

Examining the Effectiveness of Preoperative Topical Antibiotics

Knowing when to administer the antibiotic is important for the prevention and treatment of infectious ocular diseases.

BY LEAH D. FARR, ASSOCIATE EDITOR

Although there has been little study on the efficacy of antibiotics for the prevention of postoperative endophthalmitis, more than 90% of ophthalmologists routinely use anti-infectives in the perioperative period to avoid potentially visually devastating infections.¹ The theory behind this widespread practice is that by reducing or eliminating bacteria from the ocular surface prior to surgery or intravitreal injection, few bacteria will remain in the surgical field, thereby decreasing the likelihood of inoculation into the anterior chamber at the time of surgery.

Previous studies have shown that applying topical antibiotics for 3 days prior to surgery is more effective in eliminating surface bacteria than a 1-hour preoperative application, even with concomitant use of povidone-iodine.²

It is important for physicians to know how the various application times have an impact on the effectiveness of a topical antibiotic. Armed with this information, they can perform surgery or administer intravitreal injections with confidence.

GATIFLOXACIN

Christopher Ta, MD, and colleagues from Stanford University, examined the use of gatifloxacin (Zymar; Allergan, Irvine, CA) in 60 patients who underwent unilateral intraocular surgery at Stanford University Hospital's Ambulatory Surgery Center between June 2006 and February 2007. Dr. Ta examined the rates of

It is important for physicians to know how the various application times have an impact on the effectiveness of a topical antibiotic.

conjunctival ocular flora in the patients and found a reduction when gatifloxacin was administered at either 1 day or 1 hour preoperatively.³

METHOD

Researchers obtained bilateral cultures for all patients prior to any treatment (T0). Patients were then instructed to instill gatifloxacin 0.3% four times a day for 1 day prior to their surgery date in the surgical eye only. A second culture was collected from both eyes preoperatively (T1). Researchers followed up with three doses of gatifloxacin administered topically in both eyes 5 minutes apart, with a 45-minute washout period to allow the drug to diffuse out of the eye. The final culture was collected in both eyes when the surgical eye had received 1 day of preoperative topical gatifloxacin, and the nonsurgical eye had received 1 hour of treatment (T2).

Culture swabs were then inoculated onto sheep blood agar plates and SeptiChek (BD, Franklin Lakes, NJ) culture broth incubated at 37°C for 5 days.

DATA FINDINGS

Dr. Ta and colleagues found that the 1-day application of topical gatifloxacin (0.3%) caused a dramatic decrease in the number of positive bacterial cultures (from 66% to 28% [$P < .0001$] and 45% to 12% [$P = .0001$] for SeptiChek and blood agar media, respectively). When comparing surgical and nonsurgical eye cultures collected at the T1 time point, following 1-day gatifloxacin use in the surgical eye and no antibiotic use in the nonsurgical, the percentage of positive cultures in the treated eye was significantly smaller (28% vs 60% [$P = .0009$] for SeptiChek measurements and 12% vs 32% [$P = .0148$] for blood agar cultures).

It does not appear that 1-day gatifloxacin use was enough time to have an impact on more virulent organisms among the ocular flora.

Furthermore, 1-hour (three doses) application was also effective in significantly eliminating conjunctival flora. Positive bacterial cultures decreased from 60% to 37% ($P = .0176$) for SeptiChek and 32% to 13% for blood agar media.

The combination of 1-day/1-hour application decreased positive bacterial cultures from 67% to 18% ($P < .0001$) and from 45% to 7% ($P < .0001$) for SeptiChek and blood agar cultures, respectively. When compared with 1-hour-only dosing, combined dosing showed significantly smaller positive cultures (18% vs 37%).

It does not appear, however, that 1-day gatifloxacin use was enough time to have an impact on more virulent organisms among the ocular flora.

MOXIFLOXACIN

In a similar study of the effectiveness of 1-day versus 1-hour moxifloxacin treatment (Vigamox; Alcon Laboratories, Inc., Fort Worth, TX and Avelox; Bayer HealthCare, Leverkusen, Germany), Dr. Ta and colleagues found that at least 1 day of preoperative dosing was needed for effective kill time.⁴

Cultures were collected from 60 patients (120 eyes) at T0, T1, and T2 and inoculated into blood agar, chocolate agar, and SeptiChek for 3, 7, and 5 days, respectively. Eyes that received moxifloxacin 1 hour prior to surgery showed 38% (blood agar), 53% (SeptiChek), and 35% (chocolate agar) rates of bacteria on the ocular surface. In comparison, eyes that had received both the 1-day/1-hour treatments had 17%,

32%, and 22% rates of bacteria for the same cultures, respectively.

From this information, researchers concluded that the application of topical moxifloxacin 1 hour preoperatively is less effective than a 1-day application for killing conjunctival bacterial flora.⁵

CONCLUSION

When considering an administration schedule for their patients, surgeons should be aware of which type of topical preoperative antibiotics they are using. Although a 1-hour application of gatifloxacin appears to be as effective as a 1-day treatment for patients undergoing intraocular surgery, this is not the case for topical moxifloxacin—which requires at least 1-day preoperative dosing to be effective.

Knowing when to administer the antibiotic is important in the prevention and treatment of ocular infectious diseases, especially if the doctor is unsure of patient compliance before intravitreal injections. ■

Christopher Ta, MD, is Associate Professor and Director of Residency Program at Stanford University. He may be reached at cta@stanford.edu.

1. Masket S. Preventing, diagnosing, and treating endophthalmitis. *J Cataract Refract Surg.* 1998;24:725-726.
2. Ta CN, et al. Prospective randomized comparison of 3-day versus 1-hour preoperative ofloxacin prophylaxis for cataract surgery. *Ophthalmology.* 2002;109:2036-2040.
3. Moss JM, Lui YI, Nguyen D, et al. Prospective comparison of 1-day versus 1-hour preoperative topical gatifloxacin prophylaxis for intraocular surgeries. Presented at the Annual Association for Research and Vision in Ophthalmology (ARVO), May 6-10, 2007. Fort Lauderdale, Fla.
4. Ta CN, Egbert PR, Singh K, et al. Prospective randomized comparison of 3-day versus 1-hour preoperative ofloxacin prophylaxis for cataract surgery. *Ophthalmology.* 2002;109:2036-2040.
5. Chan I, Dhath H, Paterno J, et al. Prospective comparison of 1-day vs 1-hour preoperative moxifloxacin prophylaxis for intraocular surgeries. Presented at the 2006 Annual Association for Research and Vision in Ophthalmology, May 1, 2006, Fort Lauderdale, Fla.

SHARE YOUR FEEDBACK

Would you like to comment on an author's article? Do you have an article topic to suggest?

Do you wish to tell us how valuable

Retina Today is to your practice?

We would love to hear from you.

Please e-mail us at letters@bmcctoday.com

with any thoughts, feelings, or questions

you have regarding this publication.