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CASE REPORT

Contact Lens-associated Keratitis by *Elizabethkingia meningoseptica*

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ABSTRACT

Elizabethkingia meningoseptica is a Gram-negative bacillus. It is known for causing neonatal meningitis and pneumonia, sepsis in case of immunocompromised patients. It can be found in hospital and natural environments. It may exist in freshwater, salt water, and soil. It was previously known as *Flavobacterium* and *Chryseobacterium meningosepticum*.

Contact lens-induced keratitis with *E. meningoseptica* which we are reporting is the second case report till date. It has striking resemblance with the case that was published earlier, with minimal difference in presentation, but significant difference in the antimicrobial sensitivity. Most importantly, we also found this infection in healthy individual with no underlying disease.

Thus, we strongly support the case report that was published earlier, and though rare, this microbe should be considered as potential pathogen for contact lens-related keratitis, and increasing resistance to the antimicrobial agents should also be kept in mind.

Keywords: Contact lens, *Elizabethkingia meningoseptica*, Keratitis.

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INTRODUCTION

Contact lens-related microbial keratitis is rising and is likely to cause severe, vision-threatening infections.[1] Bacterial keratitis is a vision-threatening contact lens complication. Corneal epithelial damage owing to hypoxia and minor trauma is equally important as bacterial adherence to the contact lens surface. Wearing soft contact lenses poses more risk than rigid gas-permeable and other types.[2,3] Wearing and sleeping with contact lens are the major risk factors. Infection occurs due to poor lens hygiene;[15] however, it may occur despite meticulous lens care and with daily disposable lenses.[2]

A contaminated contact lens case may act as a reservoir for microorganisms that may compromise contact lens wear and lead to sight-threatening events.[4]

Elizabethkingia meningoseptica (earlier known as *Flavobacterium meningosepticum* and then *Chryseobacterium meningosepticum*) is a nosocomial, nonfermenting Gram-negative bacillus with intrinsic resistance to many antibiotics, which are usually administered in intensive care settings.[5]

In addition, it carries many antimicrobial resistance genes, as well as has potential to form biofilms and survive in a moist environment or in water sources including tap water, making it an important organism in many intensive care environments.[6,7]

Elizabethkingia meningoseptica is a rare but serious cause of neonatal meningitis and sepsis, as well as an increasingly important pathogen in health care environments; its role as a cause of ocular pathology is not well known.[5]

However, single case of contact lens-related microbial keratitis with *E. meningoseptica* has been reported till date with many similarities with our case but significant difference in antimicrobial sensitivity testing.[8]

CASE REPORT

A 21-year-old female patient visited our hospital due to left ocular grittiness. She had been wearing soft contact lenses for 8 months, approximately 8 hours per day. She had no medical history of ocular injury, surgery, or treatment with either ophthalmic or systemic medications. On our initial examination, visual acuity was 6/6 in the right eye and 6/9 in the left eye. Slit-lamp examination revealed hyperemia of the left bulbar conjunctiva, two corneal epithelial defects sized 0.5 × 0.5 mm along with intrastromal infiltration, which was of same size as that of epithelial defect. However, neovascularization was absent. Corneal sensitivity was within normal limit. The lens, vitreous body, and retina were all normal.

The patient was treated as follows: Unpreserved moxifloxacin eye drop 0.3%, 2% homatropine three times a day, and 1% carboxymethyl cellulose six times a day.

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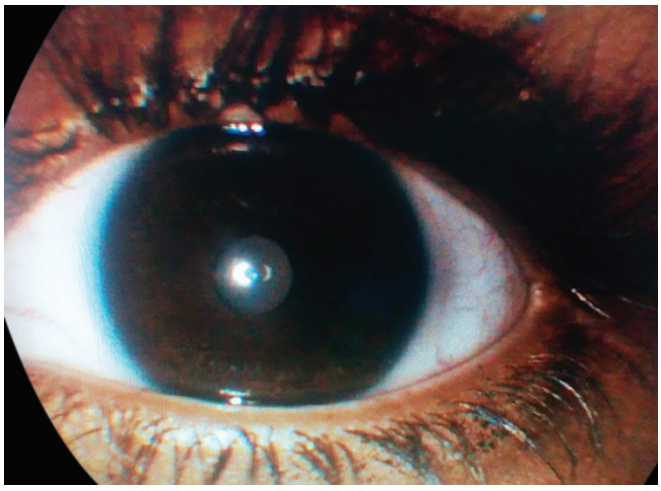


Fig. 1: Depiction of the remarkable improvement after 2 days of treatment

The patient was firstly examined at the peripheral center, so anterior segment photography and corneal scraping were not being performed.

Two days later, patient was called for the follow-up at our main tertiary care center. The contact lens and its case were then sent for bacteriological test.[16] Patient was symptomatically better. The corneal epithelial defect was nearly healed, and the corneal intrastromal infiltration was also decreased significantly (Fig. 1).

After the initial bacterial culture, bacteria were inoculated and cultured in MacConkey agar at an intermediate level, in specimens (Fig. 2A). Gram staining revealed pink rods suggestive of Gram-negative bacilli (Fig. 2B). *Elizabethkingia meningoseptica* was identified by using the VITEK 2 compact instrument (Biomerieux). *Elizabethkingia meningoseptica* was sensitive to fluoroquinolones, trimethoprim/sulfamethoxazole, but resistant to gentamicin, piperacillin/tazobactam, and amikacin (Table 1).

The patient was thus continued on moxifloxacin (0.3%) and 1% carboxymethyl cellulose four times a day. However, 2% homatropine was discontinued. Complete reepithelialization of the lesion was observed on the 7th day after treatment. After 2 weeks, the patient was being treated only with 1% carboxymethyl cellulose four times a day. Her final corrected visual acuity in the right eye was 6/6.

DISCUSSION

Elizabethkingia meningoseptica is found in hospital and natural environments, such as soil and seawater. In hospital settings, it is seen in water supplies, the saline solution, disinfectants, and medical devices. The bacterium is an aerobic, Gram-negative rod, and it may cause pneumonia and sepsis in immunologically compromised and postoperative adults.[9]

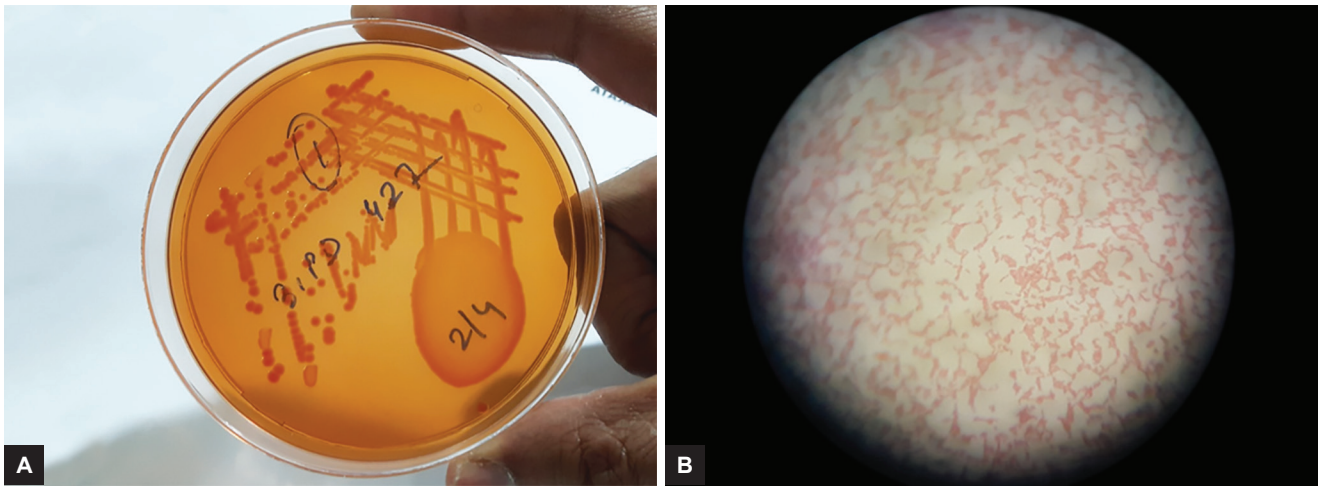
So far, only one case[8] of soft contact lens-related keratitis with *E. meningoseptica* as a sole cause with striking resemblance with our case has been reported.

Similarities include the young age group, healthy individual, history of prolong contact lens wear, epithelial erosion, and intrastromal infiltration; however, in our case, neovascularization of cornea was not observed, which was present in the earlier case.

Elizabethkingia meningoseptica was sensitive to ciprofloxacin, trimethoprim/sulfamethoxazole, levofloxacin, gentamicin, piperacillin/tazobactam, and amikacin in the earlier case; however, in our case, *E. meningoseptica* was sensitive to fluoroquinolones and trimethoprim/sulfamethoxazole, but resistant to gentamicin, piperacillin/tazobactam, and amikacin (Table 1).

Few cases of keratitis associated with *E. meningoseptica* have been described earlier.

In the first case, keratitis was caused by polymicrobial etiology, in which a 14-year-old cosmetic contact lens user presented with a paracentral corneal ulcer in her right eye. She had bought the contact lenses online. The cultures from corneal scrapings and contact lenses



Figs 2A and B: (A) Multiple colonies on MacConkey's agar; and (B) Gram stain showing Gram-negative bacilli

Table 1: Antibiotic sensitivity test

First-line antibiotic	Result MIC (μg/mL)	Interpretation
Ampicillin	≥32	Resistant
Gentamicin	≥16	Resistant
Nitrofurantoin	≥512	Resistant
Trimethoprim–sulfamethoxazole	40	Sensitive
Second-line antibiotics		
Amoxicillin clavulanate	≥32	Resistant
Piperacillin tazobactam	≥128	Resistant
Ciprofloxacin	0.50	Sensitive
Cefuroxime	≥64	Resistant
Ceftriaxone	≥64	Resistant
Cefoperazone sulbactam	32	Intermediate
Amikacin	≥64	Resistant
Imipenem	≥16	Resistant
Meropenem	≥16	Resistant
Supplemental antibiotics		
Nalidixic acid	8	Sensitive
Tigecycline	4	Intermediate

Specimen – Contact lens and contact lens case; aerobic culture: (method – colorimetric): Positive; organism: *E. meningoseptica*

showed heavy growth of *C. meningosepticum* and *Delftia acidovorans*. The treatment with topical ciprofloxacin and fortified gentamicin was effective, and the infection resolved with corneal scar after 5 weeks.[9]

The second case too had polymicrobial etiology, in which the patient presented with bilateral simultaneous infectious keratitis secondary to contact lens wear. In this case, a 21-year-old soft contact lens wearer visited the emergency department with a 3-day history of pain, redness, decreased vision, photophobia, and tearing in both eyes. On examination, a central corneal ulcer was identified with hypopyon in both eyes. The cultures from corneal scrapings of both eyes, the contact lenses, and the contact lens solution showed heavy growth of *Pseudomonas aeruginosa*, *Alcaligenes* species, and *F. meningosepticum*.[10]

The third case was posttraumatic keratitis caused by *Elizabethkingia meningosepticum*.

A 45-year-old woman presented with keratitis, which had developed following nonpenetrating eye trauma from a tree branch. Cultures from a corneal smear demonstrated heavy growth of *E. meningosepticum*. Patient responded well to combination of topical moxifloxacin and topical trimethoprim/polymyxin B. Corneal infection resolved within 2 months, but a central corneal scar and vascularization remained.[11]

In the fourth case, a 48-year-old man presented with a corneal ulcer in his right eye and was treated with ofloxacin and fortified bacitracin ophthalmic solution. Cultures grew *C. meningosepticum* and the infection resolved. Patient had no significant comorbidities.[12]

The fifth case had developed massive lipid keratopathy after *E. meningosepticum* keratitis.

A 52-year-old female presented with complaints of pain, redness, watering, and blurred vision in her left eye for 6 days. Patient already had undergone radiotherapy for mucoepidermoid carcinoma of the maxillary antrum, which was later complicated by radiotherapy-associated dry eye syndrome in her left eye. At the time of presentation, her best-corrected visual acuity was hand movements close to face in the left eye. Slit-lamp examination of the left eye showed a small infiltrate 1.4 × 1.2 mm in size with an overlying epithelial defect. *Elizabethkingia meningosepticum* was isolated on broth. Good clinical response was observed with hourly 5% vancomycin eye drops.

At the end of 8 weeks, slit-lamp examination of the left eye revealed a corneal scar with mild lipid deposition at the site of previous corneal infiltrate, which increased tremendously over the next 4 weeks.[13]

In our case, we observed ocular infection with *E. meningoseptica* in an eye with no significant comorbidities. We suspected the contact lens-induced keratitis; thus, microbiological examinations were performed on the contact lenses and the contact lens cases. The growth of *E. meningoseptica* was confirmed; this made it possible to ascertain that the contact lenses were the direct cause of keratitis. To the best of our knowledge, *E. meningoseptica* has been isolated exclusively only once in patients with contact lens-related microbial keratitis, in the past.

Contact lens-induced corneal hypoxia raises the chance of corneal infection by jeopardizing corneal epithelial integrity, affecting wound healing, and increasing binding of bacteria to corneal epithelial cells. Similarly, the use of contaminated saline solution, inappropriate management of the contact lenses, or direct contact with contaminated water increase the risk of corneal infection. Thus, proper lens hygiene should be maintained to prevent corneal infection. Contact lens users need to wash their hands before handling their lenses,[14] keep their lens cases clean at all times, replace their cases at regular intervals, and replace their soft contact lenses at least every 3 months.

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