

Bilateral Acanthamoeba keratitis

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Abstract

Acanthamoeba keratitis is a rare eye infection commonly misdiagnosed as herpes simplex or fungal keratitis. Failure to include it in the differential diagnosis in any contact lens wearer with the typical features of an eye infection, results in a delay in the appropriate treatment with eventual complications and even blindness. This report describes the first case of bilateral Acanthamoeba keratitis ever reported in Malta, which occurred in a young female contact lens wearer.

Introduction

Acanthamoeba keratitis (AK) is a rare, acute sight-threatening infection of the cornea, caused by the Acanthamoeba species – an organism ubiquitously found in the environment.^{1,2}

Approximately 85% of cases are associated with the use of contact lenses.³ The initial symptoms are often nonspecific, with redness, tearing, disproportional excruciating pain, and photophobia being the most common

complaints.^{4,5} Corneal nerve infiltration and an immune ring are the typical signs of this infection.

Case Report

A 17-year old female (MB) presented at Mater Dei Hospital with redness in both eyes, photophobia, severely impaired vision and excruciatingly painful eyes. The patient denied any previous ocular trauma and was not on any steroid treatment before. MB also stated that she swam with the contact lenses three days prior presentation.

On examination, both eyes were watery but there was no discharge. A slit-lamp examination of the left eye revealed multiple abscesses while that of the right showed multiple abscesses with corneal oedema. Corneal scrapings which were carried out were negative for Gram stain and culture. MB was admitted, prescribed topical moxifloxacin 0.5% three times daily, topical dexamethasone 0.1% three times daily, ciprofloxacin 750mg twice

daily and timolol maleate 0.5% twice daily, for both eyes, together with oral fluconazole 200mg daily.

The following day both eyes showed corneal oedema with prominent corneal infiltration, multiple stromal infiltrates and abscesses, with minimal fluorescein uptake. A working diagnosis of bilateral fungal keratitis was made, and topical amphotericin B 0.1% was added on an hourly regime in addition to the previous medication. The patient was referred to a corneal specialist for an opinion who in addition, also noted bilateral corneal nerve infiltrates and an immune ring in the right eye. These findings changed the working diagnosis to bilateral acanthamoeba keratitis.

At this point, the topical dexamethasone was stopped and atropine 1% twice daily together with dibromopropamide 0.15% twice daily were added. In the meantime, propamide isethionate, 0.02% chlorhexidine and 0.02% polyhexamethylene biguanide were ordered from abroad as they are

unavailable locally. Corneal scrapings were repeated the next morning with the following being sent for investigation: one scalpel blade plus two fluid samples from the right eye, and two scalpel blades plus one fluid sample from the left (enough material was collected from one fluid sample). The results were positive for *Acanthamoeba polyphaga* in the right eye. No bacteria/fungi were grown.

After waiting for the medication to arrive from abroad (16 days following admission), MB was started on the standard treatment for bilateral acanthamoeba keratitis, i.e. topical 0.02% chlorhexidine and topical 0.02% polyhexamethylene biguanide every two hours and topical 0.1% propamidine isethionate every hour. Atropine and dibromopropamide were still being administered to the patient. An improvement was noted within four days, at which point atropine and dibromopropamide were stopped while topical fluorometholone acetate 0.1%, acyclovir 3% ointment and ciprofloxacin 750mg were prescribed twice daily for both eyes. 21 days after admission, the patient was discharged, with further follow-ups both locally and abroad at the Moorfields Eye Hospital in London.

Discussion

Acanthamoeba species are extremely resistant protozoa⁶, and exist in two forms – the active trophozoite form, and the inactive cystic form. The latter is reported to be resistant even to contact lens solutions, antimicrobials and the majority of anti-amoebals.^{7,8}

A breach in the corneal epithelium is not a prerequisite for *Acanthamoeba* infection, however, contact lens-induced changes in the cornea may partly explain how the organism invades the eye.^{8,9}

Contamination with *Acanthamoeba* in itself does not cause any discomfort to the contact lens wearer^{2,4} however, proteins building up from tear secretions on the surface of the lens act as a culture medium for bacteria¹⁰ and other microorganisms. These microorganisms are then utilized by *Acanthamoeba* for growth. The trophozoites, in favourable conditions,

are liberated from the cysts, and adhere to the contact lens surface.^{2,3,11} When wearing the contact lenses, numerous trophozoites and cysts are apposed to the corneal surface, and in the presence of a minor epithelial defect, the amoebae make their way into the anterior stroma of the corneal epithelium.^{2,3,11} The parasites then phagocytose and deplete the keratocytes, starting anteriorly then proceeding deeper into the cornea. The devitalized stroma is quickly infiltrated by inflammatory cells followed by stromal necrosis from leukocytic and parasitic collagenolysis.^{3,5}


The fact that the patient swam with the contact lenses, only three days before symptoms started, strongly suggests that this might be the main causative factor. MB also claimed that the disinfecting procedure she used with the lenses and cases was not in accordance with the manufacturer's guidelines. In fact MB sometimes missed disinfecting the lenses after use, and instead placed the lenses in their cases after use. Moreover, it cannot be excluded that the patient made use of an expired contact lens solution. These three factors probably made the invasion by *Acanthamoeba* an easier task. The solution used by our patient contained neither isopropyl alcohol nor 3% hydrogen peroxide – two ingredients proved to be very effective disinfectants for soft lenses.¹⁰⁻¹³ It is of concern that companies producing contact lens solutions are not required to demonstrate activity against *Acanthamoeba*.

Treatment of bilateral AK is often difficult because of the possibility of long term therapy and toxicity of anti-amoebic medication.^{12,13} The time which elapsed from onset of symptoms till starting treatment against AK probably allowed deeper stromal invasion by the organism, making medical therapy more difficult. The fact that specific anti-AK drugs are not readily available in Malta could have played a role in allowing the infection to invade deeper into the cornea.

Conclusion

It is imperative that any contact lens wearer presenting with the features of

an eye infection should be screened for *Acanthamoeba* keratitis in order to avoid serious complications. Awareness of such a condition must therefore increase among general practitioners, optometrists and ophthalmologists.

Following a strict disinfecting procedure on a regular basis (ideally instructed by an eye specialist), avoiding any water contact with the contact lenses/cases and ensuring the use of proper disinfecting solutions, should allow adequate protection against this sight-threatening condition. Other recommendations of note include the frequent changing of the lens storage cases, avoiding overnight contact lens wear and maintaining strict personal hygiene especially when handling the lenses and cases. 

References

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