



BROMFENAC 0.09% VERSUS NEPAFENAC 0.1% AFTER CATARACT SURGERY FOR PSEUDOPHAKIC CYSTOID MACULAR EDEMA IN DIABETIC

Ophthalmology

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ABSTRACT

BACKGROUND: Cataract is one of the leading causes of vision loss worldwide. There many modern techniques to removal the cataract and frequency of complications following cataract surgery are declining significantly. But complications are still a concern due to large number of surgeries performed around the globe.

OBJECTIVE: To compare the post-op effect of Bromfenac 0.09% and nepafenac 0.1% after cataract surgery for Pseudophakic cystoid macular edema in diabetic patients

MATERIAL AND METHODS: A hospital based randomized control study was conducted in 100 eyes of 100 patient of either sex and any age having diabetes who presented or referred to ophthalmology dept. After fulfilling the inclusion and exclusion criteria, accordingly treatment was given. Group A patients received Bromfenac 0.09% eye drop twice a day and group B patients received Nepafenac 0.1% TDS. Effect of drugs were measured in terms of visual acuity and macular thickness. Chi square/Fishers Exact test for qualitative and t test for quantitative variable were applied.

RESULTS: In our study mean age of study participants in group A and B was 61.65±7.86 and 63.12±7.62, male participants were 28(56%) and 26(54%) respectively. Current study revealed that in both the group best corrected visual acuity was improved statistically significant from the pre-operative BCVA at 1 week, 3 week and 6 week. Mean retinal thickness was increased in patients who recieved of nepafenac 0.1% but not with bromfenac 0.09% eye solution.

CONCLUSION: In our study, both group of patients received bromfanac 0.09% twice a day and nepafenac 0.1% TID showed significant improvement in best corrected visual acuity. However patients who received bromfenac ophthalmic solution showed less retinal thickness from the baseline while patients who received nepafenac eye solution showed a significant increase in mean retinal thickness at 1 week, 3 week and 6 week.

KEYWORDS

cataract, bromfenac, nepafenac, cystoid macular edema

INTRODUCTION:

Cataract is one of the leading causes of vision loss worldwide.¹ Senile or age-related cataract is most common type so, the prevalence rate increases as the population ages.² It is possible to restore vision in patients with cataracts by removing the opacification of the lens.

Cataract extraction is the most commonly performed surgical interventions in the world and markedly improves patients' visual functioning and quality of life. There many modern techniques to removal the cataract and frequency of complications following cataract surgery are declining significantly. But complications are still a concern due to large number of surgeries performed around the globe.

Ocular surgery induces an inflammatory response leading to increased prostaglandin production.³ A break in the blood- aqueous barrier has been identified as the prime cause of Pseudophakic cystoid macular edema (PCME). PCME is most common complication after cataract after cataract surgery which can decrease the vision.

There is breakdown of the junction complexes of the parafoveal capillaries, allowing leakage of the fluid and resultant oedema. Occurrence of cystoid macular oedema (CME) is related to the synthesis of prostaglandins and other mediators.^[4-5] Surgical trauma leads to release of prostaglandins, which causes a break in the blood-aqueous barrier,^[6-7] with resultant release of toxins and immune complexes. Pre and postsurgical medical interventions with the topical anti-inflammatory drugs are prescribed to reduce the post-operative inflammation and to reduce the risk of development of PCME.

Non steroidal anti inflammatory drugs (NSAIDs) are chemical compounds, which inhibit cyclooxygenase (COX) enzymes and therefore inhibit the synthesis of prostaglandins.^[8] The US Food and Drug Administration (FDA) approved the following topical NSAIDs: nepafenac, bromfenac, ketorolac, diclofenac and flurbiprofen.

Nepafenac is a potent prodrug which is converted to its active metabolite, amfenac, by intraocular hydrolases.^[9] Amfenac suppresses prostaglandin synthesis by inhibiting COX-1 and COX-2. Bromfenac is an NSAID which is available in different concentrations: 0.07%, 0.075% and 0.09%. It also decrease the prostaglandin synthesis by

inhibiting cox1 and cox2. It is used to treat postoperative inflammation and ocular pain after cataract surgery.

There are few studies which were focussed to compare the efficacy of nepafenac and bromfenac.¹⁰⁻¹² Current study was designed to compare the PCME in diabetic patients after cataract surgery in the patients receiving nepafenac and bromfenac.

MATERIALS AND METHODS

A hospital based randomized control study was conducted From July 2018 to June 2019 in the dept of Ophthalmology, RNT medical college, Udaipur.

The study was conducted in 100 eyes of 100 patient of either sex and any age having diabetes who presented or referred to ophthalmology dept. at RNT MEDICAL COLLEGE, Udaipur for cataract surgery with following inclusion and exclusion criteria

Inclusion criteria: Patients having biochemically proven diabetes mellitus and good glycemic control preoperatively by either insulin or oral hypoglycemics or diet or in combination

Exclusion criteria: Diabetic patients with poorly controlled glycemic status, All ocular conditions (ARMD, CNVM, Macular dystrophy, macular atrophy, glaucoma) which affects the retina (macular thickness), Patients having any complication during surgery are excluded, All ocular condition in which OCT is not possible and patient allergic to nepafenac or bromfenac eye drop.

Detailed history regarding duration of diabetes, type, nature of treatment, associated systemic conditions, pro-diabetic states was noted. A detailed ophthalmic evaluation was done by oblique examination, slit lamp examination. The fundus examination was carried out by using direct and indirect ophthalmoscopy and slit lamp bio-microscopy using + 78 D lens. All patients undergone cataract operation under local anaesthesia. All the patients who are operated, Both types of cataract surgery i.e. Phacoemulsification and SICS were included in the study.

This study was a randomized prospective study. 100 patients diagnosed with diabetes mellitus were randomly allocated into two

study groups using sealed envelope technique. In this technique, 100 envelopes equally divided in two groups were prepared and mixed. After fulfilling the inclusion and exclusion criteria, one envelope was picked by anesthesiologist and accordingly treatment was given. Group A patients received Bromfenac 0.09% eye drop twice a day and group B patients received Nepafenac 0.1% TDS. Effect of drugs were measured in terms of visual acuity and macular thickness.

Statistical analysis was done using a licensed version of SPSS 21. Descriptive analysis was done by calculating proportions, means and standard deviation. Chi square/Fishers Exact test for qualitative and t test for quantitative variable were applied.

RESULTS:

In our study mean age of study participants in group A and B was 61.65 ± 7.86 and 63.12 ± 7.62 , male participants were 28(56%) and 26(54%) respectively. In current study there was no statistically significant difference was present between sociodemographic characteristics between both groups.(Table 1) Current study revealed that in both the group best corrected visual acuity was improved statistically significant from the pre-operative BCVA at 1 week, 3 week and 6 week. BCVA was noted at pre-op in group A and B 40.5 ± 7.6 and 41.05 ± 7.5 ETDRS letters respectively which was improved to 47.8 ± 5.78 and 49.67 ± 5.33 ETDRS letters in group A and B respectively at 6 weeks. (Table 2) In our study, mean retinal thickness in group A and group B during the pre-op was 218.43 ± 27.29 and 216.03 ± 25.56 μm respectively. Patient who received nepafenac 0.1% showed statistical significant increase in mean retinal thickness from the baseline at 1 week, 3 week and 6 weeks but group B patients did not show any increase in mean retinal thickness from the baseline at any post-op follow up. (Table 3, Figure 1)

DISCUSSION:

Current study was a randomized prospective study to evaluate the clinical characteristics of two commonly used NSAIDs in the treatment of inflammation and pain after cataract extraction surgery in diabetic patients. The anti-inflammatory effects of bromfenac 0.09% and nepafenac 0.1% are studied in some studies, and the use of NSAIDs during the first 2 weeks following phacoemulsification has been shown to improve BCVA; however, comparative study of the clinical characteristics, including postoperative BCVA and thickness, is somewhat limited.¹³

In our study we found that bromfenac and nepafenac both showed a significant improvement in term of best corrected visual acuity from the pr-op BCVA, however patients who received bromfenac ophthalmic solution showed less retinal thickness from the baseline while patients who received nepafenac eye solution showed a significant increase in mean retinal thickness at 1 week, 3 week and 6 week.

Study by Chinchurreta Capote AM et al¹⁴ reported that bromfenac is the most effective for the CME prevention and nepafenac was the least effective. This study also found that nepafenac was the most effective and bromfenac the least in reducing inflammation.

Kessel et al¹⁵ done a systematic review of articles published from 1996 comparing topical corticoids' effectiveness versus NSAIDs to control post cataract phacoemulsification CME. This systemic review concluded that NSAIDs are more effective for that purpose with a high level of evidence and no differences were found in the final visual acuity and the number of adverse effects, except for the increase of IOP in patients treated with corticoids. But this study did not include studies analyzing the efficacy of the different types of NSAIDs by separate.

In our study, it was found that a significant improvement regarding visual acuity in the NSAIDs we studied.

Russo et al¹⁶ concluded in his study that the combined use of NSAIDs and topical corticosteroids has synergic effect in controlling post-cataract surgery CME. However, the systematic use in patients with low risk of CME was doubtful, given the CME low incidence among them.

Jones et al¹⁷ come to the conclusion that the topical use of bromfenac 0.09% twice a day is superior to placebo in controlling post-cataract surgery intraocular inflammation. Silverstein et al¹⁰, concluded as well, that bromfenac 0.07% dosed once daily was clinically effective in

achieving zero-to-trace anterior chamber cell severity after cataract surgery and superior to placebo in all anterior chamber cell severity and inflammation outcome measures.

Shoss et al¹⁸ concluded that, although topical NSAIDs reduce post-cataract surgery CME incidence but this incidence is very low, and their systematic use is not recommended for uncomplicated surgeries or for patients who have corneal pathology. Combined use of corticosteroids with topical NSAIDs could reduce the latter's damaging effect on the cornea.

Topical NSAIDs may have harmful effects on the cornea, like superficial punctate keratopathy, infiltrates, or corneal melting. In the current study we did not detect any corneal adverse events.

Schoenberger et al¹⁹ observe in his literature review that there is no evidence of which NSAID is the most effective, but report flurbiprofen is less effective so this study concluded with need of further investigation to more conclusively demonstrate which of NSAIDs would be more safe and effective after cataract surgery.

Nevertheless, some investigators have reported superiority of bromfenac and nepafenac. Thus, Warren et al²⁰ studied the effect of the combined use of topical NSAIDs with intravitreal corticosteroids (triamcinolone) and anti-VEGF (bevacizumab) in the control of chronic pseudophakic CME and compared diclofenac, ketorolac, nepafenac and bromfenac. Using NSAIDs together with corticosteroids and anti-VEGF seemed to increase effectiveness, but only bromfenac and nepafenac were effective compared to placebo.

CONCLUSION:

In our study, both group of patients received bromfenac 0.09% twice a day and nepafenac 0.1% TID showed significant improvement in best corrected visual acuity. However patients who received bromfenac ophthalmic solution showed less retinal thickness from the baseline while patients who received nepafenac eye solution showed a significant increase in mean retinal thickness at 1 week, 3 week and 6 week.

Table 1: Baseline Demographic And Clinical Characteristics:

Variable	Group A (Nepafenac 0.1%) (n-50)	Group B (Bromfenac 0.09%) (n-50)	p-value
AGE (in years)			
Mean $\pm$ SD	61.65 ± 7.86	63.12 ± 7.62	0.127
Range	50-76	52-74	
Gender			
Male n(%)	28 (56)	26(52)	0.822
Female n(%)	22(44)	24(48)	
Study eye			
Right	26 (52)	27(54)	0.84
Left	24(48)	23(46)	

Table 2: Comparison Of Best Corrected Visual Acuity

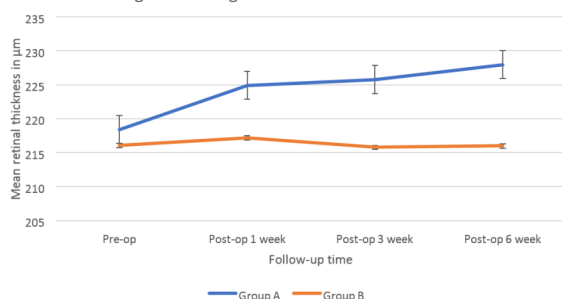
Time	Group A (Nepafenac 0.1%) (n- 50)	Group B (Bromfenac 0.09%) (n-50)
Pre-operative	40.5 ± 7.6	41.05 ± 7.5
p-value	0.364	
Post-op 1 week	49.8 ± 6.6	51.43 ± 5.82
p-value (compare to baseline)	0.001	0.001
Post-op 3 week	48.24 ± 5.32	50.13 ± 4.89
p-value (compare to baseline)	0.001	0.001
Post-op 6 week	47.8 ± 5.78	49.67 ± 5.33
p-value (compare to baseline)	0.001	0.001

Table 3: Comparison of mean retinal thickness (in μm):

Time	Group A (Nepafenac 0.1%) (n-50)	Group B (Bromfenac 0.09%) (n-50)
Pre-operative	218.43 ± 27.29	216.03 ± 25.56
p-value	0.327	
Post-op 1 week	224.93 ± 26.19	217.18 ± 25.89
p-value (compare to baseline)	0.001	0.413
Post-op 3 week	225.79 ± 23.51	215.78 ± 24.61

p-value (compare to baseline)	0.001	0.484
Post-op 6 week	227.99±24.75	216.01±23.44
p-value (compare to baseline)	0.001	0.50

Figure1: Change in mean retinal thickness



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