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Molecular screening for the detection of intravitreal drug contamination

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Objectives: Intravitreal injections of drugs have potentially the chance of contamination, of which endophthalmitis is the most serious. We evaluate the safety of bilateral intraocular injections and introduce a molecular surveillance system to screen bacterial drug contamination using polymerase chain reaction (PCR).

Methods: Molecular bacterial screening has been performed on all patients receiving bilateral same-day intravitreal injections. The drugs left after injection were analyzed by 16S ribosomal DNA real-time PCR. The DNA extraction was performed with commercial kit. The primers used for amplification were BL-F (5'-TCC TAC GGG AGG CAG CAG T-3') and BL-R (5'-GGA CTA CCA GGG TAT CTA ATC CTG TT-3'). PCR was performed using microwell plated-based Real-Time PCR system. All reactions were performed in a final volume of 20 μL and under the constant cycling conditions: 10 minutes at 95°C, and 40 cycles of 5 seconds at 95°C, 10 seconds at 58°C and 10 seconds at 74°C per cycle. For the determination of detection limits of real-time PCR on drugs, 6 different level concentrations of six bacterial species were used.

Results: Out of 278 injections screened for bacterial contamination, no case was identified as a contamination by real-time PCR. The sensitivity of real-time PCR for molecular screening that was assessed for intravitreal drugs was 10 CFUs/mL or lower for all the six bacterial species(*S. aureus, S. epidermidis, S. pneumoniae, K. pneumoniae, E. coli, S. marcescens*).
Conclusions: Although no cases showed positive results on molecular bacterial screening, the use of bacterial screening on injected drugs might be useful for the safety surveillance and for the early detection and management of drug contamination-associated endophthalmitis.