INTRAOCULAR PENETRATION OF SYSTEMIC ANTIMICROBIALS FOLLOWING SCLERAL OR CORNEAL PENUMBRATING INJURY
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Purpose: To determine if penetrating injury can enhance intraocular penetration of systemic moxifloxacin, vancomycin, and ceftazidime.

Methods: 30 rabbits were divided into 3 antibiotic groups. In each group, 5 rabbits were used for scleral, and 5 for corneal laceration injury on right eyes. Left eyes served as controls without injury. Moxifloxacin 20 mg/kg, vancomycin 15 mg/kg, or ceftazidime 50 mg/kg was administered intravenously after injury. Eyes were later enucleated, frozen, and vitreous harvested. Intra-cardiac blood was collected. HPLC was performed to determine vitreous and plasma concentration of antibiotics.

Results: Intravitreal moxifloxacin was unchanged by injury (3.3 ug/ml) when compared to control eyes. It reached 47% to 51% of plasma concentration. MIC90 was achieved in vitreous against most common endophthalmitis-causing organisms. Intravitreal vancomycin levels were not enhanced by injury (0.2-0.4 ug/ml), compared to control eyes. It reached only 1-2% of plasma level, not sufficient for MIC90 of organisms commonly causing intraocular infection. Intravitreal ceftazidime was increased, 1.78 ug/ml (67% higher) and 1.50 ug/ml (73% higher) in scleral and corneal injury eyes, respectively, compared to control eyes. It reached 0.98% to 1.36% of plasma concentration and reached MIC90 of many gram-negative bacteria.

Conclusion: Intravitreal antibiotic penetration in eyes with penetrating injury varies depending on the antibiotics. For gram-positive bacteria-causing endophthalmitis from penetrating ocular injury, intravitreal injection is required when vancomycin is considered; whereas systemic administration can be used for moxifloxacin. Systemic ceftazidime can be used for many gram-negative bacteria, but intravitreal injection is recommended for better coverage, especially for more potent organisms.