Original Article

Efficacy of Diclofenac Sodium on Postoperative Inflammation After Phacoemulsification With Intraocular Lens Implants In Dark Brown Irises

Zeba Matin, Farooq Afzal

Pak J Ophthalmol 2006, Vol. 22 No.1

See end of article for authors affiliations

Correspondence to:
Zeba Matin
Consultant Ophthalmologist
Shifa International Hospital
H-8, Islamabad.

Received for publication
February 2005

Purpose: To assess the efficacy of diclofenac sodium (DS) in controlling the postoperative inflammation after phacoemulsification with rigid IOL implants of 5.2 mm in dark brown irises.

Material and Methods: Fifty eight patients who enrolled in this prospective study had phacoemulsification with rigid IOL implants of 5.2 mm. They were administered topical diclofenac sodium 0.1 % postoperatively. Baseline inflammatory flare and cell count in the anterior chamber was evaluated by slit lamp examination under a 3 mm x 1 mm wide slit light beam the next postoperative day. Follow up assessments were carried out on the third day, and then 1, 4 and 6 weeks post operatively using the same evaluation procedure.

Results: There was a significant reduction of the baseline cell and flare count one week post operatively. At the end of 4 weeks, only 2% of the eyes showed a residual reaction of +1 and that too resolved later. Six weeks postoperative assessment of cell/flare count showed complete resolution of activity in the anterior chamber in all cases.

Conclusion: Diclofenac sodium 0.1% appears to be effective in controlling mild to moderate postoperative inflammation after phacoemulsification with rigid IOL implants in dark brown irises.

Postoperative inflammation after cataract surgery depends on the surgical technique itself, the presence or absence of any pre-existing ocular or systemic pathology, along with various other factors. One of the factors contributing to the postoperative inflammation is the degree of iris pigmentation[1]. Dark brown irises are prone to a greater degree of postoperative inflammation as compared to blue, brown, green and hazel irises[2,3]. Major advances in cataract extraction technique and instrumentation have occurred in the past decade[4]. Phacoemulsification with smaller incision, shorter surgical time, less peroperative manipulation of intra ocular structures results in relatively lesser degree of postoperative inflammation, even in eyes that are more prone. Topical steroids are used routinely in order to counter any postoperative inflammation. Steroids, though effective, are not devoid of side effects and can lead to a rise of intraocular pressure (IOP), delayed wound healing and facilitation of infection. This study is carried out to assess the efficacy of diclofenac sodium 0.1 %, a NSAID, in controlling mild to moderate postoperative inflammation in uncomplicated phaco surgery with IOL implants, in dark brown irises.

MATERIAL AND METHODS

A prospective study was carried out on 61 patients, 62-78 years of age, undergoing sutureless phacoemulsification with posterior chamber rigid IOL implants of 5.2 mm. Eyes with systemic or any eye disease other than cataract, were excluded from the study. One patient did not turn up the next day for baseline evaluation, two did not attend the 1st week post-op visit and were hence excluded from the study. The remaining 58 patients underwent regular clinical assessments for a six week period.

Peribulbar anaesthesia was used in all cases. The conjunctival sac was rinsed with povidone iodine

solution. A 3.2 mm superotemporal limbal incision was made continuing 1.5-2.0 mm into the clear cornea. After injecting the viscoelastic, continuous curvilinear capsulorrhexis was made, followed by hydrodissection and delineation. Balanced salt solution (BSS) with 0.3 mg epinephrine per 500 ml was used as the irrigating fluid. Phacoemulsification was performed and cortex aspirated. After injecting the viscoelastic, incision was extended with a 5.2 mm keratome and a rigid PMMA 5.2 mm IOL implanted in the capsular bag. The wound was left sutureless.

Cases encountering any per-op complications were excluded from the study. All cases included in the study were assessed the next post-op day to record a baseline inflammatory reaction in order to categorize the inflammation as mild, moderate or severe.

The criteria for evaluation of the inflammatory reaction was primarily cell and flare count in the anterior chamber, using a 3mm x 1mm wide beam, with an oblique slit under maximum light intensity of the slit lamp.

Cells were graded as

+1 5-10 cells (mild)
+2 11-20 cells (moderate)
+3 21-50 cells (marked)
+4 >50 cells (severe)

Flare was graded as

+1 faint-just detectable
+2 moderate-iris details clear
+3 marked-iris details hazy
+4 intense-severe fibrinous exudates

Other signs and symptoms of inflammation like striate keratopathy, conjunctival hyperemia as documented by slit lamp examination were also evaluated.

Cases with baseline severe inflammatory reaction and marked striate keratopathy were withdrawn from the study. All other cases were administered 0.1% diclofenac sodium (DS) in combination with ciprofloxacin eye drops 2 hourly for the first week and then 4 times a day. Follow up assessment was done on the 3rd day, 1, 4 and 6th week postoperative. On each visit cell/flare count was recorded along with the corneal status and other ocular signs. Day 3 and 7 were marked as critical study visits as the patients that showed an increase in the flare/cell count by this day were to be removed from this study.

The major efficacy parameter of topical DS drops was a reduction of anterior chamber flare and cell count.

RESULTS

Postoperative evaluation on the third postoperative day showed a reduction of baseline +3 cell/flare count from 26% of eyes to 15% whereas there was an increase in the baseline reaction of +1 and +2 in 14% and 60% to 15% and 68% of the eyes respectively. However at the end of the 1st postoperative week there was a marked increase in the number of patients showing significantly fewer signs and symptoms with 42 eyes (72%) having a flare/cell count of +1, 15 eyes (26%) showing a +2 and only one eye (2%) showing a +3 reaction in the anterior chamber. This too resolved at the end of 4 weeks with only 2% of eyes having a + 1 cell/flare. Six week postoperative assessment of cell/flare showed completely resolved activity in the anterior chamber. Figure 1 illustrates the above results.

No case of residual striate keratopathy or corneal edema was seen beyond the 1st postoperative week. However, reversible micropunctate keratitis occurred in 2 cases.

None of the cases showed a significant rise in the IOP at any visit and no patient had to be removed from the study for lack of treatment efficiency. The overall assessment of local tolerance for the drug was satisfactory, without any side effects being seen.

This study showed that the effect of 0.1% Diclofenac Sodium on the anterior chamber flare/cell reduction from baseline was significantly effective at the end of the 1st postoperative week, which subsequently led to a complete resolution of subjective and objective inflammatory signs and symptoms at the end of the 6 week period.

DISCUSSION

Postoperative inflammation after cataract surgery has continued to be a menace for the patient and the surgeon. However, over the years cataract surgery has evolved into a state of the art small incision surgery, which has led to a decline in the postoperative inflammation and a much quitter eye the next day[5]. Along with that the pharmacological advancements in the form of topical drops[6] has also contributed to a better control of postoperative inflammation. The efficacy of steroids[5] vis-a-vis control of postoperative op inflammation cannot be questioned, but the side effects like glaucoma, delayed wound healing[7] and facilitation of infection[8] are well known. Likewise, the use of NSAID has been shown to decrease ocular inflammation[9] whilst avoiding some of the adverse effects of steroids.

The degree of blood aqueous barrier disruption and postoperative inflammation differs among races, non-

Caucasians and brown irises being more prone to postoperative inflammation. The present trial assesses the effect of topical diclofenac sodium in controlling the postoperative inflammation in dark brown irises specifically.

The synthetic cascade of inflammatory mediators starts with the activation of phospholipase A2 that liberates arachadonic acid (AA) from phospholipids[10,11]. AA is converted into endoperoxides by cyclooxygenases and into hydro peroxides by lipoxygenases. One of the subsequent products of endoperoxides is prostaglandin's (PG), which mediates inflammation. DS is one of the phenylalkonic acid groups of NSAID. It is an inhibitor of the synthesis of cycloxygenase pathway in the AA cascade thus inhibiting the inflammation inducing effects of prostaglandins. It is also shown to favour reuptake of AA by cells and inhibit the lipoxygenase pathway, thus inhibiting the production of leukotrienes to some extent[12]. It is this that may make it comparable in anti-inflammatory activity to steroids[13]. Quantitative assessments have been carried out through fluorophotometry proving the effectiveness of NSAID in reducing the break down of blood aqueous barrier (BAB)[14,15] and some like DS have been shown to be as effective as steroids in nonimunogenic traumatic inflammation[16,17] such as postoperative inflammation thus making it a good alternative to steroids in cataract surgery[18].

This study furthers the knowledge obtained from other studies, showing that NSAID such as DS is quite effective in alleviating mild to moderate postoperative inflammation following uncomplicated cataract surgeries, even in dark brown irises.

CONCLUSION

Regarding all major efficacy parameters mentioned above, DS was found to be a clinically and statistically safe and effective drug for controlling mild to moderate postoperative inflammation in uncomplicated phaco surgeries. Hence it can be used to minimize the role of topical steroids, thus avoiding their adverse affects.

Another advantage of using NSAID is in environments where patients tend to be irregular in postoperative followup and typically continues to use the topical steroids prescribed to them initially without proper supervision. Our approach reduces the risk of prolonged and unsupervised usage of topical steroids by administering postoperative Diclofenac Sodium drops as an alternative with practically no side effects. The overall assessment of local tolerance for the drug was satisfactory.

Author's affiliation

Dr. Zaba Matin
Consultant Ophthalmologist
Shifa International Hospital
H-8
Islamabad

Dr. Farooq Afzal
Consultant Ophthalmologist
Shifa International Hospital
H-8
Islamabad

REFERENCES

1. **El-Harazism, Feldman RM.** Control of intraocular inflammation associated with cataract surgery. Curr Opin Ophthalmol. 2001; 12: 4-8.
2. **Corbett MC, Hingorani M, et al.** Factors pre-disposing to intra ocular inflammation. Eur J Ophthalmol. 1995; 5: 40-7.
3. **Onodera T, Gimbal HV, DeBroff BM.** Effects of cycloplegia and iris pigmentation on postoperative intra ocular inflammation. Ophthalmic Surg. 1993; 24: 746- 52.
4. **Oshika T, Yoshimura K, Miyata N.** Postsurgical inflammations after Phacoemunification and extracapsular extraction with soft or conventional intraocular lens implantation. J Cataract Refract Surg 1992;18:356-61.
5. **Laurell CG, Zetterstrom C, Philipson B, et al.** Randomised study of the blood-acqueous barrier reaction after Phacoemulsification and extracapsular cataract extraction. Acta Ophthaimol Scand 1998;76:573-8.
6. **Laurell CG, Zetterstrom C.** Effect of dexamethasone, dinofenac, or placebo on inflammatory response after cataract surgery. Br J Ophthalmol. 2002; 86: 1380-1.
7. **Me Carey BE, Na Palkov JA, et al.** Corneal wound healing strength with topical anti-inflammatory drugs. Cornea. 1995; 14: 290-4.
8. **Havener WH.** Corticosteroid therapy. In: Ocular pharmacology. 3rd ed. St Louis: CV Mosby 1974; 343-95.
9. **Kraff MC, Sanders DR, McGuigan L, et al.** Inhibition of blood-acqueous barrier breakdown with didofenac. A fluorophotometricstudy. Arch Ophthalmol. 1990; 108:380-3.
10. **Havener WH.** Corticosteroid therapy. In: Ocular Pharmacology. 5th ed. St Louis, CV Mosby 1983; 433.
11. **Moncada S, Flower RJ, Vane JR**: Prostaglandins, prostacyclin, and thromboxane A2 in Gilman AG, Goodman LS, Gilman A et al (Eds): The Pharmacologic basics of therapeutics. 6th ed. Now York, Macmillan, 1980; 116280.
12. **Scholer DW, KU EC.** Pharmacology of didofenac sodium. Am J Med 1986; 80 : 34-8.
13. **Flack AJ, Kraff MC, Donald R, et al.** The Quant/tame effect of 0.5% Ketorolac Tromethamine solution and 0.1% Dexamethasone Sodium Phosphate solution on postoperative Surgical Blood Aqueous Barrier. Arch Ophthalmol. 1988; 106.
14. **Dieslclhorst M, Aspacher F, Konen W et al.** The effect of Flurbipmfen .03% eye drops on the blood aqueous barrier in ECCEC IOL implants. Int Ophthalmol. 1991; 15: 69-73.
15. **Araie M, Sawa M, Takase M.** Topical flurbiprofen and diclofenac suppress blood aqueous barrier breakdown in cataract surgery: a fluorophotometric study. Jpn J Ophthalmol. 1983; 27: 535-42.

16. **Vichers FF, MC Guigan UB, Ford Ceta.** The effect of OS Ophthalmic on the TX of postoperative inflammation. Invest Ophthalmol. 1991; 32: 793.
17. **Sanders DR, Kraff MC.** Steroidal and non-steroidal anti inflammatory agents effect on post surgical inflammation and BAB breakdown. Arch Ophthalmol. 1988; 106: 38-383.
18. **Jiraskova N, Rozsival P, Lilakova D, et al.** NSAID agents after cataract surgery Csek Slov Ophthalmol. 2000: 56; 176-9.