IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 3 Ver. 4 March. (2018), PP 59-61
www.iosrjournals.org

To evaluate the effect of 0.5% intracameral pilocarpine on intraocular pressure after topical phacoemulsification

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Abstract: Background: *Elevated intraocular pressure is the most frequent postoperative complication demanding treatment following phacoemulsification.So this study has been carried out to evaluate the effect of 0.5% intracameral pilocarpine on intraocular pressure changes after topical phacoemulsification and to compare it with an age matched group of patients undergoing topical phacoemulsification without pilocarpine. The aim was to see if intraoperative use of 0.5% intracameral pilocarpine will prevent the post operative spike of intraocular pressure following phacoemulsification.*
Methods: *Patients were randomly divided into two groups: group 1 (50 eyes) with 0.5% intracameral pilocarpine after completing phacoemulsification under topical anaesthesia and group 2 (50 eyes) without 0.5% intracameral pilocarpine. Every alternate patient was assigned to a different group to rule out any selection bias. Baseline and postoperative intraocular pressure was recorded with a non contact tonometer in both groups. Data collected was statistically analyzed.*
Results: *This study recruited 100 patients of cataract having Nuclear Sclerosis 2+/3+. Patients were grouped as: Group 1: 50 eyes with 0.5% intracameral pilocarpine after phacoemulsification under topical anaesthesia.. Group 2: 50 eyes without 0.5% intracameral pilocarpine after phacoemulsification under topical anaesthesia. There was significant rise in intraocular pressure noticed in both groups at 4 hours and 8 hours postoperatively. However intraocular pressure returned to preoperative levels within 24 hrs postoperatively. There was significant reduction of IOP noted postoperatively at 4hrly and 8 hrly intervals in group 1 in which 0.5% intracameral pilocarpine was used as compared to group 2 after phacoemulsification.*
Conclusion: *Use of 0.5% intracameral pilocarpine after topical phacoemulsification significantly reduces intraocular pressure for 08 hrs postoperatively.There is no significant difference in reduction of intraocular pressure 24hrs postoperatively in both groups.*
Keywords*: Intracameral Pilocarpine, Phacoemulsification*

Date of Submission: 20-02-2018 Date of acceptance: 10-03-2018

I. Introduction

A known complication in the early postoperative period, especially within 24 hours of cataract surgery, is a rise in intraocular pressure (IOP).[1]After phacoemulsification intraocular pressure rises in early postoperative period i.e within 8-12 hours, which may be due to retained lens material, postoperative inflammation, retention of viscoelastic substances, obstruction of trabecular meshwork with inflammatory debris or due to pupillary/ciliary block.[2,3]Elevated pressure is the most frequent postoperative complication demanding treatment following phacoemulsification. After uneventful phacoemulsification in eyes with glaucoma, IOP spikes may reach up to 68 mmHg which is of particular concern for patients with glaucoma who are considering cataract extraction.[4]This rise in IOP can be prevented by intraoperative completeremoval of viscoelastic substances , control of intraocular bleeding, and use of antiglaucoma agents.[3]Intracameral pilocarpine is generally used at conclusion of surgery to achieve pupillary constriction. It helps in achieving pupillary constriction without having any detrimental effect on corneal endothelium.[5] Pilocarpine is available as 0.5% ophthalmic solution of pilocarpine nitrate. Pilocarpine causes an increase in outflow facility thereby decreasing the intraocular pressure which persists after cataract extraction and posterior chamber lens implantation.[6]This study evaluated the effect of 0.5% intracameral pilocarpine on IOP changes after topical phacoemulsification and compared it with an age matched group of patients undergoing topical phacoemulsification without pilocarpine. The aim was to see if universal use of 0.5% intracameral pilocarpine will prevent the post operative spike of intraocular pressure following phacoemulsification.

II. Material And Methods

This study was carried out between 2012 to 2015. One hundred patients with cataract were selected from patients visiting eye department. Inclusion criteria included patients who had cataract of grade nuclear sclerosis 2+/3+, clear cornea, in age group 55 to 70 years with well dilating (>6.5mm) pupils. Exclusion criteria included patients with history of glaucoma or ocular hypertension with IOP more than 21 mmHg, evidence of intraocular inflammation,patients on systemic medication e.g. beta blockers, carbonic anhydrase inhibitors, steroids.A detailed informed consent was taken from every patient before topical phacoemulsification with posterior chamber lens implantation under topical anaesthesia. Comprehensive ocular examination was performed before including the patients into study. The examination profile was as follows: Visual acuity was recorded by Snellen's chart both uncorrected (UCVA) and best corrected (BCVA), IOP with non contact tonometer - average of two independent readings, anterior segment and posterior segment was thoroughly evaluated.

Patients were randomly divided into two groups: group 1 (50 eyes) with 0.5% intracameral pilocarpine after completing phacoemulsification under topical anaesthesia and group 2 (50 eyes) without 0.5% intracameral pilocarpine. Every alternate patient was assigned to a different group to rule out any selection bias. Baseline IOP was recorded 24 hrs prior to surgery with a non contact tonometer .

All hundred surgeries were carried out by same surgeon through a 2.8mm triplanar clear corneal incision. Each eye at surgery received a viscous agent hydroxypropyl methylcellulose (HPMC) 2% to maintain anterior chamber depth and to facilitate IOL implantation which was aspirated following IOL implantation.

A 0.2ml of intracameral pilocarpine(0.5%) Carpinol (Sunways) was used in group 1. IOP of both groups was checked by a resident ophthalmology by non contact tonometer who was blind to the use or non use of the drug and average of two independent readings was taken. Uveal reaction (aqueous flare and cells) was measured by same resident with a slit lamp keeping beam at maximum intensity in a field of 2mm height X 1mm width. Grading of uveal reaction was done.[7]

Post-operatively the IOPs and uveal reaction was checked after 4 h, 8 h and 24hrs with same non contact tonometer. Patients were followed upto 07 days with 4 hrly topical steroid+antibiotic (ofloxacin0.3%+prednisolone1%).

III. Results

In our prospective study, 0.5% intracameral pilocarpine was given after phacoemulsification under topical anaesthesia and patients were followed up for 07 days postoperatively. This study recruited 100 patients of cataract having Nuclear Sclerosis 2+/3+. Patients were grouped as:Group 1: 50 eyes with 0.5% intracameral pilocarpine after phacoemulsification under topical anaesthesia.. Group 2: 50 eyes without 0.5% intracameral pilocarpine after phacoemulsification under topical anaesthesia.

There was significant rise in intraocular pressure noticed in both groups at 4 hours and 8 hours postoperatively. However IOP returned to preoperative levels within 24 hrs postoperatively. There was significant reduction of IOP noted postoperatively at 4hrly and 8 hrly intervals in group 1 in which 0.5% intracameral pilocarpine was used as compared to group 2 after phacoemulsification.

IV. Discussion

Cataract is the major cause of blindness in the world which may occur as a result of aging or secondary to hereditary factors, trauma, inflammation, metabolic or nutritional disorders, or radiation.[8,9,10,11]Although phacoemulsification is a very safe procedure to remove cataract as compared to other methods in terms of intraoperative as well as postoperative complications yet it is not a complication free procedure. Intraocular Pressure Elevation following cataract surgery is a common occurrence.[1] Causes of acute pressure elevation are retention of viscoelastic substances, obstruction of the trabecular meshwork with inflammatory debris, and pupillary or ciliary block.[3] Patients who have pre-existing glaucoma are at much greater risk of developing acute significant pressure elevation.[13]Some studies foundintraocular pressure peak in the early postoperative period after phacoemulsification and the spike is often at 8 to 12 hours following surgery.So, patients with high IOP at the preoperative assessment are more likely to haveIOP spikes after surgery.[14]Various measures have been taken to reduce postoperative intraocular pressure such as application of topical beta-blockers, postoperative apraclonidine; and topical, intravenous, or oral carbonic anhydrase inhibitors.[3]We used 0.1-0.2 ml of intracameral pilocarpine after completion of surgery which is a parasympathomimetic M3 receptor agonist.[15,16]Pilocarpine decreases intraocular pressure by 15-25% via contraction of iris sphincter and ciliary muscle.[17]

In our study there was significant reduction of IOP 4 hrly and 8hrly postoperatively in patients (Gp1) in whom 0.5% intracameral pilocarpine was used after phacoemulsification. However there was no significant difference in reduction of IOP 24hrs postoperatively in both groups. Intraocular pressure returned to preoperative values within 7 days postoperatively in both groups.

V. Conclusion

There is statistically significant reduction of IOP 4hrs and 8hrs postoperatively in patients in whom 0.5% intracameral pilocarpine was used after topical phacoemulsification.There is no significant difference in reduction of IOP 24hrs postoperatively in both groups. There is no significant difference of uveal reaction in both groups after phacoemulsification.

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