Contact Lens-associated Keratitis by *Elizabethkingia meningoseptica*

**Manisha Kharbanda, Parag Bagad, Sunanda Dey**

**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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**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.
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. 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 case8 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 prolonged 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
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 meningoseptica 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.

Contact lens-induced keratitis with E. meningoseptica which we are reporting is the second case reported till date. It has got striking resemblance with the case that was published earlier,8 with minimal difference in presentation, but significant difference in 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.

### Table 1: Antibiotic sensitivity test

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

*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. meningoseptica. 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.

**References**

REFERENCES