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Original Research Article

To compare the effect of Bromfenac 0.09% and Prednisolone 1% on postoperative inflammation and intraocular pressure in phacoemulsification

N. Nishant[1], SH Patil[2*], Neha T[3], Bharath Nag[4], Priyanka BC[5]

[1]Junior Resident, [2]Professor and HOD, [3-5]Junior Resident, Dept. of Ophthalmology, SDM College of Medical Sciences and Hospital, Dharwad, Karnataka, JIPMER, Puducherry, India

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Abstract

Introduction: This study was undertaken to compare the efficacy of topical Bromfenac 0.09% and Prednisolone 1%.

Materials and Methods: This was a prospective, double blind, comparative, interventional randomized controlled trial. Total of 180 patients were included in the study. Patients were randomized into two groups. Group A received Bromfenac 0.09% BD and Group B received Prednisolone 1% QID in tapering doses along with topical antibiotics post operatively. Both the groups did not receive any topical NSAIDs preoperatively. Patients preoperative grade of cataract by LOCS III Classification, post operative anterior chamber cells by SUN classification, Intraocular pressure were recorded and compared on day 3, 15 and 45 days.

Results: A total of 180 eyes were included in the study of which 20 were lost to follow up 3 in Group A and 17 in Group B. Hence a total of 160 eyes - 87 in Group A and 73 in group B completed follow up. The amount of inflammation did not differ significantly between Group A and Group B on day 3 ($p=0.698$) or on day 7 ($p=0.325$). At the end of 45 days none of the patients either in Group A or Group B had anterior chamber inflammation. IOP-There was no significant difference in IOP between the groups preoperatively ($P= 0.18$). But on the first follow up and subsequent follow ups there was significant difference in IOP between Group A and B ($p<0.05$) and this difference was increasing in trend as time passes (p value =0.00).

Conclusion: Bromfenac can be used as an alternative to steroid drops in controlling post operative anterior chanber inflammation in all grades of cataract especially in steroid responders.

Introduction

Cataract surgery is the most frequently performed ophthalmic surgery. Postoperative inflammation is a common finding, due to the release of prostaglandins. The recent improvements in surgical technique have reduced the severity inflammation.[1] Topical steroids are used after surgery for several weeks to reduce the postoperative inflammation. Steroids have a very good anti-inflammatory and analgesic effect but they also have risk of interference with wound healing, they may also cause intra ocular pressure rise and increase the risk of infection by compromising local immunity. As an alternative treatment Non Steroidal Anti Inflammatory Drugs (NSAID) can be used. NSAID's are comparatively safer and they have multiple advantage like preventing intraoperative miosis if started preoperatively and prevention of cystoids macular edema post operatively.[2-5]

Bromfenac ophthalmic suspension 0.09% twice daily is one such newer drug now being used because of better potency and penetrability this has been approved in different countries for treatment of post cataract surgery inflammation and uveitis.[6]

In this study we report the results of a prospective randomized double masked trail comparing the efficacy of Bromfenac 0.09% and Prednisolone 1% for reducing the post operative inflammatory response.

Materials and Methods

The study obtained approval from the Institute Ethics Committee, and followed the principles of the Declaration of Helsinki. It is a prospective randomized clinical trial. This study was done between November 2015 to October 2016 at SDM College of Medical sciences and Hospital, Dharwad. All the patients who met inclusion criteria and exclusion criteria were included in the study.

Inclusion Criteria

1. All patients with cataract aged more than 40 years undergoing phacoemulsification with posterior chamber intraocular lens implantation.

*Corresponding Author: SH Patil, Professor and HOD, Dept. of Ophthalmology, SDM College of Medical Sciences and Hospital, Dharwad, Karnataka, India
Email: shpatil10@yahoo.com
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2. Patients giving voluntary written informed consent for the study.

Exclusion Criteria

1. Patients aged less than 40 years.
2. Patients on long term topical medications.
3. Patients with pre existing ocular disease.
4. Patients having diabetes and systemic autoimmune diseases.
5. Patients with intra operative complications.
6. Patients on systemic anti-inflammatory medications.

Pre operatively patient history was taken, all patients were examined under slit lamp and cataract was graded according to LOCS III classification. (Lens opacities classification system III).[1] Irrespective of the grade of cataract patients were included in the study. The patients were randomized into two groups. Simple random technique was used where every patient was made to pick chits from a box which contained equal no of Group A and Group B chits. Patients who picked Group A chit received Bromfenac sodium 0.09% eye drops twice daily (BD) along with Ofloxacin 0.3% eye drops four times (QID) postoperatively for four weeks. Patients who picked Group B chit received Prednisolone acetate 1% eye drops QID in tapering dose over four weeks along with Ofloxacin 0.3% eye drops QID. All the patients were preoperatively started only on topical Ofloxacin 0.3% and Topicamide/Phenylephrine - 0.8%/5%).

All patients underwent phacoemulsification with posterior chamber in the bag intra ocular lens (IOL) by a single surgeon under topical anesthesia. At the end of surgery Group A patients were instilled Bromfenac 0.09% eye drops and Group B patients were instilled Prednisilone acetate 1% eye drops. All the patients were seen on day 0, 3, 15 and 45. Best corrected Visual acuity, Intra ocular pressure, anterior chamber cells were recorded on day 3, 15 and 45. Any complaints like pain or irritation were noted. Vision was assessed with Snellen's chart and Jaegers chart and best corrected visual acuity (BCVA) was recorded. Examination was done under slit-lamp to check for anterior chamber cells. Grading of cells was performed with a 2 mm long and 1 mm wide slit beam with maximal light intensity and magnification and was recorded according to SUN working group grading system. Intraocular pressure (IOP) was recorded using Applanation tonometry.

Statistical Analysis

Categorical variables were expressed with proportion and continue variables were expressed in mean (SD) or median (IQR). Mixed ANOVA test was done to find the significant change in IOP between the groups. Fischer exact test was used to test the significant difference in anterior chamber cells between the groups. MS excel was used to enter the data and SPSS v20 was used to analysis of data.

Results

A total of 180 eyes were included in the study of which 20 were lost to follow up 3 in Group A and 17 in Group B. Hence in Group A 87 eyes and Group B 73 eyes completed the follow up. Mean age in Group A was 63.4 years ± 10.53 and in Group B was 61.1 years ± 8.6. Out of 160 patients 85 were males. 80 right eyes and 80 left eyes were included in the study.

Most common grade of cataract in a both the groups was NS 2, Group A 42 and Group B 30 (Table 1). There was no statistical difference (p value =0. 423) in grade of cataract between the groups.

All patients had a BCVA20/20, N6 on last post operative visit. Anterior chamber inflammation was assessed clinically under slit lamp and was recorded. On day 3 there were 27 patients in Group A with more than or equal to +2 cells and 17 patients with more than or equal to +2 cells in Group B (Table 2), this difference was not statistically significant (fisher exact test value =1.553 and p = 0.698).

Table 1: Grade of Cataract (LOCSIII Classification) in Group A and Group B

Cataract type	NS2	NS3	NS1-+PSC	NS3-4+PSC	MC	PSC	PSC+ Cortical	NS2 +PSC
Group A	42	8	2	3	6	10	2	15
Group B	30	6	0	2	7	17	1	10

Table 2: Grade of AC cells in Group A and Group B on 3rd postoperative day

Inflammation	1+ cells or less	2+ cells	3+ cells
Group A	60	23	4
Group B	56	15	2

On day 15 there were 8 patients in Group A with more than or equal to +1 cells and 2 patients in Group B with more than or equal to +1 cells (Table 3), which was again statistically not significant (fisher exact test value = 4.332 and p = 0.325). At the end of 45 days in both the groups there were no AC cells.

Table 3: Grade of AC cells in Group A and Group B on 15th postoperative day

Inflammation	No cells	1+ cells	2+ cells
Group A	79	7	1
Group B	71	2	0

We also compared IOP in both the groups on same visits (Table 4). Average IOP of both groups was recorded and mixed ANOVA test was done to find the significant change in IOP between the groups. There was no significant difference in IOP between the groups preoperatively (P= 0.18). But on the first follow up and subsequent follow ups there was significant difference in IOP between group A and B ($p<0.05$) and this difference was increasing in trend as time passed (p value =0.00).

Table 4: Mean intraocular pressure before and after cataract surgery in Group A and Group B

	Pre-op IOP	Day 3 IOP	Day 7 IOP	Day 45 IOP
Group A	14.23	12.31	12.49	12.00
Group B	14.87	13.53	14.26	14.68

One of the patients in Bromfenac group had superficial punctate keratitis which resolved with addition of artificial tear substitutes. Apart from this no other complications were noted in both the groups.

Discussion

Good management of post cataract surgery ocular inflammation is one of the factors responsible for better visual outcome and patient comfort. Surgical trauma causes a trigger of the arachidonic acid cascade which in turn generates prostaglandins (PG) by activation of COX-1 and COX-2. Phospholipids in the cell membrane are the substrate for phospholipase A to generate arachidonic acid from which a family of chemically distinct prostaglandins and leukotrienes are produced[7] Corticosteroids interfere with the activity of phospholipase thereby inhibiting the release of arachidonic acid and the production of all arachidonic acid metabolites includingprostaglandins[8] whereas, Non-Steroidal Anti-inflammatory drugs (NSAIDs) nonspecifically and irreversibly inhibit the synthesis of prostaglandins by inhibiting the activity of COX-1 and COX-2.[8-10]

A total of 160 patients completed the follow ups and hence were included in the study. Unlike the other studies, all our study population consisted of Indian eyes.[11-14] The amount of inflammation did not differ significantly between Group A and Group B on day 3 (p=0.698) or on day 7 (p=0.325). At the end of 45 days none of the patients either in Group A or Group B had anterior chamber inflammation. All grades of cataract were put on Bromfenac. There were 6 patients in Group A and 8 in Group B who had Mature and NS 4 grade of cataract, even in these patients anterior chamber reaction was comparable between the groups. Our results were similar to other studies done in different populations.

In the studies done by Nishino et al and Doung HQ et al all the patients were started on NSAID preoperatively, whereas none of our patients were started on topical NSAID preoperatively.[11-12] None of the patients who used Bromfenac reported irritation, conjunctival hyperemia, toxicity towards epithelium. The FDA approved dosing for Bromfenac is twice daily, with no pre-dosing before surgery necessary which makes it more compliant to patient.[15]

All our patients had a best corrected visual acuity of 20/20, N6 vision on final follow up. These eyes were also evaluated for pre and post op change in IOP. The average preoperative IOP were 14.23mmHg and 14.87mmHg in Group A and Group B respectively. The average postoperative IOP on day 45 was 12.00 mm Hg and 14.68 mm Hg Group A and Group B respectively. There was a 2.23mm of hg decrease in IOP within the group A from the pre operative values, this decrease in IOP may be advantages in patients with glaucoma, in steroid responder whereas there was only 0.19 mm of hg IOP reduction in group B . Doung et al reported an increase in the intraocular pressure in both steroid and NSAID group on first follow up, but we did not find any increase in intraocular pressure in either group.[11]

Only one patient in Bromfenac group had superficial punctate keratitis which resolved with addition of artificial tear substitutes. Apart from this no other complications were noted in both the groups. None of the other patients who used Bromfenac reported irritation, conjunctival hyperemia, or toxicity towards epithelium.

Usage of steroid to control post operative inflammation is associated with potential complication like delayed wound healing, increased risk of infection and increase in intra ocular pressure.[16] The most common complications reported with Bromfenac include abnormal sensation in eye, conjunctival hyperemia, stinging/ burning, redness.[4,17] Topical. NSAIDs reduce the risk of post-operative Cystoid macular edema (CMO) and also have been found to be effective in treating postoperative cystoids macular edema. Bromfenac has been found to be equally efficacious in treating CMO in various studies.[5]

Thus our study showed that Bromfenac can be used in all grades of cataract even in mature cataracts. Since all the patients were operated by a single surgeon, all were subjected to similar trauma and technique. Unlike other studies none of our patients were given preoperative NSAID (as routinely done to prevent intraoperative miosis).[11-12] Hence there was no confounding effect of preoperative NSAID usage in either of the groups.

Further study needs to be done with a larger sample. Anterior chamber cell grading was done using slit lamp according to SUN grading system, which could vary between clinician's. A similar study with AC cells grading by Laser flare photometry may be done as it enables an accurate and highly reproducible measurement of intraocular inflammation.

Conclusion

This study shows that bromfenac twice daily dosage can be used as an alternative to steroid drops in controlling post op

AC inflammation in all grades of cataract especially in steroid responders.

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Conflict of Interest: None.

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