Unilateral Acanthamoeba Keratitis following the Use of Cosmetic Contact Lens

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Colored lenses were first designed for patients with eye pathologies, such as aniridia or corneal opacity. However, in recent years they have become readily available over-the-counter as cosmetic accessories. Widespread use of these lenses has been noted among young adults. Acanthamoeba keratitis is a rare cause of corneal infection, which is associated with poor visual prognosis. Over the past ten years, improvements in the management of this infection have been documented, yet the best treatment is still primary prevention. Hence, contact lens wearers must be provided with proper instructions regarding contact lens hygiene.

We present a case of unilateral Acanthamoeba keratitis in a cosmetic contact lens wearer who presented with a month history of right eye pain, photophobia, redness and blurred vision. The contact lenses were obtained over the counter, and a history of poor contact lens hygiene was found. The patient was started on empirical treatment initially. The treatment was modified once the diagnosis was confirmed via Giemsa Stain of corneal scrapings, which showed Acanthamoeba cysts. The patient improved markedly and was discharged from the hospital. The disease classically has a slowly progressive, chronic course, with frequent remission periods. Our patient was lost to follow-up due to poor compliance and failure to adhere to guidelines.


THE CASE

A thirty-six-year-old female presented with severe pain, photophobia, blurred vision and redness of the right eye for one-month. A history of daily cosmetic contact lens use was obtained. The patient reported regular cleaning of the contact lenses with tap water. Prior to the presentation, she received antibacterial and antiviral treatment and topical prednisolone acetate 1% with no noticeable improvement.

Uncorrected visual acuity was 6/24 in the right eye and 6/6 in the left eye. Intraocular pressure was 16 in both eyes. Slit-lamp biomicroscopy of the right eye showed severe diffuse conjunctival injection, complete stromal ring infiltrate, corneal edema and a two-millimeter hypopyon, see figure 1 (A and B). The epithelium was intact. There was a 2+ anterior chamber reaction. A differential diagnosis of Acanthamoeba versus fungal stromal keratitis was made. Corneal scraping was performed and the contact lens case was submitted for culture and sensitivity. The patient was admitted. Corticosteroid and antiviral were discontinued and the patient was started on empirical treatment with topical fortified cefazidime 50 mg/mL and topical fortified vancomycin 25 mg/mL hourly in addition to oral voriconazole 200 mg twice daily.

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Giemsa stain showed Acanthamoeba cysts, see figure 2. The following anti-acanthamoeba treatment was initiated: Propamidine Isethionate 0.1% eye drops hourly while awake, chlorhexidine 0.02% eye drops hourly while awake, lubricant drops six times daily, erythromycin ointment at bedtime and oral voriconazole 200 mg twice daily, moxifloxacin hydrochloride 0.5% eye drops four times daily, as well as gatifloxacin 0.3% eye drops four times daily for the left eye. The patient had marked improvement. Clinically, the hypopyon disappeared completely after 72 hours and the frequency of propamidine isethionate 0.1% and chlorhexidine 0.02% was decreased to every two hours while awake and 1% topical prednisolone acetate was added.

Contact lens case culture was positive for Chryseobacterium indologenes and Streptococcus pneumonia on the right, and Acinetobacter baumannii and Pseudomonas aeruginosa on the left. As a result, moxifloxacin 0.5% hydrochloride eye drops three hourly were added for the right eye and gatifloxacin 0.3% eye drops four times daily for the left eye as prophylaxis. On day four, one-millimeter hyphema was observed on examination; it disappeared the following day.

During initial treatment, the patient underwent periodic epithelial debridement to maximize the drug penetration. Upon discharge, propamidine isethionate 0.1% and 0.02% chlorhexidine was reduced to three hourly while awake, oral voriconazole 200 mg twice daily, moxifloxacin hydrochloride 0.5% eye drops four times daily, as well as gatifloxacin 0.3% eye drops four times daily for the left eye. The patient failed follow-up. Five weeks later, she presented with reactivation of the disease due to poor compliance with the treatment. The patient was advised re-admission for intensive treatment; however, the patient refused and was lost to follow-up.

**DISCUSSION**

Acanthamoeba keratitis is uncommon; however, documented cases have shown that it is a potentially blinding corneal disease. The WHO estimated corneal ulcers to be responsible for 1.5 to 2.0 million new cases of monocular blindness every year. Early recognition and appropriate treatment are essential for restoring vision. The association between AK and concurrent contact lens use was first made in 1984. Eventually, a combination of predisposing factors was identified, such as corneal microtrauma, extended contact lens wear, wear of contact lens inside hot tubs, swimming pools or lakes; in addition to poor lens hygiene including the use of tap water to clean, disinfect and store the lens. Most of contact lens-related AK is seen in soft contact lens users.

The disease has a slowly progressive chronic course, with frequent periods of remission. The typical clinical presentation is severe pain, disproportionate to the signs, with superficial keratitis, which is often misdiagnosed as herpes simplex virus (HSV) keratitis, followed by radial keratoneuritis and ring infiltrates (commonly with an overlying epithelial defect) is observed. Therefore, an accurate direct microscopic examination of corneal scrapings is necessary to provide a rapid diagnosis before commencing initial antimicrobial therapy, which could be modified according to culture. Special stains such as calcofluor white and acidine orange have shown to be the most promising; however, they are time-consuming and require special microscopic filters. Hematoxylin and Eosin are quick, inexpensive stains readily available and could evaluate Acanthamoeba cysts by an experienced pathologist.

This form of keratitis is not only rare, but also one of the most difficult infections to treat because Acanthamoeba could exist in two forms: cysts and trophozoites, cysts are resistant to treatment. Therefore, anti-amoebic treatment must include the use of cysticidal agents. Most published studies recommend combination therapy, which is associated with increased cost, poor compliance and more side effects, such as epithelial toxicity. Furthermore, these medications are associated with poor corneal penetration; thus, periodic epithelial debridement is needed similar to our patient. The average duration of medical therapy is six months to ensure eradication of
organisms emerging from cysts. Recent studies have shown that antifungal drugs, such as voriconazole and natamycin and B-blockers, such as propranolol may possess antifungal properties\(^2,5,9\).

Our case was initially misdiagnosed with other types of microbial keratitis. Numerous patients with Acanthamoeba keratitis are misdiagnosed initially and receive treatment targeting more typical forms of infectious keratitis. Consequently, the diagnosis may be delayed if the prescribed topical antimicrobial or corticosteroid results in temporary symptom relief\(^2,6\).

In Bahrain, cosmetic contact lenses are readily available over-the-counter from various non-eye care retailers that do not offer eye examination, lens fitting and education regarding proper lens hygiene. Regulatory changes have been made in USA, United Kingdom, Canada and Australia classifying cosmetic contact lenses as medical devices, and thus preventing their distribution without a prescription or proper fitting by an eye care professional\(^3,10\). In addition, contact lens related complications are associated with considerable cost to the healthcare system\(^10\).

**CONCLUSION**

Acanthamoeba keratitis is a potentially sight-threatening infection resulting from unsafe contact lens use. Cleaning contact lenses with tap water rather than using the proper disinfectant solution is a major risk factor to develop Acanthamoeba keratitis. This could be avoided by proper patient education. The serious risks of improper contact lens use needs to be communicated to the public and we strongly advocated regulatory changes restricting the sale of contact lenses without proper consultation.

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