

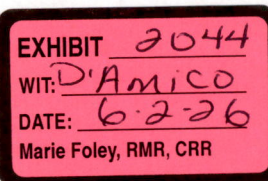
SHORT COMMUNICATIONS & CASE REPORTS

Cefuroxime dilution error

Yasar Sakarya¹, Rabia Sakarya²

¹Gozmer Eye Center

²Tekden Hospital, Denizli - Turkey



PURPOSE. To present clinical findings of a cluster of cases of inadvertent high-dose intracameral cefuroxime injection after uneventful phacoemulsification cataract surgery.

METHODS. Six eyes of 6 patients (mean age 68.33 years, range 61-75, 4 male, 2 female) were operated on the same day by the same surgeon. At the end of surgery, 3 mg in 0.1 mL cefuroxime (30 mg/mL, Zinnat, GlaxoSmithKline) was erroneously injected into anterior chamber of 6 eyes. Incorrect dilution of cefuroxime was noticed at the end of operation day.

RESULTS. The 6 patients were followed up very closely every day during the first week. No adverse reaction or inflammation was observed at postoperative examination. All patients achieved 20/20 or better vision at the end of the first week.

CONCLUSIONS. Inadvertent intracameral (3 mg in 0.1 mL) cefuroxime injection did not cause any detectable adverse effect on ocular tissues. (Eur J Ophthalmol 2010; 20: 460-1)

KEY WORDS. Cefuroxime, Endophthalmitis, Phacoemulsification

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INTRODUCTION

Endophthalmitis is one of the most feared complications of phacoemulsification cataract surgery. Despite povidone-iodine irrigation of conjunctival sac, anterior chamber fluid contamination rates ranging from 2.7% to 4% after routine phacoemulsification surgery have been reported (1). Irrigating conjunctival sac with 5% povidone-iodine solution, bolus intracameral antibiotic injection, adding antibiotic to irrigation solution, and subconjunctival antibiotic injection are popular measurements for endophthalmitis prophylaxis (2). Suggested doses of bolus intracameral antibiotic injection are for vancomycin 1 mg/0.1 mL (2), for cefuroxime 1 mg/0.1 mL (3), and for moxifloxacin 250 µg/ 0.05 mL (4). Inadvertent high-dose antibiotic injection following cataract surgery has been reported (5, 6). Here we report 6 cases of inadvertent intracameral high concentration (3 mg in 0.1 mL) cefuroxime injection.

Case report

Six eyes of 6 patients (mean age 68.33 years, range 61-75, 4 male, 2 female) were operated on the same day by the

same surgeon (Y.S.). Under topical anesthesia, standard phacoemulsification surgery with 2.8-mm incision was completed in all eyes without any complication. Single-piece hydrophilic intraocular lens (Model HQ201, Hexavision, France) was implanted with MonarchB (Alcon Labs, Fort Worth, TX) cartridge. At the end of surgery, 3 mg in 0.1 mL cefuroxime (30 mg/mL, Zinnat, GlaxoSmithKline) was erroneously injected into the anterior chamber of 6 eyes. Incorrect dilution of cefuroxime was noticed at the end of the operation day.

The 6 patients were followed up very closely every day during the first week. At postoperative day 1, slit-lamp findings included quiet anterior chamber, clear cornea without obvious edema, minimal Descemet stria, clear vitreous, no signs of toxic anterior segment syndrome, no pupil dilatation, intraocular pressure within normal range, no intraocular lens discoloration, no signs of iridocyclitis, and no cystoid macular edema. These findings did not change during the first week. All the patients achieved 20/20 or better vision at the end of the first week. After the first week, patients were examined at 1-week intervals for 1 month. All the patients were followed up for 6 months at 1-month intervals. There was no significant change in ocular findings in this period.

DISCUSSION

Inadvertent intracameral high concentration antibiotic injections have been reported (5, 6). Because of dilution-related error, Fry erroneously injected 5 mg/0.1 mL vancomycin instead of 1 mg/0.1 mL concentration in 3 eyes and reported no adverse effect postoperatively (5). Ha et al erroneously used subconjunctival mixture of gentamicin (20 mg/0.5 mL) and dexamethasone (2 mg/0.5 mL) for stromal hydration of corneal incision (6). In this case, after the mistake was recognized, the surgeon immediately irrigated anterior chamber and the patient achieved 30/40 visual acuity after 4 months.

Intracameral 1 mg/0.1 mL cefuroxime injection was found safe and effective in cataract surgery (3). In an in vitro study, dose-dependent toxicity of cefuroxime on cultured human corneal endothelial cell started at a concentration above 2.75 mg/mL (7). Anterior chamber volume after cataract surgery is 0.2 mL to 0.35 mL (4). In routine phacoemulsification surgery, immediately after intracameral injection of 1 mg/0.1 mL cefuroxime, anterior chamber cefuroxime concentration is 2.86 mg/mL to 5 mg/mL. This value is higher than the 2.75 mg/mL reported by Yoeruek et al (7). In our cases, intracameral 3 mg/0.1 mL cefuroxime injection yields approximately 8.6 mg/mL to 15 mg/mL cefuroxime concentration in anterior chamber. Assuming an aqueous

turnover rate of approximately 2 hours, these high initial antibiotic levels drop below 2.75 mg/mL concentration in 3 to 5 hours. In our cases, this concentration of cefuroxime did not cause any detectable adverse effect on ocular tissues.

The cause of this mistake was found to be that the boxes and the vials of 250 mg and 750 mg Zinnat (GlaxoSmithKline) were similar. Strict precautions and clear communication between nurses and surgeons are important to prevent such a mistake in preparation of dilution. Precise labeling of every injectable solution is mandatory in the operation room.

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Address for correspondence:
Yasar Sakarya, MD
Gozmer Eye Center
Hastane Caddesi No: 19/1 Denizli
Turkey
yasarsakarya@yahoo.com

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