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## Comparison of corneal and aqueous humor penetration of moxifloxacin, gatifloxacin and levofloxacin during keratoplasty

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**Introduction:** Achieving high antibiotic concentrations is important for preventing and treating postoperative infections. However, no study has simultaneously compared the achieved concentrations of moxifloxacin, gatifloxacin, and levofloxacin in the human cornea and aqueous humor. The authors therefore performed a randomized study to determine the concentrations of 0.5% moxifloxacin, 0.3% gatifloxacin, and 0.5% levofloxacin in the corneal tissue and aqueous humor after topical instillation in patients undergoing penetrating keratoplasty.

**Methods:** Patients who required penetrating keratoplasty were eligible for this study. The topical preparations of 0.5% moxifloxacin, 0.3% gatifloxacin, and 0.5% levofloxacin used in the study were preservative free (Japanese formulations). Patients were randomly assigned to one of three sequential drug groups, in which each drug was administered three times before surgery. In each administration cycle, the patients received two drops of each drug at 2-minute intervals. Samples of corneal tissue and aqueous humor were collected during surgery. The concentrations of each drug in the samples were determined by high-performance liquid chromatography.

**Results:** A total of 63 patients across eight centers in Japan were enrolled in the study. Overall, 61 corneal and 58 aqueous humor samples were evaluated. The concentration (mean  $\pm$  standard deviation) of moxifloxacin in corneal tissues was  $12.66 \pm 8.93$   $\mu\text{g/g}$ , which was significantly higher than that of gatifloxacin ( $4.71 \pm 3.39$   $\mu\text{g/g}$ ;  $P < 0.0001$ ) and levofloxacin ( $5.95 \pm 4.02$   $\mu\text{g/g}$ ;  $P < 0.0001$ ). The mean concentration of moxifloxacin in aqueous humor samples was  $1.40 \pm 1.17$   $\mu\text{g/mL}$ , which was significantly higher than that of gatifloxacin ( $0.65 \pm 0.80$   $\mu\text{g/mL}$ ;  $P = 0.0001$ ) and levofloxacin ( $0.89 \pm 0.86$   $\mu\text{g/mL}$ ;  $P < 0.05$ ). The sequence of drug administration did not significantly affect the results.

**Conclusion:** These results show that 0.5% moxifloxacin achieved superior ocular concentration than both 0.3% gatifloxacin and 0.5% levofloxacin.

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