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Preparation of intracameral antibiotics for injection

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We recently reported a decreased rate of endophthalmitis with adoption of intracameral antibiotic injection.¹ As there are no commercially available preparations in the United States, antibiotic solutions must generally be compounded prior to injection. We describe our process for medication preparation.

One day prior to surgery, the pharmacist reviews each patient's updated allergy profile and, working under an approved policy and procedure, selects an appropriate antibiotic. Cefuroxime is our first-line agent. Moxifloxacin is substituted if there is a documented allergy to a cephalosporin or a potentially cross-reactive antibiotic in the penicillin or betalactam class. Vancomycin is reserved for patients who are also allergic to fluoroquinolones.

The antibiotics are prepared under a certified laminar airflow hood on the morning of surgery, conforming to the guidelines of the U.S. Pharmacopeial (USP) Convention for sterile compounding.² All medications and diluents for compounding are preservative-free. A 5 µm or smaller pore size filter needle is used to withdraw drugs into a syringe. The filter needle is replaced with a regular nonfilter needle before the diluted ingredients are transferred to subsequent containers.

Cefuroxime

A vial of cefuroxime 750 mg injectable powder is reconstituted with 7.5 mL sodium chloride 0.9%, USP (preservative-free normal saline [PF-NS]). Three milliliters (300 mg) of the resulting solution are then injected into an empty 30 mL sterile interior vial. To this, 27 mL of PF-NS are added, resulting in a final cefuroxime concentration of 1 mg/0.1 mL. The solution should be colorless and clear.

Moxifloxacin

One milliliter of ophthalmic moxifloxacin 0.5% (Vigamox) is injected into an empty 5 mL sterile interior vial. Moxeza 0.5% should not be substituted since it contains xanthan gum and sorbitol among other inactive ingredients. To this, 4 mL of sterile irrigating balanced salt

solution are added, resulting in a final solution of moxifloxacin 0.1%. The solution should have a clear straw color.

Vancomycin

A vial of vancomycin 500 mg powder is reconstituted with 10 mL PF-NS and labeled “Vancomycin Vial A, 50 mg/mL.” Two milliliters (100 mg) are withdrawn and transferred to an empty 10 mL sterile interior vial labeled “Vancomycin Vial B, 1 mg/0.1 mL.” Next, 8 mL BSS are added to Vial B, resulting in a final solution of vancomycin 1 mg/0.1 mL. The solution should be colorless and clear. The final patient vials, containing 1 mL aliquots of antibiotic, are labeled and refrigerated (4°C) until use.

Operating Suite

Under sterile conditions, the scrub technician draws up 0.2 mL of antibiotic into a 1 mL tuberculin syringe and then places an angled 27-gauge cannula for later use. Surgeons inject 0.1 mL of antibiotic into the anterior chamber through the paracentesis wound following stromal hydration. Additional antibiotic is injected if further hydration of the wound is necessary.

Antibiotic Choice

Cefuroxime has been the most extensively studied for its efficacy and safety in intracameral injection^{3,4} and is a cost-effective choice.⁵ Bacterial killing is time-dependent. Once compounded, cefuroxime should be refrigerated (4°C) and used within 7 days.⁶ Corneal edema and retinal toxicity have been reported with injection of 50 mg.⁷ We have not detected a single dilution error or adverse reaction in over 20 000 cases with a system of independent double-checks by pharmacy personnel.

Intracameral moxifloxacin has been less extensively studied but has a broad spectrum of coverage and has been shown to retain stability for at least 24 weeks when stored at 4°C.⁸ Bacterial killing is dose-dependent, which may have theoretical advantages in the aqueous turnover environment of the anterior chamber.^A Ease of preparation may reduce the risk for dilution errors. Moxifloxacin 0.5% has also been injected, undiluted, from the commercially available product (Vigamox).⁹

Routine vancomycin prophylaxis is discouraged by the Centers for Disease Control. For U.S. surgery centers in which on-site compounding is not feasible, contracting with pharmacies that adhere to USP, local, and federal guidelines and who undergo periodic inspection by an independent organization should reduce the risk for formulation errors and contamination.

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