

Comparison of Changes in Intraocular Pressure after Subtenon Triamcinolone Acetonide and Topical Dexamethasone

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Purpose: To compare the changes in intraocular pressure after subtenon triamcinolone acetonide and topical dexamethasone in patients undergoing phacoemulsification and intraocular lens implantation.

Material and Methods: It was a double blind randomized control trial, conducted in the Department of Ophthalmology Khyber Teaching Hospital Peshawar, from March 2009 to February 2012. The patients were divided into two groups. Patients undergoing cataract surgery with an injection of subtenon triamcinolone acetonide were included in Group "A" and those receiving topical dexamethasone post-operatively for a period of 4-6 weeks were included in Group "B" (control group). Intraocular pressure was noted pre-operatively and on 1st day, 1st week, and 1st month post-operatively.

Results: There were 84 patients in each group. The difference in mean intraocular pressure in the two groups did not reach statistical significance pre-operatively (P value = 0.583). On 30th post-operative day the mean IOP was 15.08 ± 2.66 mmHg in group "A" and 15.39 ± 2.98 mmHg in group "B" (P value = 0.479). At 30th post-operative day, intraocular pressure elevation above the normal value of 21 mmHg was seen in 2 patients (02.38%) in group "A" and in 3 patients (03.57%) in group "B".

Conclusion: There is no statistically significant difference in intraocular pressure between both groups in our study.

Cataract surgery is the most commonly performed ophthalmic surgery throughout the world.¹ Cataract surgery causes a certain degree of post-surgical ocular inflammation.² Corticosteroids, non-steroidal anti-inflammatory drugs (NSAIDs) and immune modulators effectively control ocular inflammation. Corticosteroids interfere with the activity of phospholipase A₂, thereby inhibiting the release of arachidonic acid and the production of all arachidonic acid metabolites. However, they are associated with a number of adverse events, including a rise in intraocular pressure (IOP) and increased susceptibility to microbial infections.³

Topical corticosteroids form the mainstay of the anti-inflammatory therapy after cataract extraction.^{4,5}

Topical medications can have adverse effects on the cornea and compliance may be an issue.

Triamcinolone acetonide is a potent corticosteroid that is safe and effective for controlling post-operative ocular inflammation when administered as a single sub-tenon injection after uneventful phacoemulsification surgery.^{6,7}

The purpose of this study was to compare the changes in intraocular pressure after subtenon triamcinolone acetonide and topical dexamethasone in patients undergoing phacoemulsification and intraocular lens (IOL) implantation.

MATERIAL AND METHODS

It was a prospective double blind randomized

controlled trial. The study was conducted in the Department of Ophthalmology, Khyber Teaching Hospital Peshawar from March 2009 to February 2012. Before starting the study, approval was taken from the ethical review board of the institution. Sampling technique was non-probability consecutive sampling. Patients with pre-existing glaucoma, known steroid responders, children and young adults (< 18 years), patients with ocular infections, uveitis and traumatic cataract were excluded from the study. Patients who had difficult or complicated cataract surgery were also excluded from the study. The patients were divided into two groups i.e. Group "A" and Group "B". Total of 168 eyes were included in the study, with 84 eyes in each group. Written informed consent was taken from all the patients.

Pre-operatively detailed history was taken followed by complete ocular examination including assessment of best corrected visual acuity using Snellen chart, anterior segment examination with slit-lamp (Takagi SM-70, Japan), fundus examination with 90 diopter lens (Volk, USA) and IOP measurement with Goldman applanation tonometer. Systemic assessment and routine laboratory investigations were also carried out on all the patients. All the patients underwent phacoemulsification and foldable IOL implantation in the capsular bag. All the surgeries were performed by the same surgeon.

Patients of group "A" received a single injection of subtenon triamcinolone acetonide 40mg/ 1ml just after the surgery. Patients of group "B" received topical dexamethasone post-operatively for a period of 4-6 weeks depending upon the inflammatory response (i.e. 2 hourly in the first few post-operative days and then 4 times/ day, 3 times/ day, 2 times/ day and 1 time/ day for 1 week each). No subconjunctival or intracameral antibiotics were given at the end of surgery in either group. Topical tobramycin was given to the patients of both groups for 2 weeks. Follow up was done on 1st, 7th and 30th post-operative day. IOP was recorded at each visit. In addition, post-operative inflammation was quantified at each visit.

All the data analysis was carried out using statistical package for social sciences-11 (SPSS-11) software. Quantitative variable included age and IOP at each visit. Qualitative variables included gender. For quantitative variables mean, standard deviation and range were calculated, and for qualitative variables percentage and proportion were calculated. P-value was generated using t-test for comparison of mean and chi-square test for comparison of

proportions and percentages. P-value < 0.05 was considered significant.

RESULTS

Out of the 168 patients 106 were male and 62 were female. There were 54 males and 30 females in group "A" and 52 males and 32 females in group "B". Age of the patients was ranging from 30 to 84 years with a mean of 58.23 ± 9.68 years. Age of group "A" was ranging from 33 to 84 years and that of group "B" was ranging from 30 to 81 years. Mean age of group "A" was 59.23 ± 10.29 years and that of group "B" was 57.23 ± 8.98 years.

There was no significant difference in mean IOP in the two groups pre-operatively and post-operatively (Table 1). Total of 5 patients were steroid responders i.e. at 30th post-operative day, intraocular pressure elevation above the normal value of 21 mmHg was seen in 2 patients (02.38%) in group "A" and in 3 patients (03.57%) in group "B". The mean rise in IOP from baseline was slightly greater in group "B" as compared to group "A" but it was not statistically significant (Table 2).

DISCUSSION

Cataract surgery can cause varying degree of post-surgical intraocular inflammation. Post-operative intraocular inflammation produces the mediators required for tissue healing.² Recent advances in surgical techniques, surgical tools and intraocular lens (IOL) have reduced the amount of intraocular inflammation after cataract extraction.⁸

Post-operative intraocular inflammation is treated with topical or periocular corticosteroids⁴⁻⁷. Intraocular pressure (IOP) elevation is one of the adverse effects of corticosteroid therapy. If the IOP elevation is of sufficient magnitude and for a long duration, damage to the optic nerve (steroid-induced glaucoma) may occur.⁹

Topical application to eyelid skin,¹⁰ subconjunctival and subtenon injection,¹¹ intravitreal injection¹² and systemic steroids¹³ may all cause IOP elevation, but it is most commonly identified as a complication of topical therapy with drugs such as dexamethasone or prednisolone. In responsive patients, the IOP typically rises after several weeks of continual corticosteroid therapy or subtenon injection and returns to normal following cessation of such therapy.

In this study we compared the changes in IOP after subtenon injection of triamcinolone acetonide

Table 1: Pre-operative and post-operative intraocular pressure (mmHg) in both groups

	Group A		Group B		P-value
	Range	Mean \pm SD	Range	Mean \pm SD	
Pre-operative IOP					
Baseline	10 - 20	14.80 \pm 2.39	10 - 20	14.60 \pm 2.36	0.583
Post-operative IOP					
1st day	10 - 20	13.89 \pm 1.90	10 - 20	14.23 \pm 2.26	0.287
7th day	10 - 20	14.78 \pm 2.33	10 - 20	14.59 \pm 2.07	0.577
30th day	11 - 28	15.08 \pm 2.66	11 - 30	15.39 \pm 2.98	0.479

Table 2: Increase in intraocular pressure from baseline

	Mean	Standard Deviation	P-value
Group A	0.27 mmHg	3.17	0.243
Group B	0.78 mmHg	2.44	
Total	0.52 mmHg	2.83	

and topical dexamethasone in patients undergoing phacoemulsification and intraocular lens implantation.

Our study included 84 patients in each group. Both the groups were similar in terms of age and gender distribution (P value = 0.182 and 0.749 respectively). Baseline IOP was recorded in all patients. All the cases underwent uneventful phacoemulsification with IOL implantation by the same surgeon. Post-operatively IOP was noted at the 1st, 7th and 30th post-operative day.

In our study there was no significant difference in IOP between the 2 groups preoperatively (P value = 0.583) and at 1st (P value = 0.287), 7th (P value = 0.577) and 30th post-operative day (P value = 0.479). In the study of Paganelli F et al.⁷ and Lacmanovic et al.¹⁴, a significantly lower intraocular pressure was recorded in patients who received subtenon triamcinolone acetonide injection as compared to patients who received topical prednisolone and dexamethasone respectively.

In our study, there was a mean increase in IOP from baseline of 0.52 \pm 2.83 mmHg. The rise in IOP was slightly greater in group "B" as compared to group "A" but this difference was not statistically significant (P value = 0.243).

In our study all the patients had uncomplicated cataract surgery and there was no significant difference in the IOP in both groups at each visit. Therefore subtenon injection of triamcinolone and topical dexamethasone are equally safe for the control of post-operative intraocular inflammation. However, subtenon injection of triamcinolone should be used with great caution in glaucomatous eyes, because of its prolonged action.

CONCLUSION

In this study there was no statistically significant difference in intraocular pressure after subtenon triamcinolone acetonide and topical dexamethasone in patients undergoing uncomplicated phacoemulsification and intraocular lens implantation. Therefore subtenon triamcinolone acetonide with a few days of topical antibiotics can be used in routine after uncomplicated phacoemulsification.

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