Efficacy of Prophylactic Intracameral Moxifloxacin in Cataract Surgery

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ABSTRACT

Purpose: To determine the efficacy of prophylactic intracameral moxifloxacin 0.5% ophthalmic solution (Vigamox) in preventing postoperative endophthalmitis in patients having cataract surgery.
Material and methods: The study was conducted at Alkhair Lions Eye Hospital, Lahore, from February 2010 to April 2011. Preoperative and final 1-month postoperative anterior chamber reaction was assessed in 650 eyes that had cataract surgery with intracameral moxifloxacin. All eyes received 0.1 mL intracameral moxifloxacin 0.5% ophthalmic solution containing 500 mg of moxifloxacin as the last step of cataract surgery. Patients were followed up for one month. Patients with any major intraoperative complication or who were lost to follow-up were excluded.
Results: 615 eyes completed the study. The mean age was 69.5 years (range 48 to 84 years). All eyes had quiet anterior chamber preoperatively and had trace to +2 cells and flare anterior chamber reaction only on the first day after surgery. Postoperative evaluation was done on first day, after one week and finally after one month. There was no anterior chamber reaction and no endopthalmitis.
Conclusion: Intracameral moxifloxacin 0.5mg/mL appeared to be effective in preventing postop anterior chamber reaction and ultimately endophthalmitis in patients undergoing cataract extraction.
Key words: Prophylactic intracameral moxifloxacin, cataract,

INTRODUCTION

Postoperative endophthalmitis has always been a major threat and concern for the ophthalmologists all over the world. Postoperative anterior chamber reaction is an important predictor for this worst complication. Different methods have been adopted for the prevention of endopthalmitis. The use of prophylactic intracameral antibiotics is one of them. Among the antibiotics given intracamerally, most commonly used are cefuroxime and vancomycin[1].

Before the introduction of moxifloxacin ophthalmic solution 0.5% (Vigamox), many surgeons used intracameral vancomycin at the conclusion of cataract surgery as part of the prophylactic regimen[2]. Although the risk for endophthalmitis was reduced with vancomycin, there was no strong proof that vancomycin prevents endophthalmitis[3,4]. In addition, one study conducted by Axer-Siegel et al showed that vancomycin increased the risk for clinically significant macular edema (CSME) as well as cystoids macular edema (CME) seen on fluorescein angiography 1 month and 4 months after cataract surgery[5]. Moreover, because of its potency, vancomycin has generally been reserved for treatment of infections that are not efficiently treatable by other drugs. Issues have been raised regarding the emergence of vancomycin-resistant enterococci, an increase in intermediate resistance to vancomycin in coagulase-negative staphylococci, and methicillin-resistant Staphylococcus aureus. These issues and the lack of scientific proof of vancomycin's efficacy in preventing endophthalmitis led to a joint statement by the American Academy of Ophthalmology and the U.S. Centers for Disease Control discouraging the routine prophylactic use of vancomycin in ocular surgery[6,7].

In contrast, in a preliminary report of the ESCRS Endophthalmitis Study Group, intracameral cefuroxime was shown to significantly reduce the risk for developing endophthalmitis after phacoemulsification cataract surgery[8,9]. However, like vancomycin, cefuroxime is available in a systemic preparation that must be reconstituted using saline solution before it can safely be delivered to the eye. Reconstituting the drug for intracameral use may increase the risk for toxic anterior segment syndrome (TASS) because an undesired concentration of the drug may be inadvertently injected if a mistake occurs during the preparation or dilution process. It is well known that incorrect drug concentration, incorrect pH, and incorrect osmolality can cause TASS[10].

Considering the possible complications with vancomycin and cefuroxime, moxifloxacin seems to be the better choice of antibiotic for endophthalmitis prophylaxis because of its broad-spectrum coverage and mode of action. [11] Moxifloxacin is a fourth-generation fluoroquinolone antibacterial agent that is active

against a broad spectrum of gram-positive and gram-negative ocular pathogens, atypical microorganisms, and anaerobes [12-13] (Tables 1 to 3). The ophthalmic solution is isotonic and formulated at pH 6.8 with an osmolality of approximately 290 mOsm/kg (product description, moxifloxacin hydrochloride ophthalmic solution 0.5%, Alcon Laboratories, reference: AAA083–0604); both values are within the compatible range for humans (pH 6.5 to 8.5 and osmolality 200 to 400 mOsm/kg). Vigamox is also a self-preserved (no added preservatives) commercial ophthalmic formulation that requires no special preparation for intracameral delivery, reducing the risk for TASS[13]. In addition, early studies of rabbit eyes did not show intraocular toxicity after injection of intravitreal or intracameral moxifloxacin[12].

PATIENTS AND METHODS

The study was conducted from February 2010 to April 2011 on patients of age 45 to 85 years with no ocular pathology other than cataract. Exclusion criteria included glaucoma, retinopathy, maculopathy, media opacity other than cataract (cornea or vitreous), and visual pathway problems. Patients with uveitis, diabetes, corneal endothelial disease, or pseudoexfoliation and those who were taking systemic immunosuppressants or anticoagulants were also excluded. Other exclusion criteria were intraoperative complications or difficulties and prolonged surgery and patients lost in follow up.

Pupils were dilated with a solution of tropicamide 1%. All surgeries were performed using peribulbar anesthesia of Bupivacaine and Lignocaine. Uneventful extracapsualr cataract extracton with implantation of IOL was performed. At the end of surgery, intracameral moxifoxacin was given to each patient. The reason we went to intracameral antibiotic was that it just made sense to put the antibiotic at the site of potential infection.

Preoperatively, patients received 1 drop of topical Vigamox every 15 minutes at least 4 times. Povidone–iodine 0.5% was instilled into the cul de sac. At the start of the operating day, the contents of a newly opened bottle of Vigamox was aspirated into a sterile 10 cc syringe and set aside. With a tuberculin syringe, a volume slightly in excess of 0.1 mL (0.3 to 0.5 mL) of the pure moxifloxacin 0.5% ophthalmic solution was then aspirated from the 10 cc syringe. No solution, including saline, was added to dilute the commercial preparation. The excess amount was discarded, leaving 0.1 mL in the tuberculin syringe ready for injection into the anterior chamber. This volume contained 0.5 mg of the nonpreserved moxifloxacin with a pH of 6.8 and an osmolality of approximately 290mOsm/kg. The solution prepared in the syringe was injected using a 27-gauge cannula through the incision as the last step of cataract extraction and IOL implantation. Postoperative antibiotics included oral ciprofloxacin 500 mg, 1 tablet twice a day for 5 days. For First 48 hours, topical Tobramycin was given every 2 hourly. The Tobramycin was then reduced to 4 times a day for three weeks. Topical prednisolone acetate 1% (Pred Forte) was also given postoperatively using the same dosage schedule used for Tobramycin.

The patients were scheduled for follow-up at 1 day, 1 week, and 1 month after surgery. Anterior chamber reaction, expressed as cells and flare intensity, was graded by an independent observer using the Hogan system[14]. All observations were done using a slit lamp biomicroscope 1 day and 1 and 4 weeks after surgery.

RESULTS

Out of 650 eyes, 615 eyes completed the study. All patients were Asian. The mean age of the 295 men and 320 women was 69.5 years (range 48 to 84 years). All eyes had trace to +2 cells and flare only on the first day after cataract surgery. On subsequent follow ups, anterior chamber was quiet in 99.18% (610 Patients). Only five patients had anterior chamber reaction on second follow up visit and were given topical steroids in higher frequency, which cured the uveitic reaction. No patient ended with endophthalmitis at the completion of study.

Table 1. Susceptibility of gram-positive species to moxifloxacin MIC50 (mg/mL)

Bacterial Species	**Moxifloxacin**
Staphylococcus aureus	0.03
Staphylococcus epidermidis	0.06
Staphylococcus haemolyticus	0.06
Staphylococcus saprophyticus	0.03, 0.13
Staphylococcus lugdunensis	0.13
Staphylococcus hominis	0.03, 0.06
Staphylococcus simulans	0.03
Staphylococcus pasteuri	0.06
Staphylococcus warneri	0.03, 0.06
Streptococcus pyogenes	0.13, 0.25
Enterococcus faecalis	0.19, 0.25
Micrococcus luteus	0.50
Kocuria species	0.25
Bacillus cereus	0.09, 0.13
Bacillus pumilus	0.13
Bacillus subtilis	0.16
Corynebacterium accolens	0.03
Corynebacterium macginleyi	0.03
Corynebacterium propinquum	0.25
Corynebacterium pseudodiphtheriticum	0.25

MIC = minimum inhibitory concentration

Table 2. Susceptibility of gram-negative species to moxifloxacin MIC_{50} (mg/mL)

Bacterial species	**Moxifloxacin**
Aeromonas caviae	0.13
Citrobacter koseri	0.03
Enterobacter aerogenes	0.06, 0.25
Enterobacter cloacae	0.03, 0.13
Enterobacter hormaechei	0.13
Escherichia coli	0.008, 0.06
Klebsiella oxytoca	0.03, 0.25
Klebsiella pneumoniae	0.03, 0.13
Pantoea agglomerans	0.03, 0.06
Proteus mirabilis	0.06, 0.50
Serratia marcescens	0.25, 0.50
Achromobacter xylosoxidans	2.0, 4.0
Acinetobacter baumannii	0.03, 0.13
Acinetobacter calcoaceticus	0.016, 0.06
Acinetobacter johnsonii	
0.16, 0.13	
Acinetobacter junii	0.06
Acinetobacter genospecies 3	0.016, 0.06
Chryseobacterium indologenes	0.25
Chryseomonas luteola	0.13
Stenotrophomonas maltophilia	0.13, 1.0
Pseudomonas aeruginosa	0.50, 2.0, 4.0
Pseudomonas oryzihabitans	0.13
Pseudomonas stutzeri	0.25
Haemophilus influenza	0.016, 0.03, 0.39
Moraxella catarrhalis	0.03, 0.047, 0.06
Moraxella osloensis	0.13
Neisseria perflava	0.03

Table 3. Susceptibility of atypical and anaerobic species to moxifloxacin MIC_{50} (mg/mL)

Bacterial Species	Moxifloxacin
Atypical	
Mycobacterium avium	3.2
Mycobacterium marinum	0.4
Mycobacterium chelonae	1.6, 8.0
Mycobacterium abscessus	8.0
Mycobacterium fortuitum	0.06
Mycobacterium kansasii	0.06
Chlamydia trachomatis	0.03
Anaerobe	
Propionibacterium acnes	0.25
Bacteroides fragilis	0.25
Clostridium perfringens	0.50
Peptostreptococcus species	0.25

To our knowledge, this is the first report of a topical ophthalmic preparation applied through the intraocular route as a prophylactic agent in cataract surgery. [13] Our study evaluated the efficacy of injecting intracameral Vigamox in human eyes having cataract surgery to prevent postoperative endophthalmitis.

DISCUSSION

Endophthalmitis cases after cataract surgery increased from 1994 to 2001, with a reported incidence of 0.215%[15]. With only povidone iodine prophylaxis, incidence of endophthalmitis is 0.3-0.5% in Europe[16, 17] and 0.015% in USA. While in Pakistan this rate was found to be 0.6%[18]. The European Society of Cataract and Refractive Surgery (ESCRS) study has found the lowest observed incidence rates were for the group which received both intracameral and perioperative topical antibiotics[9] . Thus, there is a need for protective antibiotics to combat the rise and to better treat patients, especially in the light of increasing antibacterial resistance among causative organisms. Of the prophylaxis methods for cataract surgery, only povidone–iodine received intermediate clinical recommendation, as discussed by Ciulla et al[19] in a literature review of endophthalmitis prophylaxis. In addition, Isenberg et al.[20] found that povidone–iodine reduces conjunctival flora by 91% for colony-forming units and 51% for species when applied alone to the eye just before surgery; when applied in conjunction with a topical antibiotic, it produced a synergistic effect that led to sterilization of 83% of the eye. Although antiseptic agents such as povidone–iodine are effective for ocular surface decontamination, antibiotics with favorable pharmacodynamic properties are required to deliver ocular protection.

Fluoroquinolones were introduced for treatment of corneal and conjunctival infections; however, these antibiotics found a greater role in prophylaxis before surgery to prevent endophthalmitis. New generations of fluoroquinolones were introduced to counteract resistance to the second-generation agents. These include third-generation (levofloxacin) and fourth-generation (moxifloxacin and gatifloxacin) fluouroquinolones[11].

Several studies[11,13,21,22] found moxifloxacin, a fourthgeneration antibiotic, to be superior in terms of potency. It has the lowest mean inhibitory concentration (MIC) for most bacterial endophthalmitis isolates[13]; thus, it seems to be a better choice for prophylactic antibiotic. The moxifloxacin injection we used was a commercially available ophthalmic solution labeled for topical use with the brand name Vigamox. Vigamox does not contain preservatives, which in addition to its broad-spectrum activity led us to investigate its intraocular use. Vigamox has a pH of 6.8 and an osmolality of 290 mOsm/kg; both values are within the compatible range for humans.

Our choice to analyze the data 4 weeks after surgery is supported by observations in previous studies of intracameral instillation of vancomycin, cefuroxime, and cefotaxime[3,23, 24].

Regarding efficacy, the drug level in the target tissue (in this case the aqueous) becomes paramount. Antibiotic concentrations over time should be established and should be above the MIC_{90} levels of the most common, if not all, endophthalmitis-causing pathogens. We injected 0.1mL of Vigamox 0.5% solution, or an equivalent of 0.5 mg (500 mg) of moxifloxacin, into the capsular bag. With an IOL positioned in the capsular bag, the estimated fluid capacity of the combined anterior and posterior chambers after crystalline lens extraction is approximately 0.525 mL.[25] Granting that we reestablished this volume with balanced salt solution (BSS) and the 0.1 mL of antibiotic at the conclusion of the surgery, the concentration of moxifloxacin would be 500 mg in 0.525mL, or 952mg/mL. The median MIC (in mg/mL) of even moxifloxacin-resistant endophthalmitis isolates has been established to be no higher than 3 mg/mL[11].

Therefore, the initial moxifloxacin levels in the anterior chamber after injection in our cases was at least 300 times the median MICs of endophthalmitis-causing organisms.

So therapeutic levels were achieved peroperatively and it proved to be safe to prevent postoperative anterior chamber reaction and ultimately effective for the prevention of endophthalmitis.

CONCLUSION

Due to poor socio-economic status in Pakistan, mostly cataract surgery is done by ECCE technique especially in peripheral areas where follow up of such patients is very poor. Moxifloxacin given intracamerally appeared to be nontoxic in terms of postoperative anterior chamber reaction. This study established not only that moxifloxacin can safely be given intracamerally; but also that it is effective in preventing endophthalmitis. So, moxifloxacin given intracamerally is an effective method to prevent drastic complication of endopthalmitis especially in Pakistan.

REFERENCES

1. Masket S. Preventing, diagnosing, and treating endophthalmitis [guest editorial]. J Cataract Refract Surg 1998; 24:725–726
2. Gills JP. Filters and antibiotics in irrigating solution for cataract surgery [letter]. J Cataract Refract Surg 1991; 17:385
3. Gimbel HV, Sun R, de Brof BM. Prophylactic intracameral antibiotics during cataract surgery: the incidence of endophthalmitis and corneal endothelial cell loss. Eur J Implant Refract Surg 1994; 6:280–285
4. Gimbel HV, Sun R. Prophylactic intracameral vancomycin and CME [letter]. Ophthalmology 2000; 107:1614–1615
5. Axer-Siegel R, Stiebel-Kalish H, Rosenblatt I, et al. Cystoid macular edema after cataract surgery with intraocular vancomycin. Ophthalmology 1999; 106:1660–1664
6. Seppa¨la¨ H, Al-Juhaish M, Ja¨rvinen H, et al. Effect of prophylactic antibiotics on antimicrobial resistance of viridans streptococci in the normal flora of cataract surgery patients. J Cataract Refract Surg 2004; 30:307–315
7. Centers for Disease Control. Staphylococcus aureus resistant to vancomycin-United States, 2002. MMWR Morb Mortal Wkly Rep 2002; 51:565–567
8. Barry P, Seal DV, Gettinby G, et al. ESCRS study of prophylaxis of postoperative endophthalmitis after cataract surgery: preliminary report of principal results from a European multicenter study; the ESCRS Endophthalmitis Study Group. J Cataract Refract Surg 2006; 32:407–410
9. Seal DV, Barry P, Gettinby G, et al. ESCRS study of prophylaxis of postoperative endophthalmitis after cataract surgery: case for a European multicenter study; the ESCRS Endophthalmitis Study Group. J Cataract Refract Surg 2006; 32:396–406
10. Mamalis N, Edelhauser HF, Dawson DG, et al. Toxic anterior segment syndrome. J Cataract Refract Surg 2006; 32:324–333
11. Mather R, Karenchak LM, Romanowski EG, Kowalski RP. Fourth generation
12. fluoroquinolones: new weapons in the arsenal of ophthalmic antibiotics. Am J Ophthalmol 2002; 133:463–466
13. Kowalski RP, Romanowski EG, Mah FS, et al. Intracameral Vigamox_
14. (moxifloxacin 0.5%) is non-toxic and effective in preventing endophthalmitis in a rabbit model. Am J Ophthalmol 2005; 140:497–504
15. Stroman DW, Dajcs JJ, Cupp GA, Schlech BA. In vitro and in vivo potency of moxifloxacin and moxifloxacin ophthalmic solution 0.5%; a new topical fluoroquinolone. Surv Ophthalmol 2005; 50(suppl): S16–S31
16. Nussenblatt RB, Whitcup SM, Palestine AG. Uveitis: Fundamentals and Clinical Practice, 2nd ed. St Louis, MO, Mosby-Year Book, 1996; 61–62
17. West ES, Behrens A, McDonnell PJ, et al. The incidence of endophthalmitis after cataract surgery among the U.S. Medicare population between 1994 and 2001. Ophthalmology 2005; 112:1388–1394

18. Patwardhan A, Rao GP, Saha K, Craig EA. Incidence and outcomes evaluation of endophthalmitis management after phacoemulsification and 3-piece silicone intraocular lens implantation over 6 years in a single eye unit. J Cataract Refract Surg. 2006; 32: 1018-21.
19. ESCRS Endophthalmitis Study Group: Prophylaxis of postoperative endophthalmitis following cataract surgery: results of the ESCRS multi-centre study and identification of risk factors. J Cataract Refract Surg. 2007; 33: 978-88.
20. Babar TF, Masud Z, Saeed Nasir, et al. A two years audit of admitted patients with the diagnosis of endophthalmitis. Pak J Med Res Sep. 2003; 42: 105-11.
21. Ciulla TA, Starr MB, Masket S. Bacterial endophthalmitis prophylaxis for cataract surgery; an evidence-based update. Ophthalmology 2002; 109:13–24; questions for CME credit request, 25–26
22. Isenberg SJ, Apt L, Yoshimori R, et al. Efficacy of topical povidone-iodine during the first week after ophthalmic surgery. Am J Ophthalmol 1997; 124:31–35.
23. Alfonso E, Crider J. Ophthalmic infections and their anti-infective challenges. Surv Ophthalmol 2005; 50(suppl):S1–S6.
24. Schlech BA, Alfonso E. Overview of the potency of moxifloxacin ophthalmic solution 0.5% (Vigamox_). Surv Ophthalmol 2005; 50(Suppl):S7–S15
25. Montan PG, Wejde G, Setterquist H, et al. Prophylactic intracameral cefuroxime: evaluation of safety and kinetics in cataract surgery. J Cataract Refract Surg 2002; 28:982–987
26. Peyman GA, Sathar ML, May DR. Intraocular gentamicin as intraoperative prophylaxis in South India eye camps. Br J Ophthalmol 1977; 61:260–262
27. Mindel JS. Pharmacokinetics. In: Tasman W, Jaeger EA, eds, Duane's
28. Foundations of Clinical Ophthalmology on CD-ROM. Philadelphia, PA, Lippincott Williams & Wilkins, 2006; vol. 3, chap 23.

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Decreased postoperative endophthalmitis rate after institution of intracameral antibiotics in a Northern California eye department.

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Source

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Abstract

PURPOSE:
To evaluate post-cataract-surgery endophthalmitis rates in relation to changing practice patterns in antibiotic administration.

SETTING:
Kaiser Permanente, Diablo Service Area, California.

DESIGN:
Ecological time-trend study.

METHODS:
During 2007 through 2011, 3 time periods were identified based on increasing adoption of intracameral injections after phacoemulsification cataract surgery. In 2007, patients primarily received postoperative antibiotic drops without intracameral injection. During 2008 and 2009, in addition to the surgeons' usual postoperative topical drop regimen, patients received intracameral cefuroxime unless contraindicated by allergy or posterior capsule rupture (PCR). During 2010 and 2011, all patients received an intracameral injection of cefuroxime, moxifloxacin, or vancomycin while topical antibiotics were used according to surgeon preference. The rates of postoperative endophthalmitis during these 3 periods were calculated. Also evaluated separately were consecutive patients without PCR from a subgroup of 3 surgeons who used intracameral injection alone without perioperative topical antibiotics.

RESULTS:
Nineteen cases of endophthalmitis occurred in 16 264 cataract surgeries. The respective rates per 1000 during the 3 time periods (2007, 2008 and 2009, 2010 and 2011) were as follows: 3.13 (95% confidence interval [CI], 1.43-5.93); 1.43 (95% CI, 0.66-2.72); 0.14 (95% CI, 0-0.78). One case of endophthalmitis was observed in 2038 patients without PCR who received intracameral injection only without topical antibiotics (rate per 1000: 0.49; 95% CI, 0.01-2.73).

CONCLUSIONS:
The adoption of intracameral antibiotic injection coincided with a decline in the rate of postoperative endophthalmitis, and a low infection rate was observed with intracameral injection alone.

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No author has a financial or proprietary interest in any material or method mentioned.

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Bag and chamber flushing: a new method of using intracameral moxifloxacin to irrigate the anterior chamber and the area behind the intraocular lens.

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Source

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Abstract

BACKGROUND:
Intracameral moxifloxacin is currently administered by injecting small doses (0.05-0.2 mL) of either undiluted or diluted solutions. It is difficult to ensure delivery of small amounts of antibiotic into the area behind the intraocular lens (IOL). Moreover, the anterior chamber pressure decreases as the tip of irrigation is removed, often leading to contaminated fluid flowing into the chamber.
Conventional intracameral injectionadministers the diluted antibiotic without irrigating the recontaminated anterior chamber. Therefore, we developed a method of intracameralmoxifloxacin delivery which flushes both the anterior chamber and the area behind the IOL immediately after surgery.
METHODS:
Surgical technique (bag and chamber flushing = BC flushing): After removing the viscosurgical device, 1.5-1.8 mL diluted moxifloxacinwas injected. Both the anterior chamber and the area behind the IOL were irrigated by lifting the IOL edge so that a stream of solution could circulate behind the IOL. Experiment 1 (pig): The anterior chamber was filled with condensed milk, and irrigated with 150-fold diluted moxifloxacin (33.3 μg/mL) in six eyes (BC flushing) to observe the irrigating effect. The anterior aqueous humor was sampled. Experiment 2 (human): A conventionalintracameral injection (500 μg/mL) or BC flushing (33.3 μg/mL) was followed by sampling 0.1 mL of the anterior aqueous humor in six eyes each. High-performance liquid chromatography was performed to determine antibiotic levels.
RESULTS:
Experiment 1: The antibiotic concentration in the anterior chamber was 33.0 μg/mL (99.0 % was displaced). The area behind the IOL was not effectively irrigated without inserting the cannula tip.
Experiment 2: The final antibiotic concentration was 152.3 μg/mL using the conventional method and 29.4 μg/mL using the BC flushing (88.3 % was displaced).

CONCLUSION:
BC flushing technique enables surgeons to completely displace the anterior chamber including the posterior IOL surface, resulting in effective irrigation and a stable antibiotic concentration in virtually all cases.

Am J Ophthalmol. 2005 Sep;140(3):497-504.

Intracameral Vigamox (moxifloxacin 0.5%) is non-toxic and effective in preventing endophthalmitis in a rabbit model.

Kowalski RP, Romanowski EG, Mah FS, Yates KA, Gordon YJ.

Source

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Abstract

PURPOSE:
To determine whether Vigamox (moxifloxacin 0.5% ophthalmic solution) can be safely injected intracamerally to prevent Staphylococcus aureus endophthalmitis in a rabbit model.
DESIGN:
Animal study.

METHODS:
The safety and bactericidal-effectiveness of Vigamox were evaluated in three stages using 189 New Zealand White rabbits. (Stage 1) The toxicity of two intravitreal doses of Vigamox (moxifloxacin 500, 250 microg) was compared with vancomycin (1 mg) and saline. (Stage 2) A reproducible rabbit model of Staphylococcus aureus endophthalmitis was established. (Stage 3) The bactericidal effect of intracameral Vigamox (moxifloxacin 500, 250, 125, 50 microg) was compared with vancomycin (1 mg) and saline. Intracameral antibiotic therapy commenced immediately after Staphylococcus aureus intravitreal challenge (5000 cfu). Toxicity was evaluated by masked clinical examination using a slit-lamp, an indirect ophthalmoscope, and corneal-ultrasound pachymetry. The clinical examination included the exterior eye, cornea, anterior chamber, vitreous, and retina. The presentations were graded on a severity scale of 0, 0.5, 1, 2, and 3. The bactericidal efficacy was determined using intracameral colony counts.
RESULTS:
In the toxicity studies without bacterial challenge, the clinical scores of rabbits injected intracamerally with Vigamox were statistically equivalent to rabbits given intracameral vancomycin or saline. In the efficacy studies, eyes treated intravitreally with Vigamox, at all doses, or vancomycin were negative for Staphylococcus aureus and nontreated controls remained culture-positive.
CONCLUSIONS:
Vigamox appears to be nontoxic for intracameral injection and effective in preventing experimental endophthalmitis in the rabbit model. Further studies will determine the clinical role of intracameral Vigamox for surgical prophylaxis and postoperative therapy.

Comment in

- Intracameral Vigamox (moxifloxacin 0.5%) is not effective in preventing endophthalmitis in a rabbit model. [Am J Ophthalmol. 2006]

J Cataract Refract Surg. 2008 Sep;34(9):1451-9.

Evaluation of the safety of prophylactic intracameral moxifloxacin in cataract surgery.

Lane SS, Osher RH, Masket S, Belani S.

Source

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Abstract

PURPOSE:
To evaluate posterior and anterior segment safety of an intracameral injection of moxifloxacin 0.5% ophthalmic solution as prophylaxis for endophthalmitis in patients having cataract surgery.

SETTING:
Three private practices, the University of Minnesota School of Medicine, Stillwater, Minnesota, and the University of Cincinnati, Cincinnati, Ohio, USA.

METHODS:
In this prospective randomized combined-center open-label trial, 57 eyes of 47 patients were treated with intracameral moxifloxacin (250 mug/0.050 mL) or an equal volume of balanced salt solution at the conclusion of cataract surgery with intraocular lens implantation. Safety parameters, including visual acuity, intraocular pressure, endothelial cell counts, corneal pachymetry, corneal clarity and edema, and anterior chamber cells and flare, were evaluated preoperatively and for 3 months postoperatively.

RESULTS:
Optical coherence tomography results showed no statistically significant differences between the 2 treatment groups preoperatively or at 3 months. There were also no statistically significant differences between the 2 treatment groups in all other parameters preoperatively or at 1 day, 2 to 4 weeks, or 3 months. No study-related adverse events occurred.

CONCLUSION:
There was no increased safety risk associated with a 250 mug/0.050 mL intracameral injection of moxifloxacin, which appears to be safe in the prophylaxis of endophthalmitis after cataract surgery.