

Assessing the Synergistic Potential of Antimicrobials for Bacterial Keratitis

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Introduction

An alarming increase in resistance to antimicrobials in bacterial keratitis has recently been described. We investigated *in vitro* synergy between antimicrobials currently in use to attempt to combat this.

Methods

Bacterial isolates were collected by the Microbiology Ophthalmic Group from patients with bacterial keratitis. We examined 10 *S. aureus* and 10 *P. aeruginosa* isolates for possible synergy using E-Test methodology. Isolates were spread onto media and E-tests of two antimicrobials, were crossed at the point at which the individual minimum inhibitory concentrations intersected. Plates were incubated overnight and experiments were done in duplicate. Combinations tested for *P. aeruginosa* isolates were; moxifloxacin and meropenem, meropenem and ciprofloxacin, ciprofloxacin and gentamicin and moxifloxacin and gentamicin. In addition teicoplanin was tested with ciprofloxacin, moxifloxacin and meropenem against *S. aureus* isolates. We then undertook checkerboard synergy experiments on selected isolates.

Results

Fractional Inhibitory Concentrations (FIC) were calculated from E-Test experiments; >4 =antagonistic, <4 to >1 =indifferent, >0.5 to <1 =additive, <0.5 =synergistic.

None of the isolates were antagonistic to any of the combinations. Additive and synergistic effects were seen to some combinations. Using the mean FIC combinations that were additive were; meropenem and ciprofloxacin for both *S. aureus* and *P. aeruginosa* and teicoplanin with meropenem/ciprofloxacin/moxifloxacin for *S. aureus*. All other combinations were indifferent. Checkerboard experiments thus far in selected isolates have reflected findings with E-Tests.

Discussion

We did not find any combination to be antagonistic. The combination with the lowest mean FIC was meropenem and ciprofloxacin for both microorganisms.