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Case report

Painless *Acanthamoeba Keratitis* in a Soft Contact Lens Wearer – Case Report

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A B S T R A C T

Aim of our paper is to present a case of painless Acanthamoeba keratitis *in a soft contact lens wearer. A 17-year-old male, highly myopic, prolonged soft contact lens wearer, presented to us with painless red watery right eye having remarkably diminished vision. Last six weeks he was treated elsewhere for the microbial keratitis with no improvement. No pain was reported and on the direct questionnaire about it he denied it. There was marked mixed conjunctival and ciliary injection. A central stromal opacity with a pronounced surrounding corneal ring of inflammatory infiltration and epithelial defect was seen on biomicroscopy of the right eye. Circular pannus was already formed reaching epithelial defect overlying corneal ring infiltrate.* Acanthamoeba spp *in the corneal sample was confirmed. Prolonged therapy with 0.02% chlorhexidine digluconate solution combined with 0.1% hexamidine solution resulted in corneal healing left with a large central dense stromal opacity with circular pannus reaching peripheral third of the cornea but with very thin blood vessels and the best corrected visual acuity of 0.1 tested on Snellen chart. In conclusion, even in a lack of typical symptom for* Acanthamoeba *keratitis such as pain, this amoeba should be ruled out especially in a soft contact lens wearer.*

Key words: Acanthamoeba keratitis*, corneal disease, contact lens, hydrophilic*

Introduction

Acanthamoeba keratitis is a painful chronic progressive disease mostly related to soft contact lens misuse[1]. Since free-living amoebae of the genus *Acanthamoeba* can be found in our surroundings, especially in tap water resistant to normal levels of chlorine, washing contact lens and/or lens case in it and taking shower wearing contact lenses may result in a keratitis or corneal ulcer even after minor corneal trauma[1]. Severe ocular pain is a major symptom and corneal ring infiltrate important diagnostic feature of *Acanthamoeba keratitis*.

Lack of pain in an ulcerative keratitis may be clinically presumed stromal herpes simplex, bacterial or fungal inflammation. Unfortunately, *Acanthamoeba keratitis* is non-responsive to the routine antimicrobial therapy. If not properly treated early, the disease progresses quickly and may lead to corneal perforation.

Our paper presents the case of proven *Acanthamoeba keratitis* without pain in the young soft contact lens wearer.

Case Report

A 17-year-old male, highly myopic, prolonged soft contact lens wearer, presented to us with painless red watery right eye having remarkably diminished vision. Six weeks earlier he had been hospitalized in another hospital for the right eye keratitis (no data on possible causative agent) treated with vancomycin drops combined with corticosteroid and atropine subconjunctival injections. On discharge he was prescribed bacitracin--neomycine drops and tobramycine drops. Redness of the right eye and epifora persisted, an eye sight got progressively worse so he came for an another opinion. He is an otherwise healthy myop using daily-wear soft contact lenses for the past year. No trauma to the eye or pre-existing corneal epithelial disease was noticed. Careless of the soft contact lens hygiene, he was rinsing it and the lens case in domestic tap water and had been wearing lenses while shower and swimming in the pool and sea. His best corrected visual acuity was counting fingers in his right eye and 1.0 in the left eye on Snellen chart. There was epifora, photophobia, blepharospasm and lid

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oedema on the right eye. No pain was reported and on the direct questionnaire about it he denied it. There was marked mixed conjunctival and ciliary injection. A central stromal opacity with a pronounced surrounding corneal ring of inflammatory infiltration and epithelial defect was seen on biomicroscopy of the right eye. Circular pannus was already formed reaching epithelial defect overlying corneal ring infiltrate (Figure 1). Anterior chamber was quiet. Pupil dilated promptly on local tropicamide 1% solution, showing no synechia. The lens was clear. Echography revealed no vitreal opacities and normal posterior segment of the eye and the orbit. The left eye was normal.

Material and Methods

Upon hospitalization the right eye, nose, oropharynx, the contact lens and the lens case swabs were taken for microbiologic analysis. The corneal tissue sample from the ring infiltrate was put in 2 ml of sterile saline solution under local anaesthesia and send immediately to Department of Parasitology at Croatian National Institute of Public Health. Corneal scraping was examined by direct wet mount and cultivation method. Smear was screened using high power, field light microscopy (x400). For culturing, sample was placed directly in the centre of non-nutrient agar plate with Page's saline, which was overlaid with *Escherichia coli*. The plates were incubated in moist chamber at room temperature.

No amoebae were seen in direct wet mount. Two days later, agar plate was examined. Microscopically, *Acanthamoeba* trophozoites were identified. Trophozoites were approximately 18–20 μm in size, had characteristic fine thorn-like acanthopodia which were constantly extended and retracted (Figure 2). On fourth day double walled cysts, approximately 10 μm in size, with a slightly wrinkled outer cyst wall were identified (Figure 3).

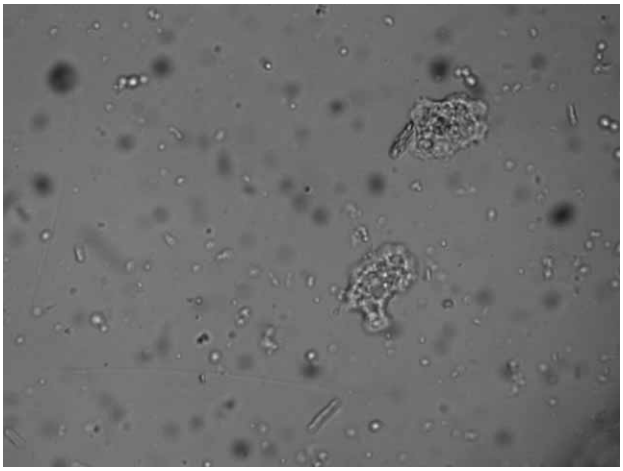

Fig. 2. Acanthamoeba spp. – trophozoites from culture, direct wet mount, magnification 400.

Results

The swab of the right eye itself was sterile, but the nose revealed *Proteus mirabilis*, the oropharynx *Proteus mirabilis* and the *Staphylococcus aureus*, soft contact lens and the lens case *Alcaligenes spp* and *Pasteurella spp*. Amoxicillin combined with clavulonic acid and sulfometoxazol combined with trimetoprime were introduced as an i.v. therapy for ten days. After confirmation of *Acanthamoeba spp.* in the corneal sample chlorhexidine digluconate 0.02% drops combined with hexamidine 0.1% drops (Desomediné, Chawin, Montepellier, France) were introduced following the scheme: hourly for two days and nights, then hourly only days, then two-hourly days for three weeks and continued 4–6 times for ten months now. At present the patient's right eye is quiet, with no signs of inflammation. There is the best corrected visual acuity of 0.1 tested on Snellen chart due to the large central dense stromal opacity with circular pannus reaching

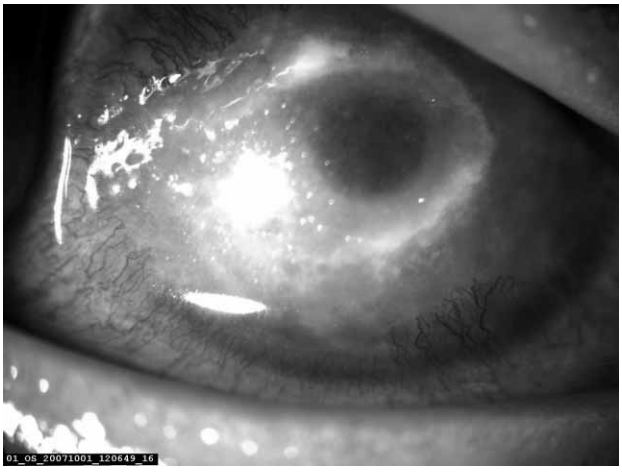

Fig. 1. The right eye showing marked mixed conjunctival and ciliary injection, central stromal opacity and ring-shaped corneal infiltrate with epithelial defect.

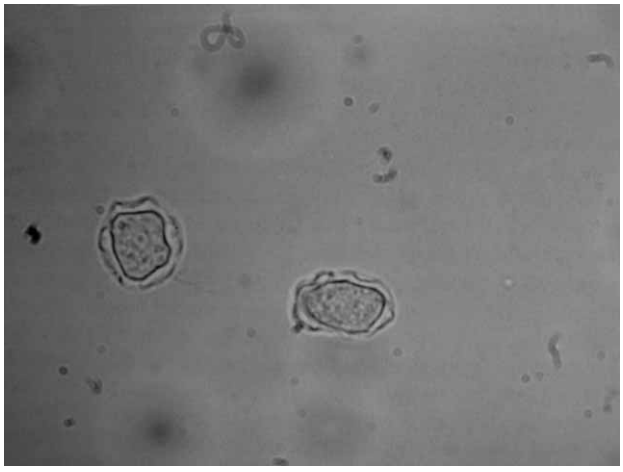

Fig. 3. Acanthamoeba spp. – cysts from culture, direct wet mount, magnification 400.

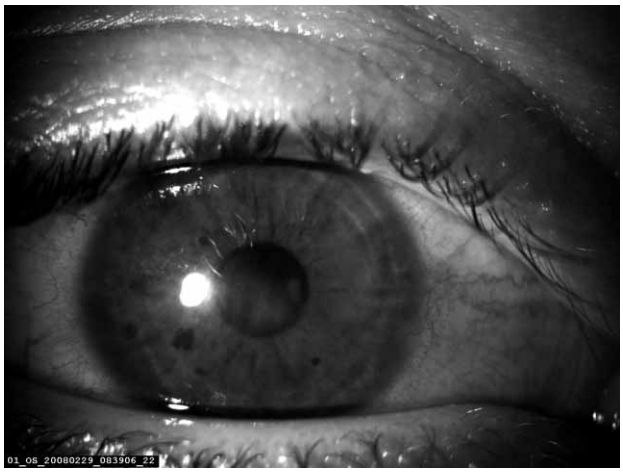

Fig. 4. Ten months of acanthamoeba keratitis treatment: hardly visible peripheral circular pannus. Quiet cornea with central dense stromal opacity. The best corrected visual acuity is 0.1 on Snellen chart.

peripheral third of the cornea but with very thin blood vessels (Figure 4). The rest of the eye is normal.

Discussion

Acanthamoeba organisms are ubiquitous parasites and they could be found in soil, water and dust. Two characteristic forms exist: active trophozoit and inactive cyst[2]. *Acanthamoeba castellani* and *Acanthamoeba polyphaga* are the most common ocular pathogens among eight known species that invade human cornea[2,3]. Damaged corneal epithelium is at greater risk to bind *Acanthamoeba* because it expresses 1.8 times more mannose--binding glicoproteins than intact epithelium[2]. Once the *Acanthamoeba* binds to epithelium it moves by extending spiny pseudopods called acanthapodia which also help in the process of phagocytosis via an amoebastome. Except acanthopodia and proteolytic enzymes, serine proteases and superoxide which have been found in some *Acanthamoeba* species allow *Acanthamoeba* to invade and destroy corneal stroma. The number of keratocytes in affected stroma decreases by necrosis, apoptosis and phagocytosis. Acute immune response of the host increases inflammation with resulting decrease of the corneal transparency. Knowing the fact that *Acanthamoeba* adheres to contact lenses and may exist in unsterile contact lens solution and having in mind that contact lens may also cause epithelial defect results with the fact that contact lens wearers represent approximately 85–90% of *Acanthamoeba keratitis*[3]. Four percent of contact lens storage cases were contaminated by amoebae[4]. People with the history of corneal trauma are at great risk too[2]. Almost non-existent soft contact lens hygiene of our patient contributed to the disease development.

Early (less than one to two months since onset) clinical signs of *Acanthamoeba keratitis* include non-specific corneal epithelial changes in form of dendritiform lesions, punctuate keratitis and perineural infiltrates. In this phase it is often misdiagnosed as herpes simplex or fungal keratitis[5]. That explains long duration of the disease in our patient prior to diagnose of *Acanthamoeba keratitis*. If missed, *Acanthamoeba keratitis*, develops late signs (more than two months since onset) such as stromal ring infiltrates, uveitis with hypopion, radial keratoneuritis (pathognomonic sign) with prominent pain and in advanced stage corneal ulceration, abscesses, scleritis, secondary glaucoma and microbial superinfection which should be also treated[3,5–7]. In our case ocular pain, one of the most prominent symptoms, was not present.

Coexisting bacterial aerobic gram-negative bacilli, including *P. aeruginosa*, are the predominant causative agents of acute necrotizing keratitis in the contact lens wearer[8]. Unfortunately, there were no data if swabs were taken at the beginning of the disease in our case. Since he presented to us after being treated for long time with multiple local and systemic antibiotics, no coexisting bacteria were isolated from the right eye.

Acanthamoeba keratitis treatment is controversial. In the available literature the most successful method of treatment for *Acanthamoeba keratitis* is a combination of either 0.02% polyhexamethylene biguanide or 0.02% chlorhexidine with 0.1% propamidine isethionate[3,9–11]. Also, recent literature shows that 0.5 to 2.5% povidone--iodine solution (PVP-I [Betadine]) has better in vitro antiamebic activity on both trophic and cystic stages of *Acanthamoeba* than chlorhexidine[12]. Our patient responded extremely well to the combination of 0.02% chlorhexidine digluconate and 0.1% hexamidine drops applied according to the scheme. Corneal healing was recorded after two months of continuous combined therapy and progressed until 10 months of treatment.

Conclusion

Pain is one of the most important symptom in *Acanthamoeba keratitis* that may alert the ophthalmologist to consider an *Acanthamoeba* testing in case of therapeutically non-responsive keratitis. Our paper shows that even in lack of the pain *Acanthamoeba spp* should be ruled out, especially in soft contact lens wearers. On--time introduced appropriate therapy may save an eye and even restore useful vision.

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BEZBOLNI AKANTAMEBNI KERATITIS U NOSITELJA MEKIH KONTAKTNIH LEĆA – PRIKAZ SLUČAJA

S A Ž E T A K

Cilj rada je prikazati slučaj bezbolnog akantamebnog keratitisa u nositelja mekih kontaktnih leća. 17-godišnji miop, koji je dugo nosio meke kontaktne leće, javio se radi bezbolnog crvenila desnog oka koje jako suzi i na koga vrlo loše vidi. Posljednjih 6 tjedana je bio liječen u drugoj bolnici radi infektivnog keratitisa no bez poboljšanja. Negira bolnost desnog oka. Na biomikroskopskom pregledu desnog oka vidio se miješani podražaj, centralno stromalno zamućenje rožnice iznad koga je opsežni epitelni defekt, a koje je okruženo prstenom upalnog infiltrata. Cirkularni panus je dopirao do epitelnog defekta iznad središnjeg zamućenja rožnice. Pregled rožničnog obriska je potvrdio *Acanthamoeba spp*. Uvedena je kombinirana lokalna terapija chlorhexidine digluconate 0,02% kapljicama i hexamidine 0,1% kapljicama. Nakon 10 mjeseci neprekinute terapije rožnica je zacijelila centralnim ožiljkom i rubnim panusom. Najbolja korigirana vidna oštrina desnog oka je 0,1 na Snellen-ovim tablicama. U zaključku, čak i u slučaju kad nema boli koja je jedan od najznačajnijih simptoma akantamebnog keratitisa, isti treba isključiti, posebice kod nositelja mekih kontaktnih leća.