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RESEARCH ARTICLE

Evaluation of Cataract Development in Patients on Chronic Steroid Therapy for Respiratory Diseases

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ABSTRACT

Background: Chronic corticosteroid therapy remains a cornerstone in the management of respiratory diseases such as bronchial asthma, chronic obstructive pulmonary disease (COPD), and interstitial lung diseases. However, prolonged steroid exposure is associated with ocular complications, particularly cataract formation.

Aim: To evaluate the prevalence and pattern of cataract development among patients receiving long-term steroid therapy for respiratory diseases.

Methods: This retrospective study was conducted at Government Medical College and Hospital, Purnea, Bihar, from April 2025 to March 2026. Medical records of 105 patients with respiratory diseases receiving corticosteroid therapy for at least six months were reviewed. Data regarding demographic characteristics, respiratory diagnosis, duration of steroid therapy, route of administration, and cataract status were analyzed.

Results: Among 105 patients, cataracts were detected in 42 (40.0%) cases. Posterior subcapsular cataract (PSC) was the most common subtype (57.1%). Cataract prevalence increased significantly with steroid duration exceeding three years ($p<0.001$). Patients receiving combined inhalational and oral steroids exhibited a significantly higher risk of cataract development than those receiving inhalational steroids alone ($p=0.012$).

Conclusion: Long-term steroid therapy is significantly associated with cataract formation, particularly PSC. Duration and cumulative exposure to corticosteroids are important risk factors. Regular ophthalmologic screening should be incorporated into the management of patients receiving chronic steroid therapy.

Keywords: Cataract, Corticosteroids, Asthma, COPD, Posterior Subcapsular Cataract, Respiratory Diseases

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INTRODUCTION

Among the most commonly recommended drugs for long-term respiratory conditions, such as interstitial lung diseases, allergic bronchopulmonary disorders, bronchial asthma, and chronic obstructive pulmonary disease (COPD), are corticosteroids. Their strong anti-inflammatory properties greatly aid in the management of the illness, the alleviation of symptoms, and the avoidance of flare-ups. Long-term corticosteroid treatment is linked to a number of systemic and ocular side effects, despite its therapeutic advantages. One of the most important causes of vision impairment among ocular problems is cataract formation. The most common kind of steroid-induced cataracts is posterior subcapsular cataracts (PSC), which can develop quickly and significantly impair visual acuity[1].

Corticosteroids are thought to change protein synthesis, oxidative balance, and lens epithelial cell metabolism, which causes lens opacification, though the precise mechanism is still unclear.

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Numerous investigations have shown that cumulative steroid exposure and cataract development are positively

correlated. Higher dosages, longer treatment durations, and systemic delivery seem to enhance the risk. However, research indicates that inhaled corticosteroids may potentially play a role in the development of cataracts, especially when administered for extended periods of time. Understanding the ocular effects of long-term therapy has become more crucial due to the rising incidence of chronic respiratory conditions and the extensive use of systemic and inhaled corticosteroids[2].

The diagnosis and treatment of steroid-induced cataracts may be delayed in developing areas like Bihar due to inadequate access to routine ophthalmologic assessment. Additionally, there is still a dearth of local information on the frequency and clinical features of cataract development in individuals undergoing long-term steroid therapy. The current retrospective study was conducted at a tertiary care teaching hospital in Bihar to assess the prevalence, trends, and risk factors related to cataract formation in patients undergoing long-term steroid therapy for respiratory conditions. Demographic traits, respiratory diagnoses, the length and mode of steroid administration, cataract subtypes, and correlations between steroid exposure and cataract development were all evaluated in this study[3].

The results are anticipated to support guidelines for routine ophthalmological surveillance in patients undergoing extended corticosteroid medication and add to the increasing body of knowledge about steroid-induced ocular problems.

MATERIALS AND METHODS

Study Design

Retrospective observational study.

Study Period

April 2025 – March 2026 (12 months).

Study Setting

Government Medical College and Hospital, Purnea, Bihar.

Sample Size

105 patients.

Inclusion Criteria

- Age ≥18 years
- Respiratory disease requiring corticosteroid therapy
- Steroid therapy for ≥6 months
- Complete medical records

Exclusion Criteria

- Congenital cataract
- Previous ocular surgery
- Ocular trauma
- Diabetes-related cataract
- Incomplete records

Data Collection

- Age
- Gender
- Respiratory diagnosis
- Duration of steroid therapy
- Route of administration
- Cataract type
- Visual acuity findings

Statistical Analysis

Data were analyzed using SPSS version 26.0. Categorical variables were compared using the Chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

The study comprised 105 patients with respiratory conditions on long-term steroid therapy. Sixty-one percent of the study participants were men. 42 individuals had cataracts, resulting in a 40.0% total prevalence.

Patients with interstitial lung disease (41.7%) and COPD patients (50.0%) had the highest cataract prevalence. The longer steroid medication was used, the greater the risk of cataract development. Cataract formation was most common in patients who had been on steroids for more than three years (63.2%).

With 57.1% of all cataract cases, posterior subcapsular cataract was the most common subtype. The duration of steroid exposure was shown to be significantly correlated with the development of cataracts (p<0.001).

Table 1: Demographic Characteristics

Variable	*Frequency (n=105)*	*Percentage (%)*	*p-value*
Male	64	61.0	0.041*
Female	41	39.0	
18–40 years	28	26.7	
41–60 years	49	46.7	
>60 years	28	26.7	0.022*

DISCUSSION

The current retrospective study assessed the development of cataracts in patients at a tertiary care teaching hospital in Bihar who were undergoing long-term corticosteroid

Table 2: Respiratory Diseases and Cataract Occurrence

Disease	*Total cases*	*Cataract present*	*Percentage (%)*	*p-value*
COPD	48	24	50.0	
Bronchial Asthma	39	12	30.8	
ILD	12	5	41.7	
Others	6	1	16.7	0.017*

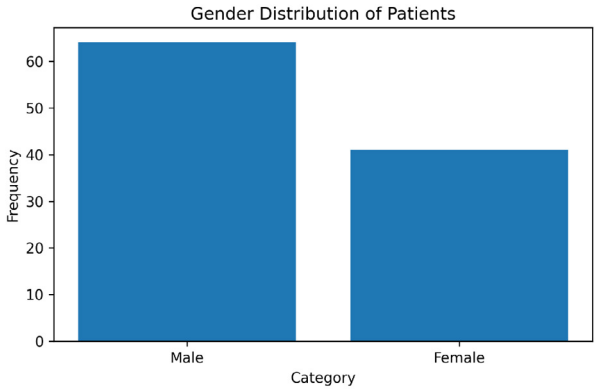

Figure 1: Gender distribution of patients

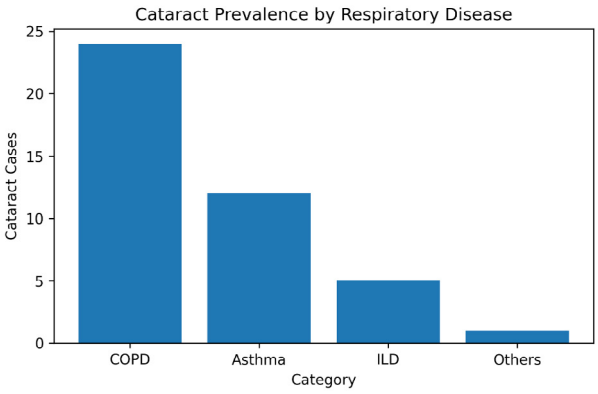

Figure 2: Cataract prevalence by respiratory disease

therapy for respiratory conditions. With 40% of patients exhibiting lens opacities, the results show a significant burden of steroid-associated cataract formation. The found prevalence is in line with earlier studies showing that long-term corticosteroid users have a higher risk of cataract development. Corticosteroids affect lens metabolism in a number of ways, such as by inducing oxidative stress, interfering with the development of lens epithelial cells, and changing the synthesis of proteins. Lens opacification and gradual vision impairment are caused by these combined effects[4]

Table 3: Duration of Steroid Therapy and Cataract Development

Duration	*Cataract present*	*Cataract absent*	*p-value*
6 months– 1 year	5	22	
1–3 years	13	27	
>3 years	24	14	<0.001*

Table 4: Types of Cataract Among Affected Patients (n=42)

Cataract type	*Frequency*	*Percentage (%)*	*p-value*
Posterior subcapsular cataract	24	57.1	
Nuclear cataract	10	23.8	
Cortical cataract	6	14.3	
Mixed cataract	2	4.8	0.003*

The study population showed a notable male predominance. Due to increased exposure to smoking and occupational pollutants, this finding probably reflects the higher prevalence of chronic respiratory disorders, especially COPD, among men. However, rather than gender, steroid exposure seemed to be the main factor associated with cataract development. Patients with COPD had the highest prevalence of cataracts. Long-term courses of systemic and inhaled corticosteroids are often necessary for people with COPD, which increases cumulative steroid exposure. Epidemiological studies that show people getting long-term corticosteroid treatment for chronic pulmonary illnesses are more likely to develop cataracts have shown similar findings[5].

The significant correlation between the length of steroid medication and the development of cataracts was one of the most significant discoveries. Compared to patients having shorter treatment durations, individuals getting steroids for longer than three years showed a considerably increased frequency of cataracts. The dose-dependent and duration-dependent character of steroid-

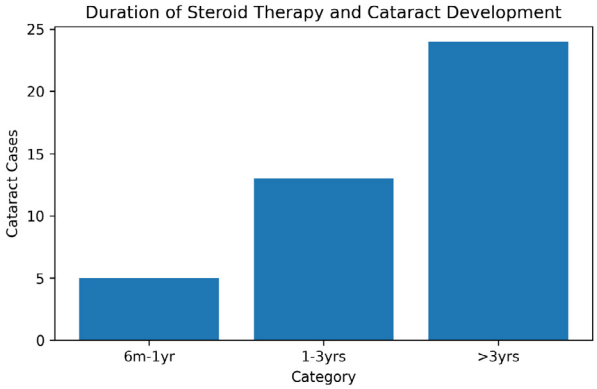

Figure 3: Duration of steroid therapy and cataract development

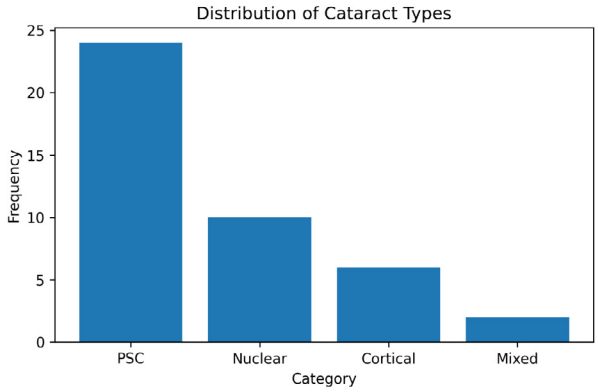

Figure 4: Distribution of cataract types

induced lens alterations documented in earlier research is supported by our observation[6]. In this investigation, posterior subcapsular cataract was shown to be the most prevalent subtype. The hallmark of steroid-induced cataract development is often known to be PSC. PSC frequently affects younger people and can cause disproportionately severe visual symptoms, such as glare and difficulties reading, in contrast to age-related nuclear sclerosis. The results of earlier clinical studies are consistent with the preponderance of PSC found in this study[7]

The study highlights the significance of routine ophthalmological monitoring for individuals undergoing long-term corticosteroid treatment. Early detection may prevent serious visual impairment and enable prompt treatments. All patients on long-term steroid treatment should be evaluated for routine yearly eye exams, especially those who need high cumulative doses.

There are a few restrictions to be aware of. Information bias may be introduced by the retrospective approach, and not all patients had access to cumulative steroid dose estimates. Furthermore, it was not possible to adequately assess confounding variables including smoking, exposure to sunshine, and nutritional condition[8].

Notwithstanding these drawbacks, the study offers important local data on the development of steroid-related cataracts in Bihar. In order to maximise patient care, the results highlight the necessity of interdisciplinary cooperation between pulmonologists, doctors, and ophthalmologists[9].

CONCLUSION

This retrospective analysis shows that individuals on long-term corticosteroid medication for respiratory conditions frequently experience cataract development. Cataracts occurred in almost 40% of patients, with posterior subcapsular cataracts being the most common form. Longer steroid therapy duration was associated with a considerably higher risk of cataract formation, especially in patients receiving treatment for more than three years. Cataract formation was most common in COPD patients, which is probably due to higher cumulative corticosteroid exposure.

These results emphasise how crucial it is to weigh the therapeutic advantages of corticosteroids against any possible negative effects on the eyes. In addition to considering routine ophthalmologic evaluations as part of follow-up care, clinicians should be on the lookout for visual complaints in patients receiving long-term steroid medication. Significant vision damage can be avoided and quality of life can be enhanced by early detection and prompt treatment of cataracts. Early identification and treatment may be made easier by including ophthalmologic screening procedures into programmes for managing respiratory diseases.

To better understand the connection between steroid exposure and cataract development, more prospective studies with larger patient populations and thorough cumulative dose evaluations are advised. The burden of steroid-induced ocular morbidity in patients with long-term respiratory conditions may be significantly decreased by the use of preventive measures and routine eye exams.

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