with the prevalence of PSCC in other groups. Usage of glucocorticoid were analyzed in patients with PSCC.

Results: No PSCC was found in group I and group II, but four PSCC was found in group III ($p>0.05$). Three of these four cases were children and they were only receiving inhaled corticosteroid. One case was adult and was receiving inhaled and systemic corticosteroid therapy. The prevalence of PSCC was 3.6% in all the patients and 3.9% (3/76) in children.

Conclusion: We suggest that ophthalmological examinations should be performed routinely, particularly in patients receiving inhaled corticosteroid for longer than two years..

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Key words: *Asthmatic patients, Corticosteroid therapy, Posterior subcapsular cataracts.*

Introduction

The association between systemic corticosteroid therapy and the development of posterior subcapsular cataracts was originally described by Black et al in adults in 1960 (1). In several subsequent reports, the occurrence of PSCC have also been reported in children receiving systemic corticosteroid for asthma and other diseases (2,3). PSCC are a well-known complication of long term oral corticosteroid therapy. The prevalence of PSCC during oral corticosteroid therapy has been correlated with daily dose, cumulative dose, and duration of treatment (4). The prevalence of PSCC in steroid dependent asthmatic

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children has been reported as 2.4% to 33.6% in various studies (5-7). However, the prevalence of PSCC in patients receiving inhaled corticosteroid is unknown (4). The present study reports the prevalence of PSCC in asthmatic patients receiving corticosteroid therapy.

Materials and Methods

One hundred and sixty cases were included in the study. The cases were divided into three groups. Group I included 25 healthy subjects. None of the subjects had received corticosteroid treatment. Group II included 25 asthmatic cases receiving specific immunotherapy and / or sodium cromoglycate for at least a year. None of the cases in this group were receiving inhaled and/or systemic corticosteroid. Group III included consecutive 110 asthmatic patients receiving inhaled corticosteroid for at least a year. In addition to inhaled corticosteroid, 17 patients received short courses (7 days) of systemic corticosteroid for acute asthma and 7 patients were receiving one or more prolonged courses (4 weeks) of systemic corticosteroid for chronic asthma. The clinical files of the patients in group III were examined. The dose of inhaled corticosteroid, duration of inhaled corticosteroid treatment, and usage of systemic corticosteroid were recorded.

All of the cases were examined by the same ophthalmologist who didn't know the group patient allocated. Examination was performed by slit-lamb biomicroscopy following pupillary dilatation with tropic-amid 0.5%. The bone age of the 3 child cases having PSCC were determined by evaluating roentgenograms of the digital and the wrist bones.

The Fisher exact test was used to compare the results between the groups.

Results

The characteristics of the groups were indicated in Table 1. Table 2 shows corticosteroid usage of the patients in group III. Of 110 asthmatic patients, 86 were not receiving systemic corticosteroid.

Table 1. Characteristics of the group

	Group 1	Group 2	Group 3
Female	14	13	72
Male	11	12	38
Mean age	22.8	23.1	22.9
Range	8-48	10-50	5-48

Table 2. Steroid usage of the cases in group III.

Inhaled beclamethasone	n = 65
Inhaled budesonide	n = 45
Short-term systemic steroid	n = 17
Long-term systemic steroid	n = 7
Nasal steroid	n = 16
Median dose (µg/day)	691.4 ± 273.5
Median duration of use (year)	2.1 (range: 1-5)

Table 3. Characteristics of the 4 cases having cataracts in group III.

Case	Age	Sex	Mean inhaler dose	Mean duration (month)	Systemic steroid
1	40	F	1000 µg/day	38	+
2	7	F	741 µg/day	25	–
3	11	M	746 µg/day	27	–
4	10	F	738 µg/day	28	–

While no PSCC was detected in group I and II cases, four patients with PSCC was detected in group III. There was no significant difference between group III and other groups with respect to PSCC frequency. Table 3 shows characteristics of the cases having PSCC. Of these four cases, 3 were children under age of 11 (7-11) and not receiving any systemic or nasal corticosteroid. No growth retardation was detected in any of them.

Discussion

Cataracts are uncommon in young people. Cataracts that complicate corticosteroid treatment are usually of the posterior subcapsular vacuolar type (4). The prevalence of PSCC in healthy young adults is estimated to be 0.2% and is most likely even lower in children and adolescents (8). Individual patient susceptibility may be important in the development of PSCC; some patients metabolise corticosteroids more slowly than others and theoretically might be at increased risk of corticosteroid accumulation and of adverse effects. The pathogenesis of these cataracts is not fully understood, but disturbances in carbonhydrate metabolism may be involved (9).

Various dose-related systemic side effects have been observed with inhaled corticosteroids and it would not be surprising if such therapy was also associated with PSCC formation (10). Simons et al (4) found no evidence of PSCC in 95 young asthmatic patients on inhaled glucocorticoids. Similarly, Tinkelmann et al (11) found no evidence of PSCC in 102 asthmatic children receiving beclomethasone. They think that the routine ophtalmological screening of patients on inhaled glucocorticoids is not warranted. Toogood et al (12) studied the associations between the occurrence of PSCC and inhaled and oral corticosteroid therapy in 48 adults. The prevalence of PSCC was found as 27% in this study. The occurrence of PSCC correlated with the current daily dose or duration of oral prednisone use, but not with the dose or duration of inhaled glucocorticoid treatment. They think that inhaled steroid therapy might lead to PSCC if a person has an exceptionally high inherent susceptibility. Karim et al (13) reported that twelve adult patients were identified whose cataracts may have been related to inhaled corticosteroid; eight of these had not received any other steroid treatment. The prevalence of PSCC was explained as 17.5% in 40 asthmatic children receiving systemic corticoid therapy. In this study, among asthmatic children having delayed bone age, 35% had PSCC whereas none of the children with normal bone age had PSCC. They recommended periodic slit-lamb examination in asthmatic children receiving corticosteroids for 2 years or longer (2).

In our study, 3 asthmatic children and 1 asthmatic adult had PSCC. The prevalence of PSCC was 3.6% in all the patients and 3.9 % (3/76) in children. In our series, the prevalence of PSCC in asthmatic patients receiving inhaled corticosteroid was higher than in the previous two studies (4,11). In addition, this prevalence was 18 to 19 times of the PSCC prevalence estimated for healthy subjects. Three children with PSCC were only receiving inhaled corticosteroid. The mean dose of inhaled corticosteroid varied between 738 g/day and 746 g/day. The duration of inhaled corticosteroid treatment was longer than two years in three patients. None of these children had growth retardation. The adult patient with PSCC has been receiving a higher dose of inhaled corticosteroid for a long time and systemic corticosteroid.

We could not find any significant difference in the frequency of PSCC among the groups. In our series, the prevalence of PSCC in asthmatic patients receiving inhaled corticosteroid was higher than in the previous studies. In addition, this prevalence was 18 to 19 times of the PSCC prevalence estimated for healthy subjects. We suggest that ophthalmological examinations should be performed routinely, particularly in patients receiving inhaled corticosteroid for longer than two years.

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