The controversy over the off-label use of topical antibiotics and the ability of pharmaceutical companies to promote such uses has dominated the ophthalmic literature recently. The sweeping decisions by two major pharmaceutical companies to drastically reduce sampling of two of the most commonly prescribed fourth-generation fluoroquinolones (moxifloxacin HCl 0.5% [Vigamox; Alcon Laboratories, Inc.] and gatifloxacin ophthalmic solution 0.5% [Zymaxid; Allergan, Inc.]) created a firestorm in the ophthalmic world. Many eye care specialists must now reevaluate their choice of preoperative antibiotic to balance the higher cost of fourth-generation fluoroquinolones (without samples) against the debatable efficacy of older, less costly generic alternatives.

The use of topical antibiotics to minimize the risk of endophthalmitis after cataract surgery has been a troublesome topic in the ophthalmic literature for years. The difficulty of studying such a rare disease (range of reported incidence, 0.04%-0.5%1-4) is well documented, with povidone-iodine’s being the only evidence-based standard accepted for prophylaxis.5 The top question still regards how effective preoperative antibiotic therapy is in cataract surgery for the prevention of postoperative infection. Although no topical medication is FDA approved for the prophylaxis of endophthalmitis, the 2007 ASCRS survey indicated that 91% of cataract surgeons perioperatively use a topical antibiotic, with an overwhelming 81% choosing a fourth-generation fluoroquinolone.6 Whereas the debate in other specialties focuses on the need for prophylactic antibiotics in uncomplicated surgeries, the controversy in the ophthalmic community has instead centered on the timing and delivery of prophylaxis. This article explores the most common preoperative and perioperative off-label uses of topical and intracameral antibiotics in cataract surgery.

**TOPICAL ANTIBIOTICS**

Although most cataract surgeons seem to prefer a fourth-generation fluoroquinolone, the antibiotic used, the frequency of dosing, and when therapy is initiated varies among physicians. Several studies have shown that moxifloxacin 0.5% and gatifloxacin 0.3% achieve high penetration into the anterior chamber, at least four times higher than previous generations of fluoroquinolones.

“Complicating matters, a review of the literature suggests that not all fourth-generation fluoroquinolones have the same properties.”

**BY LISA M. NIJM, MD, JD**

*The only topic not under debate is whether to use these agents prophylactically.*
lones. These modern agents are widely used for prophylaxis in cataract surgery. In addition, a newer fluoroquinolone, besifloxacin 0.6% (Besivance; Bausch + Lomb) was specifically designed for ophthalmic use (there is no systemic counterpart) and has gained acceptance as another topical antibiotic used off label for cataract surgery. Some studies suggest beginning antibiotic prophylaxis 1 to 3 days prior to cataract surgery, whereas others indicate that usage on the day of surgery may be equally effective.

Complicating matters, a review of the literature suggests that not all fourth-generation fluoroquinolones have the same properties. For instance, a recent study found the aqueous penetration of moxifloxacin 0.5% to be 38 to 50 times greater than that of besifloxacin 0.6%. Another study suggested that none of the three fourth-generation fluoroquinolones would be therapeutically effective in the aqueous humor against the drug-resistant staphylococcal isolates most frequently identified in recent cases of postoperative endophthalmitis.

INTRACAMERAL ANTIBIOTICS

The perioperative intracameral injection of antibiotics is an alternative to topical administration. In 2006, the ESCRS released data from its multicenter, prospective, randomized study showing that intracameral ceftuxime greatly lowered the rate of endophthalmitis after cataract surgery compared with topical antibiotics alone. The study was faulted, however, for its high rate of endophthalmitis in the control group and its use of topical levofloxacin, which was started on the day after surgery instead of a fourth-generation fluoroquinolone initiated preoperatively.

Nonetheless, the ESCRS study reopened discussion of yet another off-label use of antibiotics in cataract surgery. According to the 2007 ASCRS survey, most US surgeons do not use intracameral antibiotics, but 82% would likely do so if a reasonably priced commercial preparation became available. In theory, the advantages of intracameral antibiotics include ease of delivery, fewer problems with patients’ compliance, and the ability to achieve a much higher concentration of the antibiotic intraocularly at the time of surgery. Given that there is no standard FDA-approved intracameral antibiotic preparation, however, surgeons have expressed concern over which antibiotic to use, potential intraocular toxicity, and proper concentration.

CONCLUSION

Despite the lack of approved antibiotics specifically for endophthalmitis prophylaxis, many ophthalmologists continue to use antibiotics prophylactically during cataract surgery. Their decision is supported by the relatively low incidence of endophthalmitis in the United States as well as numerous studies suggesting that the preoperative use of antibiotics, especially in combination with povidone-iodine, greatly reduces the concentration of conjunctival flora, presumed to be the primary source of bacteria for this sight-threatening complication.

The timing and delivery of prophylaxis remain controversial. Off-label use, by definition, does not allow for one standard set of practices. Cost-conscious ophthalmologists have been caught in the shift in pharmaceutical companies’ sampling policies. Surgeons are looking for alternative methods by which to achieve efficacy similar to that of topical fourth-generation fluoroquinolones while relying less on patients’ compliance and ability to afford the topical medication. The future of antibiotic prophylaxis for cataract surgery hinges on the FDA’s, pharmaceutical industry’s, and physicians’ working together to determine the most effective, cost-efficient method of preventing endophthalmitis after cataract surgery.

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