ORIGINAL ARTICLE

EFFICACY OF INTRACAMERAL MOXIFLOXACIN VERSUS TOPICAL MOXIFLOXACIN IN PREVENTING ACUTE ENDOPHTHALMITIS AFTER CATARACT SURGERY BY PHACOEMULSIFICATION

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Background: Endophthalmitis is an acute infection of anterior and posterior segment of the eye involving aqueous humour and vitreous cavity along with the other structures. It is classified into many types including bacterial, Fungal, protozoal, viral and atypical forms. Most common route of infection is exogenous either after the surgery or traumatic perforation Objectives were of evaluate the efficacy of intracameral moxifloxacin versus topical moxifloxacin in preventing postoperative acute endophthalmitis after cataract surgery by phacoemulsification. **Methods:** Patients undergoing cataract surgery by phacoemulsification are divided into two groups. Group A and group B. Cataract surgery was performed by phacoemulsification in both the groups by the same consultant. Group A was given 0.5% intracameral moxifloxacin 0.1ml undiluted at the end of surgery and Group B received topical moxifloxacin eyedrops and no intracameral medicine at the end of surgery. Post-operative medicine in both the groups was same for 1st twenty-four hours that is topical dexamethasone 0.1%. Postoperative assessment was made on the next day or after twenty-four hours of surgery Our primary outcome was incidence of postoperative acute endophthalmitis. **Results:** The study comprised 150 eyes of patients. There were 75 patients in Group A (intracameral moxifloxacin) and 75 patients in Group B (Topical group). Mean age of the patients was 58 years. No case of endophthalmitis was reported in group A (intracameral moxifloxacin). Three cases in group A had acute toxic anterior segment with moderate corneal oedema and severe anterior chamber reaction which resolved in a week time without intravitreal medication. Group B (Topical Moxifloxacin) did not report any case of endophthalmitis. The difference between the two groups was very mild anterior chamber reaction in intracameral group as compared to topical group. **Conclusion:** 0.1 ml undiluted intracameral moxifloxacin 0.5% can be given as a last step in cataract surgery by phacoemulsification to prevent postoperative acute endophthalmitis infection. This drug administration is not totally safe as our three cases developed drug reaction with moderate corneal oedema and anterior chamber reaction that resolved in a week time.

Keywords: Intracameral moxifloxacin; Antibiotic prophylaxis; Cataract surgery; Phacoemulsification; Endophthalmitis

Citation: Anwar F, Qamar N, Bashir A. Efficacy of intracameral Moxifloxacin versus topical Moxifloxacin in preventing acute endophthalmitis after cataract surgery by phacoemulsification. J Ayub Med Coll Abbottabad 2024;36(2):256–9.

DOI: 10.55519/JAMC-02-12663

INTRODUCTION

Endophthalmitis is an acute infection of anterior and posterior segment of the eye involving aqueous humour and vitreous cavity along with the other structures. It is classified into many types including bacterial, Fungal, protozoal, viral and atypical forms. Most common route of infection is exogenous either after the surgery or traumatic perforation. Cases of endophthalmitis are considered as ocular emergencies and delay in treatment can lead to permanent blindness. Intracameral antibiotics are considered safe for corneal endothelial cells[1.]Endopthalmitis is a clinically diagnosed complication that is based on low vision and pain on first postoperative day along with hypopyon, poor fundal glow and vitritis. Endophthalmitis although rare can develop after ocular surgeries. Acute Endophthalmitis after cataract surgery is amongst the serious complications that can lead to blindness.[1] Proper sterilization of instruments and applying pyodine to the eye in the sac plays an important role in preventing it but still some cases with acute endophthalmitis are reported in different centers in every years surgical data.[2] It is also important to consider the patient factor as some patients with uncontrolled diabetes and immunocompromised patients are at increased risk of having postoperative endophthalmitis. Prophylactic and postoperative role of antibiotics is always considered important in preventing postoperative infection. Studies have been conducted on different routes of antibiotics in the eye to find the safe and effective method of antibiotic

administration to prevent postoperative endophtalmitis.[3,4]

Intracameral route of drug administration is considered safe for some antibiotics administration. Previously a drug cefuroxime was administered through intracameral route which gave great support in preventing post infection. Although some complications were associated with it also as drug reaction, endothelial toxicity, acute anterior segment reaction, unexplained uveitis. Now another drug moxifloxacin is considered safe for intracameral.[5] Moxifloxacin belongs to a group of fourth generation quinolone that provide cover against gram positive bacteria, gram negative bacteria, anaerobes and atypical microorganisms. Moxifloxacin is used as of labelled drug in eye to prevent postoperative acute endophthalmitis. Previously some data is available about intracameral use of moxifloxacin in controlling postoperative endophthalmitis.[6]

Therefore, our studied is aimed to compare the intraoperative intracameral moxifloxacin administration versus postoperative topical moxifloxacin administration in preventing acute endophthalmitis on 1st postoperative day.

MATERIAL AND METHODS

The study was conducted on 150 patients as a prospective randomized clinical trial after the approval of ethical committee. Data was collected from the patients in Sharif medical city hospital Lahore from April 2022 to September 2022. Inclusion criteria considered all the patients with cataract (cataract grades ++, +++, ++++) in their eyes to be operated by phacoemulsification. Exclusion criteria included all the patients with history of trauma to the eye, drug allergies, previous history of intraocular surgery. Informed consent was taken from the patient and then shifted to operation theatre in a new sterilized disposable kit. Patient is asked to lie supine with a ring pillow under the head to stabilize the head position. Data was collected from all patients undergoing cataract surgery by phacoemulsification. Follow-up was done on 1st postoperative day for acute endophthalmitis. Endophthalmitis was diagnosed by defined clinical parameters that includes low vision, hypopyon, vitritis and fundal glow assessment. It was observed in several data analyses that if patient is infection free on first postoperative day after cataract surgery, then it is less likely for the patient to develop acute infection. Patients were randomly divided into two groups. Group A included patient who received 0.1 ml undiluted intracameral moxifloxacin (vigamox) and group B included patients who received topical moxifloxacin eyedrops and no intracameral medicine. Post-operative medicines in both groups remain the same 0.1% dexamethasone eyedrops every two hourly. All phacoemulsification surgeries were performed by a single surgeon of consultant category. Proper surgical protocol was followed in sterilization of instruments with standardized temperature for a specified time period. All other surgical medicines were also standardized including viscoelastic, Intraocular lenses and drip solutions. Patient eye was cleaned with 5% povodine iodine solution. Three to four drops of povodine iodine were instilled into the conjunctival sac for three minutes. Skin area of the eye and lashes were also cleaned with 10% povodine iodine solution to avoid infection. Oertli Phacoemulsification machine was used to perform cataract surgeries with chop technique with foldable intraocular lenses were implanted. Moxifloxacin eyedrops used were vigamox brand of alcon 0.5% intracameral. New bottle of moxifloxacin eyedrops was opened for the surgery every time. 0.1ml vigamox undiluted was given through intracameral route in group A and 0.5% moxifloxacin eyedrops were instilled in group B at the end of surgery before putting the eye pad. Dexamethasone eyedrops remained the same in both groups postoperatively. Statistical analysis was performed by using SPSS version 23.0. Details were expressed in percentages and frequencies.

RESULT

Mean age of the patients was 58 years±12 (with a range from 17 to 85 years). Sixty-eight (45.3%) were female and 82 (54.7%) were male There were 75 patients in Group A (intracameral moxifloxacin) and 75 patients in Group B (Topical group). No case of endophthalmitis was reported in group A (intracameral moxifloxacin). Three cases in group A has acute toxic anterior segment with moderate corneal oedema and severe anterior chamber reaction which resolved in a week time without intravitreal medication. Group B (Topical Moxifloxacin) did not report any case of endophthalmitis. The difference between the two groups was very mild anterior chamber reaction in intracameral moxifloxacin group as compared to topical group. No case of posterior capsular rupture and vitreous loss was noted during the study. No case during the study was left aphakic.

Table-1: Grading of Anterior Chamber Reaction

No of Cells in AC	Grade	Frequency	Percentage	Valid percent
6 to 10	Grade I (group A)	83	55.3%	55.3%
11 to 20	Grade II (group B	64	42.7%	42.7%
21 to 30	Grade III	3	2.0%	2.0%

Table-2: Incidence of Endophthalmitis in Both Groups (Intracameral Moxifloxacin Vs Topical Moxifloxacin)

Groups	No of Cases	Acute Endophthalmitis	Toxic Anterior Segment syndrome
Group A (IC)	75	Nil	03
Group B(Topical)	75	Nil	00
Total (n)	150		03

Table-3: Demographic Data (Female Vs Male)

Gender	Frequency	Percentage
Female	68	45.3%
Male	82	54.7%

DISCUSSION

The number of cataract surgeries are increasing day by day as the chances of postoperative infection. cataract surgery is a very delicate procedure and importance of antibiotic prophylaxis cannot be denied.[7,8] Postoperative infection in cataract surgery is called as endophthalmitis that can lead to total blindness. Antibiotics prophylaxis can be helpful in preventing this blinding complication. Moxifloxacin can be considered as a last step to prevent acute endophthalmitis on first postoperative day. Moxifloxacin can cause endothelial toxicity when used intracamerally both in diluted and undiluted form. Several studies have suggested moxifloxacin as safe for endophthalmitis prophylaxis. In another large retrospective analysis, the intracameral moxifloxacin was considered safe for prevention of postoperative acute endophthalmitis[9,10] Our study was conducted as a randomized control trial. In this study our focus was to prevent the postoperative acute endophthalmitis on very next day of follow-up. It is observed that if patient eye is infection free on first postoperative day or after 24 hours which is the most critical period of sterile acute inflammation then patient is less likely to develop acute infection further.[11,12] The incidence of postoperative endophthalmitis in intracameral moxifloxcin group was negligible as no case of postoperative acute endophthalmitis was reported but two of our cases develop toxic anterior chamber with moderate corneal oedema, anterior chamber reaction on 1st postoperative day. Both the cases recovered on day seven of treatment with improved visual acuity. In the Topical group (no intracameral drug) two drops of moxifloxacin eyedrops (vigamox) were instilled before eye pad. No case of postoperative acute endophthalmitis was reported in this group as well but sterile reaction in anterior chamber (cells) was slightly higher than intracameral group. Previously available literature have established the safety of moxifloxcin for intracameral use but still chances of drug toxicity are there to damage the corneal endothelium which sometimes is irreversible in low endothelial cell count cases.[13,14] Previously reported incidence of acute endophthalmitis varies between studies between 1.23 % on a higher side and 0.03 % on the lower side with intracameral moxifloxacin.[1]

Limitations of the study:

Our two cases with toxic anterior segment of moderate category were not evaluated through culture and sensitivity of aqueous sampling. Also, no PCR facility was available for detailed evaluation of suspected cases. Both the cases were fully recovered within a week time. Also, in our setup less, sample size was also a limitation in the study.

AUTHORS' CONTRIBUTION

FA: Study design, patient selection, write-up. NQ: Literature search, data collection. MAB: Statistical analysis. MTG, MHB: Literature search.

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Submitted: November 21, 2023	*Revised: March 25, 2024*	*Accepted: March 30, 2024*

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