

Acanthamoeba keratitis-a diagnostic dilemma: a case report

Abstract

Acanthamoeba keratitis presents as diagnostic dilemma as it mimics herpes simplex viral keratitis. It is also a diagnostic challenge due to lack of awareness, difficulty in diagnosis which requires strong clinical suspicion and lack of effective treatment further complicates its management. We report a case of 47 years old female with pain, redness and watering having deep stroma ring infiltrates. The strong suspicion based on clinical findings and failure to respond to antiviral therapy prompted us to investigate her further and the diagnosis of acanthamoeba keratitis was made although there was no history of contact lens wear. In spite of full diagnostic work up for bacterial, fungal and viral corneal pathogen, the diagnosis of Acanthamoeba can be easily missed, therefore one must keep the possibility of this rare entity.

Keywords: acanthamoeba, viral keratitis, stroma ring infiltrates

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Introduction

Acanthamoeba keratitis is a type of protozoa keratitis caused by free-living fresh water Amoeba. It recently gains importance because of increasing incidence, difficulty in diagnosis and unsatisfactory treatment. It is seen more commonly in contact lens wear using homemade saline or may be in non-contact lens wearers due to swimming or bathing in contaminated water. This infection is commonly confused with Herpes Simplex Virus (HSV) stromal keratitis because it is characterized by deep inflammation accompanied by persistent epithelial defect. Even when a full diagnostic work up for bacterial, fungal and viral corneal pathogen is properly performed, this diagnosis can be easily missed unless the possibility of Acanthamoeba keratitis is considered.

Case report

A 47-year-old female patient was presented in the eye OPD with a two weeks history of decreased vision, foreign-body sensation, pain, and redness in the right eye. As per record; she had been treated presumptively for herpes simplex viral stromal keratitis, intermittently for last 2 years with topical steroid, atropine and acyclovir eye ointment. There was no history contact lens wear or trauma. Examination of her right eye showed visual acuity of finger counting at two feet. External examination revealed blepharospasm with a ciliary congestion. The anterior segment of right eye showed ring shaped yellowish white stromal infiltrates in paracentral zone of cornea (Figure 1). There was an epithelial defect overlying this area. The anterior chamber had mild flare and cells. The iris, lens revealed no particular findings. The IOP was 10 mm of Hg in right eye and 13mm of Hg in left eye. Fundus examination was not possible due to hazy media. Her left eye showed best corrected visual acuity of 6/6, with normal anterior and posterior segments (Figure 2). The corneal scrapings of right were taken and sent for microscopic as well histopathological examination. Gram's staining revealed no bacteria. On 10% KOH wet mount of corneal

scrapings Acanthamoeba cysts were observed (Figure 3). Bacterial, fungal as well culture on non nutrient agar enriched within *E. coli* showed no growth.

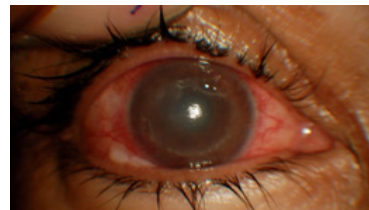


Figure 1 Right eye showing ring shaped yellowish white stromal infiltrates in paracentral zone of cornea.

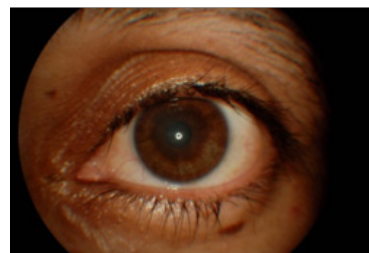


Figure 2 Left eye showing normal anterior segment.

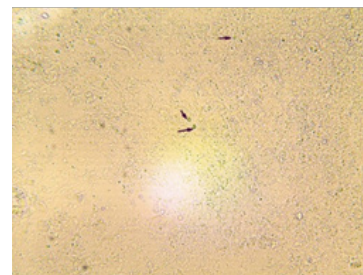


Figure 3 10% KOH wet mount showing double walled cysts of acanthamoeba.

The patient was started on combination of Neomycin, Polymixin-B and Bacitracin drop 1-2 hourly and Clotrimazole 1% drops 2 hourly with oral Ketoconazole 200mg tablet twice daily. This was improvement in signs and symptoms, especially pain within 5 days of instillation of therapy. Following 6 weeks of therapy the epithelial defect as well stromal infiltrates decreased. At 6 months follow-up the left eye showed healed ulcer with subepithelial opacification. The visual acuity was 6/36 in the left eye.

Discussion

Acanthamoeba is a genus of small free-living amoeba which normally feeds on bacteria and is found in soil, fresh water, brackish water, seawater, and air. Although exposure to viable Acanthamoeba organism is probably frequent, clinical infection, including ulcerative keratitis, are rare. A history of trauma and exposure to soil or fresh water should be sought in patients with suspected or proven Acanthamoeba Keratitis. Acanthamoeba infections seem particularly likely, if there has been contact lens wear, herpes simplex keratitis, and contact with dirty water, non-healing epithelial defect, uveitis, hypopyon, a ring infiltrate, or excessive ocular pain.¹ Contact lens wear is not always the main risk factor for infection as in a recent epidemiological study from India only 0.9% of reported cases of AK were associated with contact lens wear.² The major risk factors were associations with corneal trauma and poor water supply.

Acanthamoeba exists in pathogenic trophozoite form and dormant highly resistant cystic form. The pathogenic cascade of Acanthamoeba keratitis (AK) involves corneal epithelial adhesion through mannose and laminin binding proteins followed by desquamation by the process of apoptosis, phagocytosis and cytolysis. Stromal invasion involves various enzymes like neuraminidase, superoxide dismutase, plasminogen activator, elastase, protease, glycosidase and phospholipases. Trophozoites have been shown to follow a chemotactic response to corneal neurones and may cause a cytolytic and apoptotic response, causing the clinical sign of radial neuritis.^{3,4} Based on slit-lamp biomicroscopy findings and severity Acanthamoeba keratitis can be: epitheliitis, epitheliitis with radial neuritis, anterior stromal disease, deep stromal keratitis, or ring infiltrate.^{5,6} In the present case, the right eye showed ring shaped yellowish white stromal infiltrates in paracentral part of cornea with an epithelial defect of (5mm*5mm approximately) overlying this area. Trophozoites have not been found to disrupt corneal endothelial cells and enter the anterior chamber, the present case showed mild flare and cells in the anterior chamber.

The diagnosis of AK involves clinical symptoms of photophobia and pain out of proportion to signs. The pathognomonic sign of AK is a radial pattern of perineural infiltrates. Ring infiltrates are also common. The laboratory diagnosis involve direct microscopy of corneal scrapings using Giemsa stain, silver stains, Calcofluor-white stain, Lactophenol Cotton blue, acridine orange. The acanthamoeba trophozoites are oval, 15-45µm in size with large central nucleolus, contractile vacuole and hyaline pseudopodia known as acanthopodia. The cysts are smaller (12-25 µm) and polygonal or star-shaped. However culture on non nutrient agar enriched with *E. coli* remains the gold standard. The tentative diagnosis of AK can often be made by *in vivo* confocal microscopy.

Treatment of AK involves antimicrobials poly hexamethyl biguanide and chlorhexidine have been reported to be the most effective drugs for treatment of infection and in combination they have been reported to be effective against both cysts and trophozoites. These drugs contain highly charged positive molecules capable of binding to the muco poly saccharide plug of the ostiole resulting in

penetration of the amoeba. The drug then binds to the phospholipid bilayer of the cell membrane which is negatively charged resulting in damage, cell lysis and death.⁶ Side effects of elevated intraocular pressure as well as increased inflammation often require the use of antiglaucoma medication and cycloplegics. The role of topical corticosteroids is controversial however topical or oral voriconazole have been suggested.⁷⁻⁹ surgical interventions done in the form of therapeutic penetrating keratoplasty, deep lamellar keratoplasty in recalcitrant cases. Recently phototherapeutic keratectomy and collagen cross linking in the management of this infection have been provide good outcomes.¹⁰⁻¹¹

Conclusion

There are diagnostic delays in detection of Acanthamoeba due to early simulation of Acanthamoeba keratitis to Herpes simplex virus keratitis and lack of awareness. However this can be overcome by prompt clinical suspicion of acanthamoeba keratitis in case of failure of patient to respond to antiviral or antibacterial therapy.

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Conflicts of interest

None.

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