

Prevalence of Cataract due to Inhalational Corticosteroid in South Indian Population

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Abstract: Purpose: To evaluate the prevalence of steroid induced cataract in patients using inhalational steroid. To correlate the relation between the dose of inhalational steroid and the formation of cataract in patients with chronic obstructive pulmonary disease (COPD) and bronchial asthma. Design: Prospective observational study at Sree Balaji medical college and hospital, Chennai, Tamil Nadu. Methods: All elderly patients aged 50 years and above who were diagnosed with COPD and bronchial asthma using inhalational steroid for more than 3 months were included. Patients who came to the department of pulmonology at our institute from January 2018 to January 2019 were screened for the development of cataract based on the daily dose of inhaled steroids. The dose of corticosteroids (fluticasone propionate) was divided into 3 categories as low (1–250 µg), medium (251–500 µg), and high (501–1000 µg). Results: 100 patients using inhalational steroid were evaluated, of which 14 patients were identified with cataract with a prevalence of 14%. We also observed a dose-response relationship with the highest prevalence of cataract (57.14%) at daily doses of 501–1000 µg fluticasone propionate equivalents. Conclusion: Prevalence of steroid induced cataract was higher in patients using higher dose of inhalational steroid.

1. Introduction

There are 45 million blind population in the world of which 12 million blind persons is in India. Cataract is one of the major causes of blindness worldwide. It is estimated that 62.6% of blindness is due to cataract as per WHO¹. The use of corticosteroids in various systemic illnesses has increased the steroid-related ocular complications. The use of steroid use is the fourth leading risk factor for secondary cataract and accounts for 4.7% of all cataract extractions.²

The purpose of our study was to determine the prevalence of steroid-induced cataract among south Indian population with chronic obstructive pulmonary disease (COPD) and bronchial asthma attending a tertiary care center and also to find the dose-related response of steroid-induced cataract in COPD and bronchial asthma patients.

2. Materials and Method

100 diagnosed cases of COPD and bronchial asthma patients with the age group of 50 years and above who were treated with steroid therapy for at least more than 3 months during a period of 1 year from January 2018 to January 2019 were included. The inhalational steroid that was used for the treatment was mainly fluticasone propionate. These were used in combination with a long acting beta agonist. Patients who were previously diagnosed with cataract before steroid intake or having diminution of vision due to cornea and retinal pathology, glaucoma, uveitis were excluded from our study. Other systemic illness such as diabetes mellitus, hypertension and patients on oral steroid therapy for other systemic illness, which could lead to a confounding bias in our study, were also excluded.

The patients with COPD and bronchial asthma were categorized into 3 groups mild, moderate, high based on the daily dosage of the inhalational steroids and the duration of the treatment. Mild dosage 1–250 µg/d, Moderate dosage 251–500 µg/d, High dosage 501–1000 µg/d.

A detailed ocular examination was done for all the subjects. Anterior segment evaluation was done using slit lamp bio

microscopy and posterior segment with indirect ophthalmoscopy.

Table 1: Association of steroid induced cataract with age group

Age Group (Yrs)	Number of Subjects	Number of Cataract	Prevalence (%)
51-60	42	4	9.52%
61-70	41	7	17.07%
71-80	17	3	17.64%
	100	14	14.00%

Table 2: Dose response relationship of ICS and steroid induced cataract

Dosage of fluticasone propionate (inhalational)	3-6 months	6 months-1 year	>1 year	Total number of cataract patients
(Mild) 1-250 µg/d	-	-	-	3
(Moderate) 251-500 µg/d	-	-	3 (21.42%)	11
(High) 501-1000 µg/d	-	3 (21.42%)	8 (57.14%)	14

3. Results

A total of 100 subjects (58 men and 42 women) diagnosed with COPD and bronchial asthma on inhaled corticosteroids were examined for steroid-induced cataract during the study period. In our study 9.52% of cases were aged 51–60 years, 17.07% were 61–70 years, 17.64% were 71–80 years. Out of 100 COPD and bronchial asthma patients, 14 patients had steroid-induced cataract with a prevalence 14.00%. The prevalence of steroid-induced cataract was higher among those aged between 71 to 80 years with 17.64%. Cataract was higher in the group of patients taking moderate dosage (14.28%) for duration of more than 1 year and high dosage of (21.42%) for more than 6 months and (57.14%) for more than 1- year duration of inhaled corticosteroids on a daily basis. No cataract was found in patients taking low dosage of inhalational steroid even when taken for more than 1 year duration.

4. Discussion

Steroids have become one of the major modalities of treatment and are available in various forms of preparations such as oral, topical, injections, intravitreal. The major ocular side effect of systemic steroid therapy is the formation of posterior subcapsular cataract. Various studies have suggested the ocular complications occurring in long-term use of systemic steroids. These ocular complications mainly depend on the mode, frequency, duration and dosage of steroid administration.

The Inhaled corticosteroid has been the mainstay of treatment for Bronchial Asthma and Chronic Obstructive Pulmonary Disease (COPD). The relation between the use of ICS and development cataract have been studied in a large scale previously. In a study by cumming et al³ reported that the use of ICS – beclomethasone with a life long .dose over 2000mg is associated with the development of PSC and nuclear cataracts using a large sample size in their study of 3654 patients aged 49 to 97 years. smeeth et al⁴ reported that high doses of ICS used for prolonged periods were associated with an in- creased risk of cataract formation.

In our study of 100 copd and bronchial asthma patients, we observed a positive association between ICS and PSC, with a prevalence of 14%. A positive dose- response relationship was observed between the dosage of inhaled steroids and the prevalence of steroid induced cataract, with the highest prevalence (57.14%) found in the group taking inhaled fluticasone propionate or its equivalents in daily doses ranging from 500 to 1000 µg/d for more than 1 year's duration. This was similar to the study done in Indian population by nath T et al⁵ showed that the highest prevalence (42.85%) was noticed in the group receiving heavy doses of inhalational therapy (500–1000 µg/d fluticasone propionate or its equivalents) for more than 1 year, which was unadjusted for oral corticosteroid therapy.

In our study subjects with history of oral steroid intake for COPD and bronchial asthma were not included in the study. We found that there was no cataract formation in groups taking mild dosage (1-250 µg/d) of ICS even when used for more than a year. Also groups taking moderate dosage (251-500µg/d) of ICS showed cataract formation when used for more than 1 year (14.28%). In a similar study done by Miller et al⁶ in a UK based population subjects found that fluticasone propionate/ salmeterol fixed-dose combination and ICS exposure was not associated with increased cataracts or glaucoma, also there was no dose-response relationship observed.

The limitation to our study was the number of subjects and duration of our study. Though the history of oral corticosteroids (OCS) was noted, details of exposure to OCS in emergency room was not available in detail. Also our study observed patients taking mostly fluticasone. Patients on other drugs such as budesonide and beclomethasone were not included. A large data-based study with different types of inhalational corticosteroid and their dosage and duration of treatment leading to the formation of cataract is required to be done in Indian population to fill the lacunae.

We have observed from our study that higher prevalence of cataract was seen in patients taking higher dosage of ICS over longer duration. As corticosteroids play an important role in asthma and copd, patients should be routinely monitored for development of ocular complications. More research should be done on different types of ICS, dosage and duration on a large-scale Indian population.

References

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