

Multi-Resistant Enterococci and Morganella Morganii: A Rare Cause of Complicated Keratitis

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An eighty-five-year-old female presented with preexisting conditions of benign essential hypertension, dyslipidemia, chronic renal failure and diabetes mellitus type 2. She had gastroenteritis, pain and redness in right (blind) eye with corneal decompensation, scarring and right-eye corneal ulcer with hypopyon. Corneal scrapings sent for culture report revealed growth of Morganella Morganii and Enterococci. Corneal ulcer was successfully treated with topical and oral antibiotics.

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Infection of the eye with Enterococci is a rare condition, and it is extremely rare as a complication of gastroenteritis.

Enterococci are Gram-positive facultative anaerobes and have been documented as a cause of infective endocarditis, burn wound sepsis, meningitis, urinary tract infections and nosocomial infections. Ocular infections caused by Enterococci have been reported to cause endophthalmitis after cataract extraction, blebitis, keratitis after penetrating keratoplasty, seton implant and pupilloplasty¹⁻⁸. Isolated keratitis and conjunctivitis were also reported⁹⁻¹².

Morganella Morganii are Gram-negative bacilli belonging to the family Enterobacteriaceae, which is a pathogen of urinary tract infections¹³. It is found in the environment and as commensals in the intestines of human beings¹⁴. Our patient with corneal ulcer was culture positive to both organisms.

The aim of this report is to create awareness among clinicians and microbiologists that Enterococci and Morganella morganii, although uncommon, could cause complicated infections of the eye; a high index of suspicion is required.

THE CASE

An eighty-five-year-old female is a known case of hypertension, dyslipidemia, chronic renal failure, diabetes mellitus type 2, hyperuricemia and atrial fibrillation; she was admitted with the diagnosis of gastroenteritis. The patient complained of painful right eye with redness and discharge for one day. On examination, vision in right eye had no perception of light (it was a blind eye before), the patient had periorbital edema, diffuse ciliary injection, yellowish discharge, decompensated cornea with inferior old scar and 4x1 mm central corneal ulcer with hypopyon, see figure 1.

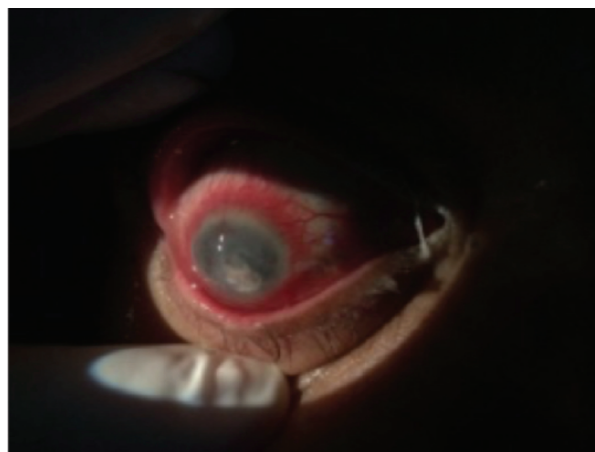


Figure 1: Yellowish Discharge, Periorbital Edema with Inferior Old Scar and 4x1 mm Central Corneal Ulcer with Hypopyon

She was diagnosed as right eye keratitis (corneal ulcer). No hypopyon was noted. Eye swab and corneal scraping was sent for culture and sensitivity. An empirical treatment including topical Gatifloxacin eye drops every hour with erythromycin ointment every six hours was initiated. The following day, hypopyon of 1 mm was noted. Vancomycin 25 mg/ml eye drops and fortified Ceftazidime 50 mg/ml eye drops were added every hour as progressive central corneal ulcer was seen. Oral Moxifloxacin 400 mg once a day was started as prophylaxis. Initially, Gram stain was negative, and PAS stain showed fungal filaments. Voriconazole, 1% eye drops every six hours was started. The culture revealed moderate growth of Morganella morganii and Enterococci, see tables 1 and 2. Eleven days following treatment, the corneal epithelial defect was reduced to 1 mm and hypopyon disappeared, see figure 2.

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Table 1: Antibiotics Sensitivity for Right Eye Swab Culture (Moderate Growth of *Morganella Morganii*)

Antibiotic	<i>Morganella Morganii</i>
Ciprofloxacin	Resistant
Amikacin	Sensitive
Piperacillin/Tazobactam	Sensitive
Ceftazidime	Sensitive
Ceftriaxone	Sensitive
Ampicillin	Resistant
Cefuroxime	Resistant
Trim/Sulfa	Resistant
Aztreonam	Sensitive
Moxifloxacin	Resistant
Levofloxacin	Sensitive

Table 2: Antibiotics Sensitivity for Right Eye Swab Culture (Moderate Growth of Enterococci)

Antibiotic	Enterococci
Ciprofloxacin	Resistant
Ampicillin	Sensitive
Vancomycin	Sensitive

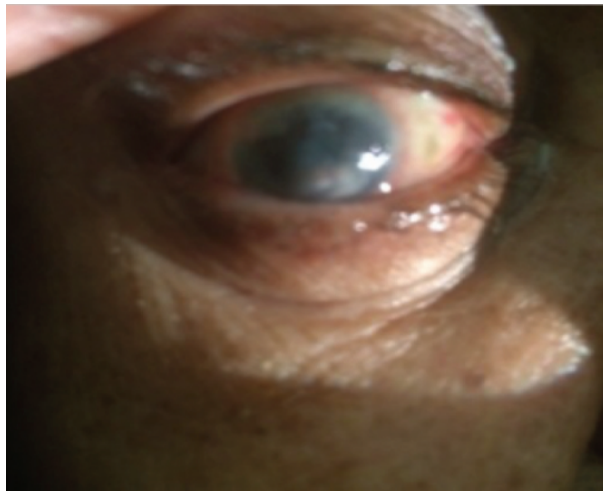


Figure 2: Corneal Epithelial Defect Reduced to 1 mm and Hypopyon Disappeared

DISCUSSION

Enterococci are Gram-positive facultative anaerobes. There are 12 different genera of Enterococci¹⁵.

The pathogenic mechanisms of *Enterococcus* infectivity are not well-understood¹⁵. Almost certainly, the pathogenicity of Enterococci lies in their capability to build up antibiotic resistance; multidrug resistance has made treatment of some *Enterococcus* infections a clinical challenge¹⁶.

To the best of our knowledge, two cases of enterococcal keratitis were reported in the literature: Polymicrobial keratitis

developed in a corneal graft and Vancomycin Resistant *Enterococcus* crystalline keratopathy in a corneal graft^{11,17,18}. *Enterococcus faecalis* is generally sensitive to vancomycin, whereas *Enterococcus Faecium* is associated with increasing vancomycin resistance¹⁵. Study of the ophthalmic use of antibiotics other than vancomycin for the treatment of enterococcal infection should continue because of increasing resistance to antibiotics¹⁹.

The overall incidence of Enterococcal infections has, in general, been on the rise for the last several decades^{20,21}.

Morganella morganii is a Gram-negative bacilli belonging to the family Enterobacteriaceae²². It was initially described in the late 1930s as a pathogen of urinary infections¹³. It originated in the environment and as commensals in the intestines of human beings¹⁴. It could cause urinary tract, skin and soft tissue infection, meningitis, bacteremia, ecthyma gangrenosum, spontaneous bacterial peritonitis, chorioamnionitis, septic arthritis and endophthalmitis. It is a rare cause of keratitis.

Our case was secondary to gastroenteritis. Falagas et al isolated *Morganella morganii* from 24 patients; 54% were from skin and soft tissue infections²². Kim et al found that *Morganella morganii* was the cause of opportunistic infection, especially in immune-compromised host²³. The majority of *Morganella morganii* infections are associated with postoperative wound and urinary tract infection. McDermott et al found that the risk factors for *Morganella morganii* were old age, the presence of concomitant bacteremia, hospitalization, recent surgery and concurrent antibiotic use²⁴. *Morganella morganii* could cause infection of hydatid cyst of the liver, neonatal sepsis, empyema, cerebral abscess and neck abscess²³⁻²⁶.

CONCLUSION

Ophthalmologists are encouraged to be aware of the potential risk of complicated mixed microbial keratitis from the environment, particularly in communities with high level of antimicrobial resistant reservoirs. Enterococci and *Morganella morganii* although uncommon cause of complicated infection, a high index of suspicion and coordination between clinicians and microbiologists is required in order to achieve a better outcome.

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