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**Case Report**

# Atypical Contact Lens Related Corneal Ulcer Caused by *Pasteurella Multocida*

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**Abstract**

A 55-year-old healthy lady with history of regular contact lens (CL) use presented with 10 days history of progressive left eye blurring of vision, redness and pain. There was good CL hygiene practiced with no history of swimming, trauma or contact with domestic pets. Left eye vision was hand movement and right eye was 1/60, pinhole 6/18. On the left eye, there was a central, oval-shaped corneal infiltrate with an overlying large epithelial defect and stromal oedema, with significant anterior chamber cells and fibrin. B-mode ultrasound showed no vitritis. Intensive topical benzylpenicillin 10000iu/ml and topical gentamycin 1.4% hourly, homatropine 2% three times daily, oral doxycycline and oral ascorbic acid were started. The gram stain results showed gram positive cocci growth. Her ulcer improved with the treatment and preservative-free dexamethasone 0.1% once daily was commenced to reduce inflammation and scarring. Interestingly, culture was reported as *Pasteurella maltocida*, a gram negative bacilli sensitive to penicillin, and so treatment was continued until the ulcer completely healed. She had central corneal scarring with best corrected vision of 6/24 in the left eye but was not keen on further surgery to improve her vision. Although it has not been previously reported, *Pasteurella multocida* can cause CL related corneal ulcer with severe anterior chamber inflammation. This diagnosis should be considered even if there is trivial contact or no history of exposure to domestic animals.

**Keywords:** contact lenses, corneal ulcer, gram negative bacteria, infection, keratitis, *Pasteurella multocida*

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## Introduction

Corneal ulcer is a potentially sight-threatening infection, which may heal with scar formation or progress to corneal melting and endophthalmitis. Contact lens (CL) wear is a predisposing factor. In Malaysia, most CL related ulcers are caused by gram negative bacteria, most commonly Pseudomonas sp. We report here a rare case of contact lens related ulcer caused by *Pasteurella multocida*

## Case Report

A 55-year-old healthy Malaysian Chinese lady presented with progressive left eye blurring of vision for 10 days, associated with redness and pain. She was a CL wearer for -10.00 DS myopia and has been using monthly disposable CL for the past 3 years. Prior to this episode, she was using the same CL for over 1 month for more than 8 hours per day, although she was otherwise practicing good CL hygiene. She denied any history of swimming or trauma. There was no recent

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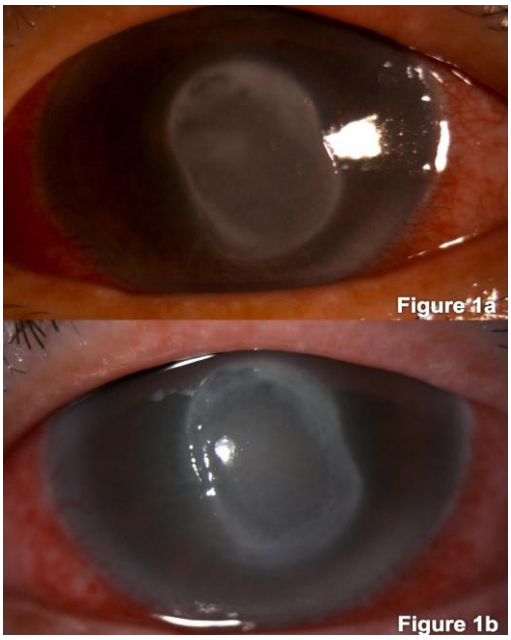


**Figure 1**: Anterior segment photograph showing: a) Central corneal infiltrate with large epithelial defect upon presentation; b) Epithelization of ulcer borders noted 4 days after initiation of treatment

travel or visits to farms. She does not own pets or had any recent contact with domestic animals.

On examination, visual acuity of her left eye was hand movement and the right eye was 1/60, pinhole 6/18. On the left eye, there was a central oval-shaped corneal infiltrate with well-demarcated margins, an overlying large epithelial defect and mild surrounding stromal oedema (Fig. 1a). Of note, there was no mucopurulent discharge, ring infiltrate, corneal melting or endothelial plaque. There was an anterior chamber cell of 3+ with fibrin and no hypopyon. The pupil was round with no posterior synechiae. There was no fundus view and B-mode ultrasound showed no vitritis. Both lens showed moderate cataract. The intraocular pressure was normal in both eyes, and examination of the right eye was unremarkable, other than presence of peripheral corneal pannus.

The corneal ulcer surface and margins were scraped and sent for gram staining and culture and sensitivity. The appearance of ulcer was suggestive of gram positive bacteria, hence intensive topical benzylpenicillin 10000iu/ml hourly, topical gentamycin 1.4% hourly, homatropine 2% three times daily, oral doxycycline 100mg daily and oral ascorbic acid 500mg daily were started. The gram stain results showed growth of gram positive cocci, negative for yeasts.

Her ulcer improved with the treatment and the edges of the ulcer had begun to epithelize (Fig. 1b). As the epithelial defect gradually reduced in size, her vision had improved to 3/60, pinhole 6/36(Fig. 2a). Topical preservative-free dexamethasone 0.1% once daily was commenced to reduce inflammation and scarring. Interestingly, culture came back as *Pasteurella maltocida*, a gram negative bacilli sensitive to penicillin, and so treatment was continued until the ulcer completely healed. She had central corneal scarring but was not keen on further surgery to improve her vision (Fig. 2b). Her best corrected vision was 6/24 in the left eye.

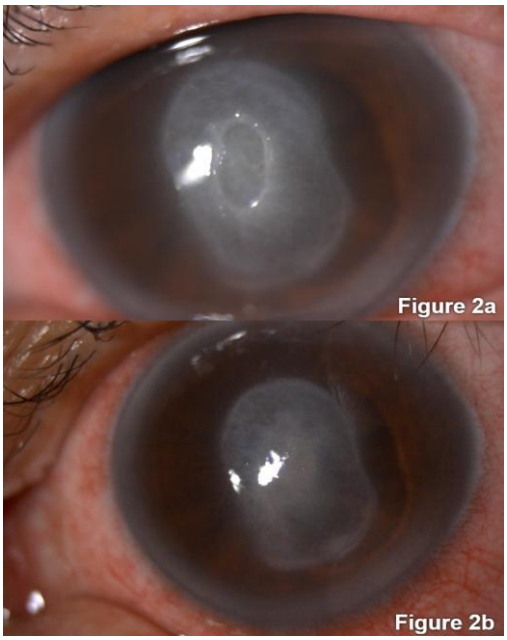


**Figure 2**: Anterior segment photograph showing: a) Further epithelization after two weeks of treatment; b) Resultant large central corneal scar upon completion of treatment.

## Discussion

With the increasing use of CL especially in developing countries, the incidence of corneal ulcers has risen. About 4-21 per 10 000 persons develop ulcerative keratitis as a result of both daily and extended wear disposable soft CL (1). CL use predispose to infection as it decreases tear distribution over the corneal surface and induces corneal hypoxia and epithelial necrosis (2).

Data from the National Eye Database (NED) has shown that CL related corneal ulcers have a female predominance, and that 78.9% of CL related corneal ulcers in Malaysia are caused by bacteria (3). Most of these bacteria are gram negative, *Pseudomonas* sp. being the most common. Other gram negative bacteria

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such as *Enterobacter sp*. and *Klebsiella sp.* have also been reported as causative organisms.

Atypically, our patient's cultures grew *Pasteurella multocida*. *Pasteurella sp*. is found as normal flora in upper respiratory and gastrointestinal tract of domestic animals (4). It is a non-motile and facultative anaerobic gram negative coccobacillus which is catalase and oxidase positive. Human infections caused by *Pasteurella* species are rare and are often associated with exposure to domestic cats and dogs.

Gram staining in this case identified presence of gram positive cocci, whereas the cultures grew gram negative coccobacilli. The commonest gram positive organism in CL related corneal ulcers are Staphylococci, although gram negative organisms are predominant (5,6). Similarly in Malaysia, gram positive organisms are less commonly cultured (3,7). Benzylpenicillin is a natural penicillin that is known to be effective against non-penicillinase producing staphylococcus, *Streptococcus pneumonia* and *viridans*, *Corynebacterium diphtheriae*, *Neisseria meningitidis* and *Pasteurella sp.* Benzylpenicillin was initiated in this case as the appearance of the ulcer on presentation was suggestive of gram positive causative bacteria. Gentamicin was started concurrently for cover against gram negative organisms.

Clinically, the patient responded to the combined treatment with topical benzylpenicillin and gentamicin and the dosage were tapered down. The results as reported by the bacteriology unit of our microbiology lab showed sensitivity to penicillin G, doxyxycline, ampicillin, amoxicillin/clavulanate and chloramphenicol. Once the culture results were obtained, the gentamicin was discontinued. The patient's ulcer continued to improve with healing of epithelial defect on topical benzylpenicillin monotherapy.

Cases in which gram stain results were dissimilar to culture results have been reported at a rate of 5% (8). Clinically assessing response to treatment administered is important, and repeated corneal scraping should be performed if no improvement is noted or if there is worsening.

Identification of *Pasteurella maltocida* from obtained samples is time consuming as the organism is fastidious and slow-growing. In this patient, identification of *Pasteurella multocida* took 13 days and was performed via the analytical profile index (API) test system where test strips of dehydrated substrates is rehydrated with bacterial suspension. The strips are incubated during which metabolism of the substrates produce color changes. These resultant colors are compiled to obtain a profile number and then matched to the bacterial species.

In the eye, *Pasteurella multocida* has been identified as a causative organism in cases of conjunctivitis, endophthalmitis and corneal ulcer (9). Most cases that have been reported are of corneal ulcers from non-penetrating, usually trivial contact with pet cats or dogs. Purcell and Krachmer and Weber et al. reported cases of *P. multocida* corneal ulcer after trivial contact of the ocular surface with a pet dog (9,10). Robinson et al. reported a case following baseball injury to the eye of a boy who owned a pet cat (11). In this case, saliva from the pet cat was cultured and was found to be positive for *Pasteurella multocida*. Similar to our patient's case, corneal ulcers with severe anterior chamber inflammation has also been reported (11,12). In all these cases, patients responded to medication from the penicillin group, namely methicillin, ampicillin and penicillin G, as well as chloramphenicol. No cases of *Pasteurella multocida* infections in the eye related to contact lens use have been reported in literature.

It has been hypothesized that trauma and contact with animals are important risk factors (10). Chronic contact lens use can alter epithelial metabolism and induce structural alterations to the corneal epithelium, causing epithelial microcysts formation and epithelial polymegathism (13). *Pasteurella multocida* is shown in animal studies to be virulent toward the cornea if the epithelium is not intact (11).

Hubbert et al. has found that in 31% of *Pasteurella multocida* infection cases, no obvious exposure to animals were found (12). *Pasteurella multocida* can disseminate through contaminated water and airborne spread, however it can only survive transiently in external environment.

Penicillin is commonly used in treating infections caused by *Pasteurella multocida*. This patient responded favourably to topical benzylpenicillin. Corneal cross-linking, topical autologous serum and amniotic membrane transplant have been used for corneal thinning and poorly healing epithelial defect in a severe case of *Pasteurella multocida* corneal ulcer (14). In our patient, the corneal ulcer healed well with a large central scar. Visual rehabilitation would require penetrating keratoplasty due to the nature of the resultant scarring.

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## Conclusion

*Pasteurella multocida* can cause CL related corneal ulcer with severe anterior chamber inflammation. This diagnosis should be considered even if there is trivial contact or no history of exposure to domestic animals.

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