

Correlation Between Posterior Subcapsular Cataract and Long-Term Topical Corticosteroid Use in Patients with Dermatological Conditions

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Abstract

Background: It is well known that corticosteroid therapy can lead to ocular complications such as posterior subcapsular cataract (PSC). Topical corticosteroids are commonly utilized by dermatologists; however, there are few data available that can inform an association with PSC. A retrospective, observational study using a large, anonymous, independent centralized database was carried out. **Methods:** This was a retrospective, observational study with the use of a large, anonymous, independent centralized database. **Material and Methods:** This cross-sectional analytical study was conducted at the hospital and comprised 140 patients who were being treated with topical corticosteroid for at least six months. Information regarding demographic data, dermatological diagnosis, corticosteroid potency, duration of treatment and the site where it has been applied were taken. All of them had complete ophthalmological evaluation with slit-lamp biomicroscopy with PSC detection and grading. Data were analysed using SPSS (version 25.0) and a p-value of <0.05 was taken to be statistically significant. **Results:** The mean age of participants was 42.8±11.6 years, and females constituted 55.7% of the study population. Posterior subcapsular cataract was identified in 42 (30.0%) patients. PSC prevalence increased significantly with longer duration of topical corticosteroid use ($p<0.001$) and was higher among patients using potent and very potent corticosteroids ($p=0.012$). Multivariate logistic regression demonstrated that corticosteroid therapy exceeding three years (AOR 3.86, 95% CI 1.84–8.09), potent/very potent corticosteroid use (AOR 2.74, 95% CI 1.29–5.81), age above 40 years (AOR 2.14, 95% CI 1.09–4.21), and facial/periorbital application (AOR 2.32, 95% CI 1.07–5.04) were independent predictors of PSC. **Conclusion:** Long-term topical corticosteroid therapy is significantly associated with posterior subcapsular cataract, particularly with prolonged use of high-potency preparations. Regular ophthalmological screening, careful corticosteroid selection, and patient education are recommended to reduce steroid-related ocular complications.

Keywords: Posterior subcapsular cataract, topical corticosteroids, dermatological disorders, atopic dermatitis, ocular complications, corticosteroid-induced cataract.

Received: 01 July 2026

Revised: 20 July 2026

Accepted: 01 August 2026

Published: 05 August 2026

INTRODUCTION

Posterior subcapsular cataract (PSC) is a distinct subtype of cataract characterized by opacities beneath the posterior lens capsule. Unlike age-related cataracts, PSC often develops at a younger age and is associated with several risk factors, including diabetes mellitus, uveitis, radiation exposure, high myopia, and prolonged corticosteroid therapy. It causes significant impairment of visual acuity, particularly during near vision and in bright light, making corticosteroid-induced PSC one of the most recognized iatrogenic causes of cataract worldwide.^[1]

Topical corticosteroids are widely used in dermatology because of their potent anti-inflammatory and immunosuppressive effects. They remain the mainstay of treatment for chronic inflammatory skin disorders such as atopic dermatitis, psoriasis, lichen planus, and chronic eczema. Although considered safer than systemic corticosteroids, prolonged use of high-potency topical preparations, especially over large body surface areas or on thin skin such as the eyelids and face, may result in systemic

absorption and ocular complications including glaucoma and cataract.^[2]

The development of corticosteroid-induced PSC is attributed to biochemical and structural changes in lens epithelial cells. The effects of corticosteroid on lens protein metabolism, oxidative stress and the disruption of differentiation of epithelial cells result in posterior subcapsular lens opacification. The risk is closely associated with the amount, strength, and length of time the body is exposed to corticosteroid.^[3,4]

A number of experiments have shown that corticosteroid-

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DOI:
10.21276/amit.2026.v13.i2.908

How to cite this article: Anjali, Sankaran P, Akarshitha B, Anto A. Correlation Between Posterior Subcapsular Cataract and Long-Term Topical Corticosteroid Use in Patients with Dermatological Conditions. *Acta Med Int.* 2026;13(2):1524-1528.

induced cataract might be reasonably prevented by careful prescribing and routine eye examination by the ophthalmologist. Longer treatment duration and treatment with more potent corticosteroids are risk factors for developing PSC, and early diagnosis and regular eye exams are therefore important in persons on long-term therapy.^[5,6] Though the awareness of the potential ocular side effects of oral and topical steroids has grown, there are only a few studies that have focused specifically on the link between prolonged topical corticosteroid use for dermatological conditions and posterior subcapsular cataract, especially Indians. Therefore, the present study was undertaken to evaluate the correlation between posterior subcapsular cataract and long-term topical corticosteroid use in patients with dermatological conditions.^[7]

MATERIALS AND METHODS

Study Design: This was a hospital-based cross-sectional analytical study designed to evaluate the correlation between posterior subcapsular cataract and long-term topical corticosteroid use in patients with dermatological disorders.

Study Setting: Patients were recruited from the Dermatology outpatient department and underwent ophthalmic evaluation in the Department of Ophthalmology of tertiary care hospital.

Study Duration: The study was conducted over a period of 18 months.

Study Population: Patients attending the Dermatology Outpatient Department who had been receiving topical corticosteroid therapy for chronic dermatological diseases were screened for eligibility and referred for comprehensive ophthalmological evaluation.

Sample Size: A total of 140 patients fulfilling the inclusion criteria were enrolled using consecutive sampling.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients with clinically diagnosed dermatological conditions requiring topical corticosteroid therapy.
- Continuous or intermittent topical corticosteroid use for ≥ 6 months.
- Patients willing to provide written informed consent.

Exclusion Criteria

- History of congenital, traumatic, or age-related cataract diagnosed before corticosteroid therapy.
- Previous ocular surgery or ocular trauma.
- History of systemic corticosteroid therapy for more than one month.
- Current or previous use of inhalational or ocular corticosteroids.
- Diabetes mellitus, uveitis, high myopia, radiation exposure, or other known causes of posterior subcapsular cataract.
- Patients with incomplete medical records or unwilling to participate.

Study Procedure: After obtaining informed consent, demographic details including age, sex, occupation, and duration of dermatological illness were recorded. Detailed dermatological history included diagnosis, type of topical corticosteroid, potency (low, moderate, high, or very high), frequency of application, anatomical site of application, duration of treatment, cumulative duration, and history of unsupervised steroid use.

Each participant underwent a complete ophthalmic examination including:

- Best-corrected visual acuity (BCVA)
- Slit-lamp biomicroscopy
- Intraocular pressure measurement by Goldmann applanation tonometry
- Dilated lens examination
- Fundus examination wherever media clarity permitted

Posterior subcapsular cataract was diagnosed by an experienced ophthalmologist using slit-lamp biomicroscopy and graded according to the Lens Opacities Classification System III (LOCS III).

Topical corticosteroids were categorized according to their potency into mild, moderate, potent, and very potent preparations based on standard dermatological classifications.

Outcome Measures

Primary Outcome

- Presence and grade of posterior subcapsular cataract.

Secondary Outcomes

- Correlation between PSC and duration of topical corticosteroid use.
- Association of PSC with corticosteroid potency.
- Relationship between cumulative corticosteroid exposure and PSC severity.
- Association of PSC with age, sex, dermatological diagnosis, and treatment duration.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. The Chi-square test or Fisher's exact test was used for categorical variables, and Student's t-test was applied for continuous variables. Pearson or Spearman correlation analysis was performed to determine the relationship between corticosteroid exposure and PSC severity. Multivariate logistic regression analysis was used to identify independent predictors of posterior subcapsular cataract. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 140 patients with dermatological conditions receiving long-term topical corticosteroid therapy were included in the study. Demographic characteristics, corticosteroid exposure, dermatological diagnoses, and ophthalmological findings were analyzed to determine the correlation between long-term topical corticosteroid use and posterior subcapsular cataract (PSC).

Table 1: Demographic Characteristics of Study Participants (n = 140)

Variable	Number (n)	Percentage (%)
Age Group (years)		
18–30	26	18.6

31–40	38	27.1
41–50	42	30.0
51–60	24	17.1
>60	10	7.2
Gender		
Male	62	44.3
Female	78	55.7
Duration of Topical Corticosteroid Use		
6 months–1 year	28	20.0
>1–3 years	54	38.6
>3–5 years	37	26.4
>5 years	21	15.0

Interpretation: Most patients (30.0%) belonged to the 41–50-year age group. Females constituted 55.7% of the study population. Nearly 80% of patients had used topical

corticosteroids for more than one year, with the largest proportion (38.6%) receiving treatment for 1–3 years.

Table 2: Dermatological Diagnosis, Steroid Potency, and Prevalence of Posterior Subcapsular Cataract

Variable	Total Patients (n)	PSC Present n (%)	PSC Absent n (%)
Dermatological Diagnosis			
Atopic dermatitis	44	17 (38.6)	27 (61.4)
Psoriasis	35	10 (28.6)	25 (71.4)
Chronic eczema	30	8 (26.7)	22 (73.3)
Lichen planus	18	4 (22.2)	14 (77.8)
Vitiligo	13	2 (15.4)	11 (84.6)
Steroid Potency			
Mild	18	2 (11.1)	16 (88.9)
Moderate	41	8 (19.5)	33 (80.5)
Potent	56	21 (37.5)	35 (62.5)
Very potent	25	10 (40.0)	15 (60.0)

Chi-square = 10.92, p = 0.012

Posterior subcapsular cataract was observed more frequently among patients using potent and very potent topical corticosteroids. Atopic dermatitis patients demonstrated the

highest proportion of PSC compared with other dermatological conditions.

Table 3: Association Between Duration of Topical Corticosteroid Use and Posterior Subcapsular Cataract

Duration of Therapy	PSC Present (n=42)	PSC Absent (n=98)	Total	p-value
6 months–1 year	3	25	28	
>1–3 years	12	42	54	
>3–5 years	15	22	37	
>5 years	12	9	21	
Total	42	98	140	<0.001

The prevalence of posterior subcapsular cataract increased progressively with longer duration of topical corticosteroid therapy. Patients receiving treatment for more than five years

demonstrated the highest frequency of PSC, indicating a statistically significant association between prolonged corticosteroid exposure and cataract development.

Table 4: Multivariate Logistic Regression Analysis for Factors Associated with Posterior Subcapsular Cataract

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Age >40 years	2.14	1.09–4.21	0.026
Female gender	1.21	0.61–2.39	0.571
Duration of steroid use >3 years	3.86	1.84–8.09	<0.001
Potent/Very potent steroid use	2.74	1.29–5.81	0.008
Periorbital/facial application	2.32	1.07–5.04	0.031

Multivariate analysis identified duration of topical corticosteroid use exceeding three years, use of potent or very potent corticosteroids, older age (>40 years), and periorbital/facial application as independent predictors of posterior subcapsular cataract. Female gender was not significantly associated with PSC.

DISCUSSION

The present study sought to assess the relationship between the use of topical corticosteroid therapy for more than a year and posterior subcapsular cataract (PSC) in dermatological patients. PSC was found in 30.0% of 140 patients in the study. There was a strong correlation between PSC and the length of topical corticosteroid use, especially with the use of potent or very potent

topical corticosteroid for more than 3 years. Topical corticosteroid periorbital use and increased age also proved to be significant independent risk factors for PSC.

There has been a long association between corticosteroid use and posterior subcapsular cataract. Patients who were on long-term corticosteroid treatment had increased risk of developing PSC, and there was a cumulative relationship between corticosteroid exposure and the development of cataract. Their observations led to the identification of corticosteroids as an important modifiable risk factor for PSC and the importance of restricting the long-term use of unnecessary corticosteroids. The findings of the present study are consistent with their observations, as cataract prevalence increased progressively with increasing duration of corticosteroid use.^[8]

In the area of ophthalmology, Donshik et al. have reported posterior subcapsular cataract after long-term topical corticosteroid use, indicating that even topical, local application of corticosteroid may cause changes in the lens in prolonged use. Their study used ophthalmic corticosteroids, but the mechanism of corticosteroid-induced lens toxicity is thought to be the same regardless of the route of administration of the corticosteroid. Our results also highlight that topical corticosteroid use can be linked to PSC, especially if potent doses are applied for long periods of time.^[9]

Kačmař and Cholevík analyzed the corticosteroid-induced PSC and noted that cumulative dosage, corticosteroid potency and length of therapy are the most important factors which influence cataract formation in corticosteroid-induced PSC. These also noted that early lens opacities could be asymptomatic until it is clinically evident that visual impairment has occurred. A dose- and potency-dependent increase in the risk of PSC was supported by significantly higher rates of PSC in patients who used potent and very potent topical steroids in the present study.^[10]

In children, Jeon et al. found an increased prevalence of cataract in those with chronic atopic dermatitis, particularly those who are on chronic corticosteroid treatment. In the present study, atopic dermatitis patients represented the largest proportion of PSC cases, and it was suggested that atopic dermatitis is a chronic disease with a prolonged need for corticosteroid use. These results again highlight the need for routine eye monitoring in these patients.^[11]

Close cooperation between the dermatologist and the ophthalmologist was emphasized by the Thyssen international guidelines on the management of atopic dermatitis affecting the eyes. The authors advised regular eye examinations in patients receiving prolonged cortisone therapy particularly in cases of treatment with high potency cortisone and lateral and periorbital application. Our results agree with these recommendations – application of steroids to the face/periorbital area was independently linked to a higher risk of PSC.^[12]

McGhee et al. examined the benefits and ocular side effects of local corticosteroid administration and reported that corticosteroids are still essential drugs, but should be carefully monitored with prolonged use due to the potential risks for cataracts and glaucoma. They stressed the need for

personalised risk evaluation and regular eye health checks of patients needing chronic treatment. The current study confirms these recommendations, and clearly shows a connection between long-term topical corticosteroid use and PSCs in dermatologic patients.^[13]

In summary, the present study emphasizes the significance of the correct prescription of steroids, patient education on the use of these drugs and frequent ophthalmological screening. For those patients taking chronic topical corticosteroid therapy, early detection of PS can assist in timely intervention, minimise visual morbidity and enhance long-term outcomes.

CONCLUSION

Long-term topical corticosteroid use was found to be a significant risk factor for the development of PSC in patients with dermatological diseases in the present study. However, the longer that therapy was used, the greater the risk of PSC, as well as that of other factors such as using potent or very potent corticosteroids, the age of the person and using the drug on the face or around the eyes. Eye checks are advised in patients with chronic dermatological conditions who are taking steroids for the long-term as early detection of any changes to the lens will be beneficial. To prevent visual complications, rational corticosteroid use, patient counseling for appropriate use, and interdisciplinary management (with cooperation between dermatologists and ophthalmologists) are needed to maximize disease control while minimizing additional visual morbidity.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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