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ANALYSIS OF ANTI-INFLAMMATORY EFFECT BETWEEN INTRCAMERAL TRIAMCINOLONE ACETONIDE AND TOPICAL DEXAMETHASONE AFTER PHACOEMULSIFICATION

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Abstract:

Introduction: *Phacoemulsification is the most frequently employed method of cataract extraction. Although the phacoemulsification technique has improved greatly over the years, still it involves surgical trauma which predisposes the individual to post-operative inflammation.*

Aims and objectives: *The basic aim of the study is to analyze the anti-inflammatory effect between intrcameral triamcinolone acetonide and topical dexamethasone after phacoemulsification.*

Material and methods: *This comparative study was conducted in Foundation University Medical College, Islamabad during March 2018 to November 2018. The data was collected from 60 patients who undergo phacoemulsification. The data was divided into two parts, one group were given single intracameral injection of triamcinolone acetonide 1mg at the end of surgery using a 27-guage cannula. Group B get post-operatively Dexamethasone 0.1% eye drops (one drop every four hours) and Moxifloxacin 0.5% eye drops (one drop every six hours) were given for 4 weeks with gradual tapering of dose of dexamethasone eye drops.*

Results: *The data was collected from 60 patients, divided into two groups. The mean age of the selected patients was 55.55 ± 5.68 years. The two groups were comparable with respect to age and sex. There were no significant differences between the groups in age or sex (P > 0.05). Injection of TA into the anterior chamber resulted in a 'snow-globe effect' of various densities at slit-lamp examination. Despite the suspension of crystals, it was easy to assess cell and flare between crystals.*

Conclusion: *It is concluded that single dose intracameral injection of triamcinolone acetonide and postoperative topical dexamethasone are equally effective in controlling post-operative inflammation after phacoemulsification.*

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INTRODUCTION:

Phacoemulsification is the most frequently employed method of cataract extraction. Although the phacoemulsification technique has improved greatly over the years, still it involves surgical trauma which predisposes the individual to post-operative inflammation. Surgical trauma causes a trigger of the arachidonic acid cascade, which in turn generates prostaglandins by activation of cyclooxygenase (COX) 1 and cyclooxygenase 2 [1]. Phosoholipids in the cell membrane are the substrate for phospholipase A-2 to generate arachidonic acid from which a family of chemically distinct prostaglandins and leukotrienes are produced. Ocular effects of prostaglandins include increased or decreased intraocular pressure (IOP), local vasodilation and increased permeability of the blood-aqueous barrier and miosis. Corticosteroids effectively control ocular inflammation [2].

There are several application/preferences about corticosteroid injections at the end of the phacoemulsification surgery. Some surgeons apply such injections to suppress the inflammation during the first 24 hours, as well as, other surgeons apply nothing at all apart from topical steroids. Subconjunctival steroid injections are still one of the most prevalent methods to prevent postoperative inflammation, but it can be painful in cases with topical anesthesia and can cause subconjunctival hemorrhage and chemosis [3]. In our clinic, this method had been applied to suppress the inflammation in the past. The triamcinolone acetonide (TA)-assisted anterior vitrectomy was described as an effective method to enable visualization and removal of the vitreous in complicated surgeries and in cases with vitreus loss [4].

The toxicity of intraocular dexamethasone (DXM) was studied in 1974 in the treatment of inflammatory diseases of the eye by Graham and Peyman. However, in the past two decades, there have been a small number of studies analyzing the use of intracameral DXM in controlling post-cataract surgery inflammation. This strategy offers cataract surgeons the option of a single injection of DXM into the eye at the end of surgery [5]. In order to improve the delivery method, two biodegradable DXM delivery systems for managing inflammation following cataract surgery have been developed, one of which received recent approval by the US Food and Drug Administration (FDA) [6].

Aims and objectives:

The basic aim of the study is to analyze the anti-inflammatory effect between intrcameral triamcinolone acetonide and topical dexamethasone after phacoemulsification.

MATERIAL AND METHODS:

This comparative study was conducted in Foundation University Medical College, Islamabad during March 2018 to November 2018. The data was collected from 60 patients who undergo phacoemulsification. The data was divided into two parts, one group were given single intracameral injection of triamcinolone acetonide 1mg at the end of surgery using a 27-guage cannula. Group B get post-operatively Dexamethasone 0.1% eye drops (one drop every four hours) and Moxifloxacin 0.5% eye drops (one drop every six hours) were given for 4 weeks with gradual tapering of dose of dexamethasone eye drops.

Statistical analysis:

All the data was collected and analyzed using SPSS version 21.0. P value $\leq$ 0.05 was considered significant.

RESULTS:

The data was collected from 60 patients, divided into two groups. The mean age of the selected patients was 55.55 ± 5.68 years. The two groups were comparable with respect to age and sex. There were no significant differences between the groups in age or sex ($P >$ 0.05). Injection of TA into the anterior chamber resulted in a 'snow-globe effect' of various densities at slit-lamp examination. Despite the suspension of crystals, it was easy to assess cell and flare between crystals. The treatment modalities used in the two groups reduced anterior chamber cells and flare equally and effectively, and no statistically significant differences were observed at any postoperative visits. Both drugs were equally effective in controlling post-operative inflammation with a p-value > 0.05 that was statistically non-significant.

Table 01: Comparison of inflammation scores between the two groups

	Group 1 (*n*=30)	Group 2 (*n*=30)	*P* value
Cells			
Postoperative day 1, median (range)	1,8 (0-2)	1,6 (0-2)	0,33
Postoperative day 7, median (range)	0,3 (0-1)	0,2 (0-1)	0,42
Postoperative day 30, median (range)	0 (0-0)	0 (0-0)	1,00
Flare			
Postoperative day 1, median (range)	0,2 (0-1)	0,3 (0-1)	0,67
Postoperative day 7, median (range)	0 (0-0)	0 (0-0)	1,00
Postoperative day 30, median (range)	0 (0-0)	0 (0-0)	1,00

DISCUSSION:

Triamcinolone acetonide is being used to treat posterior segment inflammatory diseases in the form of intraocular injections. Oh et al injected triamcinolone acetonide into anterior chamber of rabbit eyes to check its effect on corneal endothelium [7]. They examined after 2 hours of injection and found there was decrease in microvilli but no statiscally significant difference noted on endothelial cell count and central corneal thickness. Chang et al also found some toxic effects of triamcinolone acetonide on cultured endothelium. Despite toxic effects of triamcinolone acetonide on corneal endothelium shown by some studies, triamcinolone acetonide is being used to control postoperative inflammation after cataract surgery [8].

Dexamethasone is one of the most potent glucocorticoid preparations that downregulates a variety of inflammatory mediators. Similar to all glucocorticoids, DXM binds to the intracellular glucocorticoid receptor α after dissociation of the receptor from heat shock protein. This promotes translocation of the complex to the nucleus where it acts as a transcription factor to induce the expression of genes with anti-inflammatory effects, such as lipocortin, IL-1 receptor antagonist, IL-10, and IκBα genes [7].

DXM, similar to all corticosteroids, inhibits the production of prostaglandins by blocking the enzymatic activity of phospholipase A_2-mediated release of arachidonic acid from cell membranes [9]. Experimental studies of inflammation have established that prostaglandin production is significantly higher in inflamed eyes compared to the non-inflamed baseline state. For instance, in a study of endotoxin-induced uveitis in rabbits, a 60-fold-induction in the amount of prostaglandin was detected in the aqueous humor [10].

CONCLUSION:

It is concluded that single dose intracameral injection of triamcinolone acetonide and postoperative topical dexamethasone are equally effective in controlling post-operative inflammation after phacoemulsification.

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