

Stenotrophomonas maltophilia Corneal Infection Post-penetrating Keratoplasty

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Immunocompromised eyes are more prone to atypical infections that may be resistant to current broad spectrum antimicrobials. The fluoroquinolone class of antimicrobial agents should be considered as first-line therapy for immunocompromised eyes. This report is of a patient with Stenotrophomonas maltophilia corneal ulcer post-penetrating keratoplasty.

Key Words: Corneal ulcer, Keratoplasty, penetrating, *Stenotrophomonas maltophilia*

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Introduction

Immunocompromised eyes are more prone to atypical infections that may be resistant to current broad spectrum antimicrobials. *Stenotrophomonas maltophilia*, the sole member of the genus *Stenotrophomonas*, is a non-fermentative gram-negative obligate aerobic bacillus. This microorganism is ubiquitous but will cause infection only in immunocompromised individuals or in debilitated patients such as elderly people, and patients in the intensive care unit, receiving mechanical ventilation, or undergoing prolonged hospital admission, and those with central venous catheters or malignant neoplasms.^{1,2} *S maltophilia* is an opportunistic ocular pathogen.

Case Report

A 62-year-old woman with bilateral macular corneal dystrophy had right penetrating keratoplasty with cataract extraction in 1994. Her preoperative vision was 1/60 and her postoperative vision improved to 6/12. She then underwent left penetrating keratoplasty in December 2004. Her left preoperative vision was counting fingers and her postoperative vision was 6/36.

Seven months after the operation to the left eye, the patient presented with a

painful left red eye of 1 day duration. She had been receiving long-term tapering steroid eye drops. The vision in her left eye had decreased to 6/60. At examination, conjunctival hyperaemia and a corneal ulcer of 2.0 mm by 1.5 mm were noted at the temporal mid-periphery of the graft. The anterior chamber had 3+ cells. She was admitted to hospital and treated with intensive topical ceftazidime and gentamycin. Corneal scraping was

performed. The culture result was available after 3 days and revealed the presence of *S maltophilia*, which was sensitive to ciprofloxacin and sulfamethoxazole/trimethoprim but resistant to ceftazidime, imipenem, and gentamycin.

The antimicrobial therapy was changed accordingly to ciprofloxacin given both orally and topically. Ceftazidime and gentamycin were stopped. The ulcer improved following fluoroquinolone treatment (Figure 1).

Discussion

The cells of *S maltophilia* are straight or slightly curved and non-sporulating. Their colonies are smooth, glistening white to pale yellow.¹ *Stenotrophomonas* spp was first described in 1960 when it was thought to be related to *Pseudomonas* spp. In 1983, the microorganism was classified to the genus *Xanthomonas* spp and has recently been reclassified as *Stenotrophomonas* spp.

In the hospital setting, *S maltophilia* multiplies in an aqueous environment particularly in respiratory secretions, urine, and intravenous fluids. Nosocomial infection by this microorganism is reported to

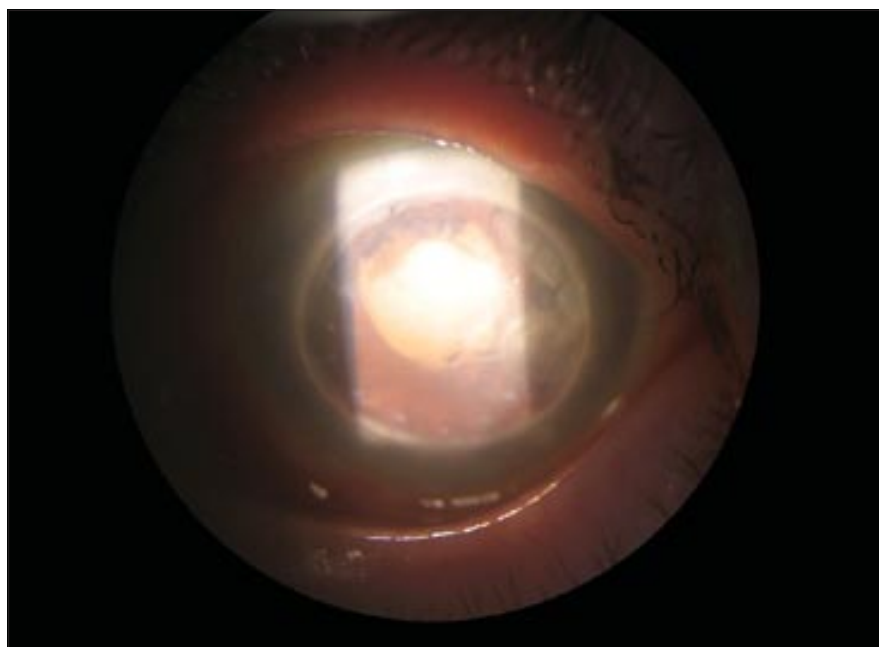


Figure 1. Corneal ulcer post-penetrating keratoplasty.

Stenotrophomonas maltophilia Post-penetrating Keratoplasty

be increasing. Systemic clinical manifestations include soft tissue infection, pneumonia, meningitis, urinary tract infection, endocarditis, postoperative wound infection, and septicaemia.²⁻⁴ Reported ocular infections by this microorganism include acute conjunctivitis, keratitis, infected scleral buckle, dacryocystitis, preseptal and orbital cellulites, and endophthalmitis, particularly after penetrating injury.⁵⁻⁷

Infected corneal graft ulcer is an uncommon but serious complication of keratoplasty, occurring in approximately 1% of patients.⁸ The most common causative microorganism is *Staphylococcus*.² Infection by *S maltophilia* is rare but can develop post-keratoplasty. Penland and Wilhelmus⁵ and Chen et al⁹ described ocular surface compromise and steroid use as predisposing factors in *S maltophilia* keratitis following penetrating keratoplasty.

Routine empirical antimicrobial therapy for infective keratitis such as the use of ceftazidime and gentamycin will not be suitable as *S maltophilia* is characterised by its resistance to many currently available broad-spectrum antimicrobial agents.¹ Penicillin, cephalosporins, and aminoglycosides are reported to exhibit poor activity against *S maltophilia*.¹ The primary reason for this microorganism's resistance is the presence of 2 chromosomal cephalosporinases that hydrolyse antibiotics. Only polymixin B and ciprofloxacin have been used with good results against *S maltophilia* ocular infections.^{5,6}

There has not been any reported use of the newer fluoroquinolones, gatifloxacin and moxifloxacin, for *S maltophilia*

ocular infections but they would be likely to have better activity than ciprofloxacin. This is because of their better ocular penetration and their ability to inhibit both DNA gyrase and topoisomerase IV, enzymes responsible for bacterial DNA synthesis, while ciprofloxacin primarily inhibits only DNA gyrase.

Steroid use post-penetrating keratoplasty predisposes the cornea to a wide range of infectious agents including atypical bacteria. Fluoroquinolones rather than cephalosporins or aminoglycosides will be better empirical treatment for corneal ulcers in an immunocompromised eye, in view of their broader spectrum and coverage against atypical gram-negative microorganisms.⁹ However, care must be taken to monitor the resistance of atypical microorganisms as emergence of new antimicrobial resistance is increasing in the hospital setting.¹⁰ Development of resistance against commonly used fluoroquinolones such as ciprofloxacin will make treatment of the already highly resistant *S maltophilia* more difficult.

With the increasing use of immunosuppressive therapy and the rise in incidence of AIDS, it is expected that ocular infections by opportunistic pathogens such as *S maltophilia* will become more frequent.⁵ It is worth considering the possibility of *S maltophilia* infection in these groups of patients.

These authors believe that the treatment regimen for infective keratitis following penetrating keratoplasty should include a fluoroquinolone, to cover atypical gram-negative microorganisms, if the infection occurs following steroid use.

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