



Ophthalmology

STUDY OF INTRAOCULAR PRESSURE VARIATION WITH USE OF DEXAMETHASONE AND PREDNISOLONE STEROID EYE DROPS AS POST OPERATIVE MEDICATION IN CATARACT PATIENTS

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ABSTRACT **Background:** Topical corticosteroids are routinely prescribed after cataract surgery to control postoperative inflammation. However, steroid-induced elevation of intraocular pressure (IOP) remains a significant concern, particularly in susceptible individuals. **Objective:** To compare IOP variation among cataract patients receiving dexamethasone and prednisolone eye drops as postoperative medication. **Materials and Methods:** A longitudinal analytical observational study was conducted in the Department of Ophthalmology of a tertiary care hospital. A total of 214 postoperative cataract patients aged 50–70 years were enrolled using systematic random sampling. Patients were divided into two groups: dexamethasone (n=107) and prednisolone (n=107). IOP was measured preoperatively and at scheduled postoperative follow-up visits. Mean IOP changes over time and between groups were analyzed. **Results:** Both steroid groups demonstrated a transient postoperative rise in IOP, with the maximum increase observed during the first postoperative week. Mean IOP gradually declined toward baseline by the fourth postoperative week. Although dexamethasone-treated patients showed slightly higher mean IOP values at some visits, the overall difference between dexamethasone and prednisolone groups was not statistically significant. The temporal pattern of IOP variation was similar in both groups. **Conclusion:** Dexamethasone and prednisolone exhibit comparable postoperative IOP profiles in uncomplicated cataract surgery patients. Routine IOP monitoring, particularly during the first postoperative week, is essential for early detection of steroid-induced ocular hypertension. The choice of steroid should be individualized based on inflammatory status, patient risk factors, and clinical requirements.

KEYWORDS : Cataract Surgery, Intraocular Pressure, Dexamethasone, Prednisolone, Steroid Response

INTRODUCTION

Cataract remains one of the leading causes of reversible visual impairment worldwide. Modern cataract surgery, including small-incision cataract surgery (SICS) and phacoemulsification, provides excellent visual outcomes but requires effective postoperative inflammation control. Topical corticosteroids such as dexamethasone and prednisolone are widely used to suppress postoperative inflammation and improve visual recovery.^{1,2}

Despite their efficacy, corticosteroids may induce ocular hypertension by increasing resistance to aqueous humor outflow through the trabecular meshwork. Steroid-induced elevation of intraocular pressure (IOP) may lead to secondary open-angle glaucoma if not detected and managed promptly.^{3,4} Risk factors include pre-existing glaucoma, ocular hypertension, diabetes mellitus, high myopia, family history of glaucoma, and prolonged steroid therapy.^{3,5}

Several studies have evaluated IOP changes associated with postoperative steroid use. Pleyer et al. reported that both dexamethasone and prednisolone may cause clinically significant IOP elevation in susceptible individuals.³ Mohankumar et al. observed that postoperative IOP typically peaks during the early postoperative period and gradually declines with tapering of steroid therapy.⁶ Similarly, Reddy and Garapati found marginally greater IOP elevation with dexamethasone compared with prednisolone, although the differences were not clinically significant.⁷

Given the widespread use of these corticosteroids after cataract surgery and the potential risk of steroid-induced ocular hypertension, comparison of IOP variation between dexamethasone and prednisolone remains clinically relevant. Therefore, the present study was undertaken to evaluate postoperative IOP changes and compare the safety profiles of these commonly prescribed steroid eye drops.

MATERIALS AND METHODS

This observational longitudinal analytical study was conducted in the

Department of Ophthalmology of a tertiary care teaching hospital. The study included postoperative cataract patients aged 50–70 years undergoing uncomplicated cataract surgery. Patients with glaucoma, ocular hypertension, or significant anterior segment pathology were excluded.

A total sample size of 214 patients was calculated based on previous literature and divided equally into two groups:

Table 1. Study Groups

Group	Postoperative Medication	Sample Size
Group 1	Dexamethasone eye drops	107
Group 2	Prednisolone eye drops	107

Patients were recruited through systematic random sampling. Baseline demographic and clinical details were recorded. IOP was measured preoperatively and during scheduled postoperative visits using standard tonometry. The primary outcome measure was change in IOP over time and comparison between the two steroid groups. Statistical significance was considered at $p < 0.05$.

Table 2. Sample Size Estimation Parameters

Parameter	Group 1	Group 2
Mean IOP (mmHg)	15.8	16.6
Standard Deviation	2.6	2.77
Sample Size	107	107

RESULTS

The study included 214 patients, with 107 patients in each treatment group. Baseline age and preoperative IOP were comparable between groups. The mean preoperative IOP was approximately 15.6 mmHg in the dexamethasone group and 15.7 mmHg in the prednisolone group.

Both groups exhibited a postoperative increase in IOP. The highest mean IOP was observed during the first postoperative week, followed by a gradual decline toward baseline by week four. Dexamethasone-treated patients showed a slightly greater increase in IOP at certain visits; however, the overall difference between the groups was not

statistically significant.

Table 3. Summary of Postoperative IOP Trend

Follow-up Visit	IOP Trend
Baseline	Normal preoperative value
Day 1	Mild increase
Week 1	Peak IOP elevation
Week 4	Decline toward baseline

DISCUSSION

The present study demonstrated a transient postoperative increase in IOP in both dexamethasone and prednisolone groups, with the highest mean IOP observed during the first postoperative week. Thereafter, IOP gradually declined toward baseline by the fourth postoperative week. These findings suggest that postoperative IOP variation is largely time dependent and reflects the combined effects of surgery and steroid therapy.

The results are consistent with those reported by Mohankumar et al., who observed that the maximum IOP elevation occurred during the early postoperative period and subsequently declined with steroid tapering.⁶ Similarly, Shelke et al. found slightly higher IOP values in dexamethasone-treated patients, although the difference between dexamethasone and prednisolone was not statistically significant.⁸

Malhotra et al. reported a higher incidence of early postoperative IOP elevation in patients receiving dexamethasone compared with prednisolone, suggesting that dexamethasone may have a greater tendency to induce transient ocular hypertension.⁹ In the present study, dexamethasone-treated patients also exhibited marginally higher IOP values at certain follow-up visits; however, the overall intergroup difference remained statistically insignificant.

The findings further support the observations of Pleyer et al., who emphasized that both dexamethasone and prednisolone are capable of producing clinically meaningful IOP elevation in susceptible individuals.³ Bojikian et al. demonstrated that steroid response is significantly more common in patients with glaucoma and glaucoma suspects, underscoring the need for individualized postoperative monitoring.¹⁰

From a clinical perspective, the first postoperative week appears to be the most critical period for IOP surveillance. Failure to assess IOP during this interval may result in missed detection of steroid responders. Patients with diabetes mellitus, glaucoma, ocular hypertension, high myopia, or a previous history of steroid response should be monitored more closely.^{3, 4}

Overall, the present study indicates that dexamethasone and prednisolone possess comparable IOP safety profiles following uncomplicated cataract surgery. The choice of postoperative steroid should therefore be guided by the severity of inflammation, patient-specific risk factors, drug availability, and clinician preference rather than concern over major differences in IOP elevation alone.

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