

UPDATE ON INTRACAMERAL ANTIBIOTICS



Recent evidence indicates a shift in the standard of care.

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ANTIBIOTIC PROPHYLAXIS OF POSTOPERATIVE ENDOPTHALMITIS AFTER CATARACT SURGERY: RESULTS OF THE 2021 ASCRS MEMBER SURVEY

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Industry support: None

ABSTRACT SUMMARY

Chang and Rhee surveyed 1,200 ASCRS members who perform cataract surgery to explore the utilization and safety of intracameral (IC) antibiotics for prophylaxis against endophthalmitis following cataract surgery. Sixty-six percent of respondents reported using IC antibiotics, a notable increase from the 2014 (50%) and 2007 (30%) surveys.^{2,3} Fewer respondents (82%) reported using perioperative topical antibiotic prophylaxis in 2021 compared to prior surveys (90% in 2014 and 91% in 2007). The antibiotic of choice shifted further toward moxifloxacin (73%) in lieu of cefuroxime (19%) and vancomycin (6%) compared to preferences found by the 2014 survey (33% moxifloxacin, 26% cefuroxime, 22% vancomycin). Most users (95%) reported injecting antibiotics into the anterior chamber rather than performing transzonular or pars plana intravitreal injections or running antibiotics through the irrigating solution.

Complications were reported by 5% of surgeons using compounded IC antibiotics and 5% of those using

STUDY IN BRIEF

► A recent survey of ASCRS members found that the number of surgeons (66%) using intracameral (IC) antibiotics to prevent endophthalmitis after cataract surgery increased compared to previous surveys by the organization. The rate of reported complications was low. Moxifloxacin was the antibiotic preferred by most of the respondents. Compared to the results of earlier surveys, the use of topical antibiotic prophylaxis, preoperative drops, IC vancomycin and cefuroxime, and antibiotics run through irrigation lines decreased.

WHY IT MATTERS

Topical antibiotics have been a mainstay of endophthalmitis prophylaxis after cataract surgery. The only available level 1 evidence supporting the use of either topical or IC antibiotics found that the latter were more effective for prophylaxis.^{4,5} IC antibiotics are neither approved by the FDA nor commercially available in the United States. Recent studies, however, have demonstrated their efficacy. The ASCRS survey suggests that cataract surgeons in the United States and abroad may be taking this evidence into consideration. The survey also demonstrated increasing acceptance and utilization of IC antibiotics for endophthalmitis prophylaxis after cataract surgery.

antibiotics mixed in the OR. The most common complications were toxic anterior segment syndrome and corneal injury.

DISCUSSION

In 2003, a landmark ESCRS study provided level 1 evidence supporting the efficacy of IC antibiotic prophylaxis in cataract surgery.⁴ Since then, several large, retrospective cohort studies (that cumulatively include millions of eyes) have also demonstrated

the efficacy and relative safety of IC antibiotic prophylaxis.⁶⁻¹³

The 2021 survey study of ASCRS member cataract surgeons reveals a growing interest in and utilization of IC antibiotics for endophthalmitis prevention. Reporting bias may be a concern, but 66% of survey respondents reported actively using IC antibiotics and 93% of respondents reported that they would use IC antibiotics if an FDA-approved drug were commercially available.

ENDOPHTHALMITIS PROPHYLAXIS FAILURES IN PATIENTS INJECTED WITH INTRACAMERAL ANTIBIOTIC DURING CATARACT SURGERY

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Industry support: None

ABSTRACT SUMMARY

A retrospective clinical cohort study evaluated 216,141 patients who received IC antibiotics at the time of cataract surgery at a single hospital system. Patients received either IC moxifloxacin or cefuroxime.

The rates of endophthalmitis and reasons for prophylaxis failure were examined. Endophthalmitis rates in the two groups (0.02% in the moxifloxacin group vs 0.013% in the cefuroxime group, difference not statistically significant) were equivalent.

STUDY IN BRIEF

► In a retrospective cohort study, the rate of endophthalmitis was low among the 216,141 eyes that received intracameral (IC) antibiotic prophylaxis during cataract surgery. Prophylaxis failures in the group treated with moxifloxacin were more common with sensitive strains of bacteria and associated with a large anterior chamber volume. Prophylaxis failures in the group treated with cefuroxime were more common with resistant strains of bacteria.

WHY IT MATTERS

The study demonstrated the efficacy of IC moxifloxacin and cefuroxime. IC injections of larger volumes of adequately diluted moxifloxacin may be superior to injections of smaller, more highly concentrated volumes owing to the drug's concentration-dependent mechanism.

Most culture-positive failures in the moxifloxacin group were caused by bacteria sensitive to moxifloxacin whereas most failures in the cefuroxime group were caused by resistant strains. The failure of moxifloxacin prophylaxis was more common in eyes with large postoperative pseudophakic anterior chamber volumes (estimated based on preoperative biometric measurements).

Shorstein and colleagues suggested that the failure of moxifloxacin prophylaxis might have been the result of a dilution effect in large anterior chambers and the injection of insufficient concentrations of the drug. They therefore recommended injecting a higher volume (0.5 mL) of 0.1% or 0.15% IC moxifloxacin to approximate replacement of the entire pseudophakic anterior chamber. The investigators suggested that this dosage is likely to have adequate bactericidal activity and minimize corneal toxicity.

DISCUSSION

The failure of moxifloxacin prophylaxis was more common in eyes with large anterior chambers, consistent with the drug's concentration-dependent mechanism of bactericidal activity. A mathematical model of an IC injection of 0.4 mL of moxifloxacin (150.0 µg/0.1 mL) demonstrated bactericidal aqueous concentrations against the most resistant known strains of coagulase-negative staphylococci and methicillin-resistant

Staphylococcus aureus for the first 10 to 12 hours after administration and against methicillin-susceptible *S aureus* for more than 29 hours.¹⁵⁻¹⁷ Comparable in vivo studies have suggested that the frequent pre- and perioperative topical administration of moxifloxacin does not reach comparable aqueous concentrations and likely is not effective against highly resistant strains.¹⁸⁻²⁰ Cefuroxime and vancomycin, in contrast, have a time-dependent bactericidal mechanism. The same models suggested that the antibiotics maintain bactericidal activity against these highly resistant strains for only half the amount of time as sufficient IC concentrations of moxifloxacin.

The available evidence indicates that IC antibiotics are a successful method of prophylaxis against endophthalmitis after cataract surgery, cefuroxime and moxifloxacin are both highly effective, and moxifloxacin has the potential to reach its maximal efficacy when a sufficient concentration and dosing frequency are used.¹⁴ ■

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