



IOP MONITORING PREOPERATIVELY AND POST OPERATIVELY – OUR OBSERVATIONS AT DR. P.S.R. GOVERNMENT REGIONAL EYE HOSPITAL, KURNOOL MEDICAL COLLEGE, KURNOOL

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Abstract

Background: Cataract is major cause of blindness and morbidity worldwide, with treatment of choice being cataract surgery. Postoperative inflammation is the major problem after cataract surgery, managed by administration of topical corticosteroid drops. Most common side effect of topical corticosteroid is increase in intraocular pressure.

Objective: of our study is to observe the Intraocular pressure changes after cataract surgery and on administration of topical corticosteroid drops.

Methods: 200 patients who underwent uneventful small incision cataract surgery and phacoemulsification were put on fix drug combination of 0.3% Gatifloxacin and 0.1% Dexamethasone sodium phosphate. Intraocular pressure (IOP) monitored using non-contact tonometer at preoperatively and compared with 1st day, 1st week, 2nd week, 4th week and 6th week postoperatively.

Results: The final mean IOP was calculated and compared with each other, showed rise in mean IOP postoperatively at 4th week i.e. 23.5 mm hg, 8.27 mmhg higher than mean IOP preoperatively (15.25 mmhg) and second highest at first week postoperatively i.e. 21.23mmhg , 5.98 mmhg higher than baseline preoperative IOP

Conclusion: Steroid-induced IOP elevation was observed mostly after 4 weeks of topical steroid therapy. The prevalence of steroid responders is relatively significant in our study sample, being 9%; thus coming to a conclusion that topical steroid should be used judiciously. Topical steroids should be tapered early & can be replaced / supplemented with topical NSAIDS and lubricant eye drops.

Keywords:- Topical corticosteroids, Intraocular pressure, post-operative inflammation

INTRODUCTION

Cataracts are a major cause of blindness and severe visual impairment, leading to bilateral blindness. Over half of all persons over the age of 65 develop age-related cataracts with visual disability^[1]. Globally, the number of cataract cases is expected to increase as populations age and lifespans increase. Cataracts are the most common cause of vision loss in developed and developing countries^[2]. Identified risk factors for cataract formation include age, ethnicity, gender, genetic factors, smoking, exposure to sunlight, certain medications, nutrition, lower education and medical conditions such as diabetes, obesity, kidney disease, ocular trauma and hypertension. Complications from lack of treatment of cataract include sensitivity to glare, poor night vision and progressive vision loss. Individuals with hypermature cataract can develop lens-induced (phacoanaphylactic) persistent uveitis or glaucoma and persistent cataract-related inflammation can cause significant tissue damage. Surgical removal of cataract remains the only treatment option for patients.

Small-incision cataract surgery using phacoemulsification has largely replaced extracapsular cataract extraction because of faster healing, smaller wounds and fewer resultant complications, with improved patient outcomes^[3]. However, post-operative complications, including ocular inflammation after cataract surgery, continue to cause visual impairment, pain and other sequelae among patients.

The physical trauma associated with cataract surgery, including disruption of the blood–aqueous barrier (BAB), can induce an inflammatory response and the release of inflammatory mediators such as prostaglandins and leukotrienes from arachidonic acid^[4]. Prostaglandins are released naturally from the iris and ciliary body and migrate to the retina after cataract surgery. The inflammatory response may lead to the activation of the immune cascade, involving neutrophils, macrophages, T lymphocytes and additional inflammatory mediators. Post-cataract surgery inflammation presents as protein flare and inflammatory cells in the anterior chamber, hyperaemia, miosis, oedema, leukocyte migration, fibroblast proliferation and scar formation, along with other local responses to the released pro-inflammatory cytokines. Persistent inflammation leads to higher rates of post-operative cystoid macular oedema (CMO), patient discomfort and compromised visual outcomes consequent to the breakdown of the blood–retinal barrier. Multiple potential complications of untreated post-operative inflammation include pain, photophobia, posterior synechiae, pseudophakic cellular precipitates, uveitis, elevated intraocular pressure (IOP) and glaucoma.

Ocular hypertension (OHT) can occur after steroid use in susceptible individuals. Steroid-induced glaucoma (SIG), a form of secondary glaucoma, can occur when elevated intraocular pressure (IOP) gives rise to irreversible optic neuropathy. The term "steroid responder" (SR) is used to indicate individuals that show elevated IOP after steroid use, which has been defined in current literature as IOP above 21 mmHg to 24 mmHg and/or an increase of greater than 5 to 10 mmHg compared to baseline with clinical significance^[5].

SIG is considered a type of secondary open-angle glaucoma caused by increased resistance to the aqueous outflow at the TM level. In this condition, there is increased production and decreased destruction of the extracellular matrix of the TM^[6]. There is increased deposition of glycosaminoglycans, fibronectin, elastin, and type IV collagen and reduced activity of matrix metalloproteinases. TM cells have glucocorticoid receptors, and steroids may act on them to alter cell migration and phagocytosis. This reaction causes decreased cellularity of the TM and increased extracellular matrix deposition, thus increasing aqueous outflow resistance and a rise in IOP^[7]. Glaucoma may develop if the IOP elevation is of sufficient magnitude and duration, thus leading to progressive damage to the optic nerve and visual field.

MATERIALS & METHODS

This is observational cross section study of 200 patients conducted over a period of three months among patients attending cataract OPD at REH, Kurnool.

Inclusion Criteria

1. Patients aged 50-80 years of age
2. Sex – both males and females
3. Patients who Underwent uneventful Small incision cataract surgery (SICS) /phacoemulsification cataract surgery

Exclusion Criteria

1. Patients who had previous history of glaucoma
2. Patients with complicated cataracts and previous history of iridocyclitis
3. Patients with complications during cataract surgery(Iridodialysis, PCR with vitreous disturbance, remnant cortex, Zonular Dehiscence etc)
4. Patients already on corticosteroid treatment either topical or systemic
5. Connective tissue disorders.

All the patients IOP was recorded by Non-contact tonometer preoperatively and compared with 1st day, 1st week, 2nd week, 4th week and 6th week postoperatively. Patients were given topical eye drops in weekly tapering doses with fixed combination of 0.3% Gatifloxacin and 0.1% Dexamethasone sodium phosphate (Supplied at REH) for 6 weeks.

High risk patients (Diabetes mellitus, pre-existing CME etc) were given NSAIDS eye drops (flurbiprofen/nepafenac) after 2nd week and lubricant eye drops in suspected dry eyes

The following parameters were assessed, and their significance verified by statistical means

- Fluctuation in IOP from baseline.
- Difference in recorded IOP at different time period.
- Age & Sex.
- Steroid response will be graded according to the rise in IOP from baseline as done by Armaly et al. after applying topical steroids for a period of 6 weeks, starting with 6 times per day (considering the cells in anterior chamber <2+) & tapering the steroid dose subsequently each week: -
- Low fluctuation: rise in IOP < 6 mm Hg from baseline IOP
- Medium fluctuation: rise in IOP of 6-15 mm Hg from baseline IOP
- High fluctuation: rise in IOP > 15 mm Hg from baseline IOP

STATISTICAL ANALYSIS

In our study we observed that there was statistically significant difference, p value being, $p=0.03$, using SPSS software tool version 20, mean IOP (mm Hg) between preoperative with post-operative follow up. The mean IOP on 4th week (23.52 mm Hg) following cataract was higher than pre-operative (15.52 mm Hg)

RESULTS

In our study we observed steroid-induced IOP elevation following topical steroids after four weeks post-op. The prevalence of steroid-responders in our study was 9% (18 patients). Mild rise in IOP was seen in 5.5% (11 patients) and moderate rise in IOP was seen in 3.5% (7 patients) and none of the patients in the study group showed severe rise in IOP following topical steroid eye drops for 6 weeks [8,9]

The highest mean IOP was noted at 4th week post-op follow-up. Mean IOP being 23.5mmhg. Second highest mean IOP (21.23 mm Hg) was noted at 1st week postop follow-up, mostly due to inflammatory reaction

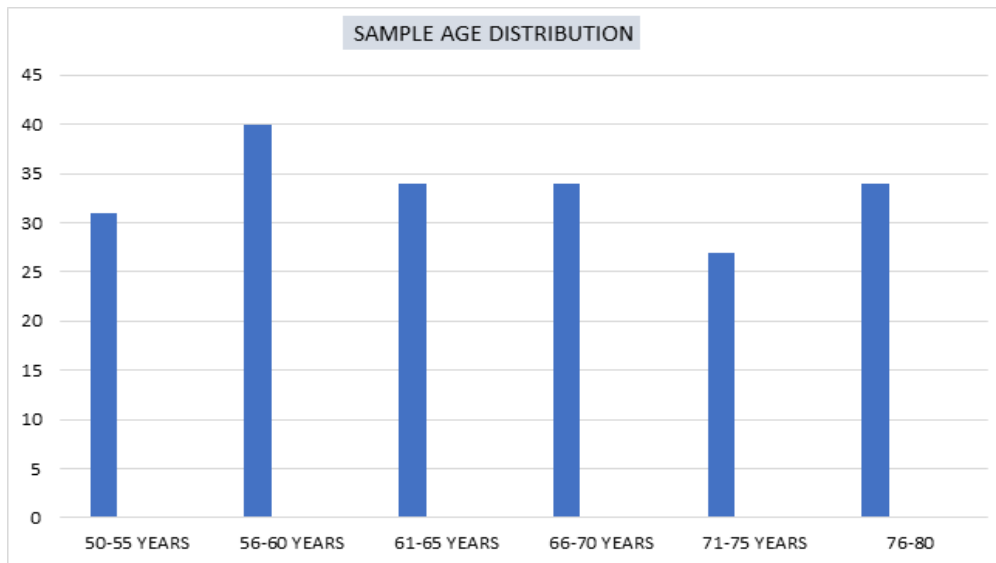


Figure 1

Total Sample	200
Mean Age	65.17
Standard Deviation	8.45
Standard Error of Mean	0.59
Range	30
Max	80
Min	50
Table 1	

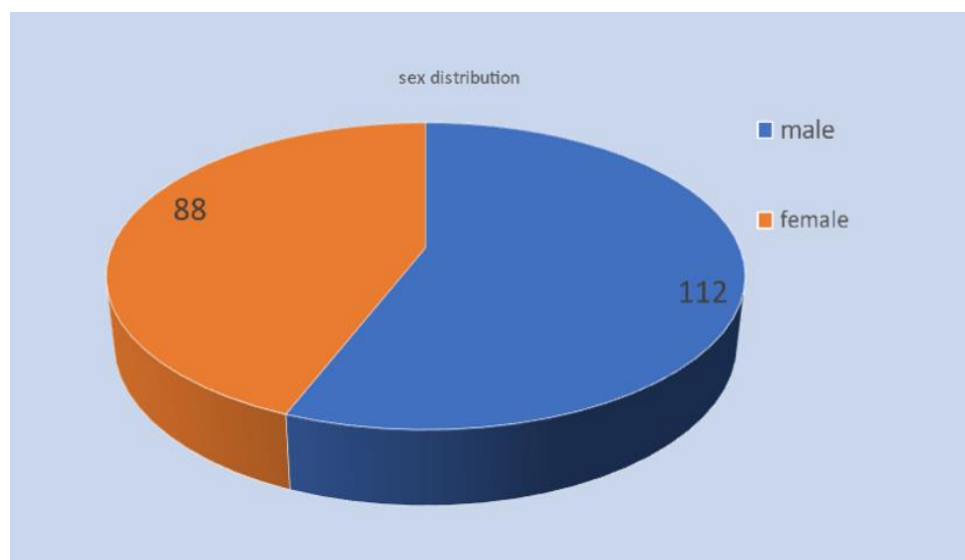


Figure 2

Time	Mean	Difference from the Baseline Mean Preop IOP
Preoperative	15.25	-
1 ST Day	14.22	-1.03
1 ST Week	21.23	5.98
2 ND Week	16.14	0.89
4 TH WEEK	23.52	8.27
6 TH WEEK	17.23	1.98
Table 2		

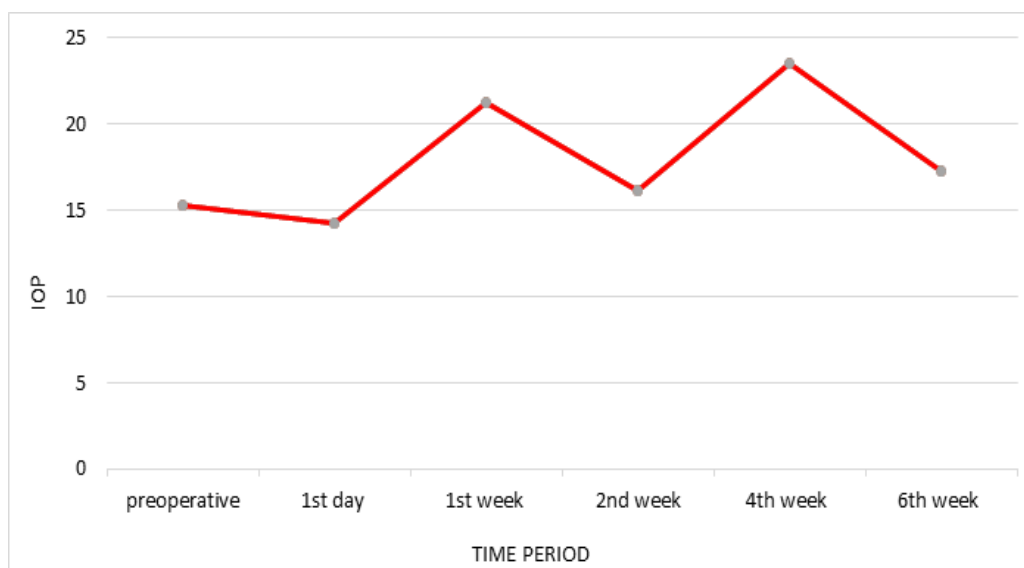


Figure 3

DISCUSSION

It was observed that the mean age for 200 study sample size was 65.17 years with standard deviation of 8.45 years, with the highest 80 years and lowest 50 years. There were 88(44%) females and 112(56%) males in the study. 31 (15.5) subjects were from 51-55 years age group followed by 40 (20%) subjects in 56-60 years age group and 34 (17%) subjects in 61-65 years age group, 34 (17%) subjects in 66-70, 27(13.5%) subjects in 71-75 years age, 34 (17%) subjects 76-80 years age. For this study, the range of ages that were considered were 50-80 years.

The study by Armaly et al. demonstrated that older adult patients were at higher risk for steroid-induced increase in IOP postoperatively than younger adult patients^[5]. A study was conducted by Kusne Y et al., in which 3488 eyes of 3488 patients were included. A retrospective analysis was done regarding the post-operative IOP rise after cataract surgery following the usage of topical steroids and they did not find any statistically significant difference between the age group and the genders as compared to the IOP rise after surgery^[10].

According to study conducted by Hon-Vu Q. Duong et al. which compared efficacy of topical steroid against topical NSAID among a group of 222 patients enrolled. Group 1 patients received NSAIDS - besifloxacin 0.6% and bromefenac 0.09% and group 2 patients received besifloxacin and prednisolone acetate 1 %.Dispensing protocol being besifloxacin 0.6%, 1 drop in operated eye BID for three days prior to surgery and continue for 7 days post-surgery, prednisolone acetate 1%, 1 drop in operated eye QID for 7 days followed by tapering dose for 14 days and bromefenac 0.09%, 1 drop in operated eye, QID for 3 days prior to surgery and continuing for total of 14 days.

This study also demonstrated that topical NSAIDs are equally efficacious when compared to topical steroids and ophthalmologists should consider using a two-drug regimen in managing postoperative cataract extraction.

The paradigm shift in pharmacotherapy post uncomplicated cataract surgery has deviated little from the 'norm' as indicated by the AAO Preferred Practice Pattern (American Academy of Ophthalmology 2006). Based on this current study and others, the authors believe that the pharmacological approach should be tailored to each patient, based on the patient's ocular and medical history, undergoing cataract surgery as opposed to mass 'standardized' treatment for all patients. Tailoring the treatment will increase compliance, that is, fewer drugs and less complex or confusing dosing frequencies, enhance efficacy and decrease the cost to the patients^[11].

CONCLUSION

Steroid-induced IOP elevation was observed mostly after 4 weeks of topical steroid therapy. The prevalence of steroid responders is relatively significant in our study sample, being 9%; thus coming to a conclusion that topical steroid should be used judiciously. Topical steroids should be tapered early & can be replaced / supplemented with topical NSAIDS and lubricant eye drops. In most cases, the IOP lowers spontaneously to the baseline within 2 weeks upon stopping the steroids.

This small study highlights the need for IOP evaluation at every postop followup and need for alternate safe post-op treatment regimens.

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