

A non-contact lens related *Acanthamoeba keratitis*

Lalana Sansopha*

Wasee Tulvatana**

**Sansopha L, Tulvatana W. A non-contact lens related *Acanthamoeba keratitis*.
Chula Med J 2003 Oct; 47(10): 661 - 6**

Acanthamoeba keratitis is a damaging infection of the cornea caused by protozoa, *Acanthamoeba* species. A 65-year-old woman who did not use contact lens, suffered from severe pain and progressively poor vision of her left eye after a trauma from dust. She was primarily treated with antifungal agents and antibiotics which resulted in no improvement. Finally, her eye was eviscerated owing to painful and uncontrolable infection. Histopathologic examination of the cornea showed acanthamoebas. This report recommended the need for increased suspicion of *Acanthamoeba keratitis* in patient who does not present with pathognomonic clinical features.

Key words: *Acanthamoeba keratitis*, Poor visual acuity, Uncontrolable infection.

Reprint request : Sansopha L, Department of Pathology, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Received for publication. August 10,2003.

* Department of Pathology, Faculty of Medicine, Chulalongkorn University

**Department of Ophthalmology, Faculty of Medicine, Chulalongkorn University

ลลนา แสนโสภา, วลี ตูลวรธนะ. โรคกระจกตาติดเชื้อปรสิต, *Acanthamoeba*. จุฬาลงกรณ์เวชสาร 2546 ต.ค.; 47(10): 661 - 6

โรคกระจกตาติดเชื้อปรสิต, *Acanthamoeba* ก่อให้เกิดการติดเชื้อที่รุนแรง จนถึงขั้นอาจเสียดวงตาได้ ในผู้ป่วยหญิง อายุ 65 ปี เศษดินกระเด็นเข้าตาซ้าย แล้วมีอาการตาแดง ปวดตา และตามัวลงเรื่อย ๆ ผู้ป่วยได้รับการรักษาด้วยยาต้านเชื้อราและเชื้อแบคทีเรีย แต่อาการก็ไม่ดีขึ้น ปวดตามากขึ้น และตามัวลงระดับ *light perception* การศึกษาทางพยาธิวิทยาของกระจกตาพบว่ามี *cyst* และ *trophozoite* ของ *Acanthamoeba* การรายงานผู้ป่วยรายนี้มีวัตถุประสงค์เพื่อให้แพทย์ผู้ดูแลรักษาได้นึกถึงโรคนี้ เมื่อพบผู้ป่วยที่มีการอักเสบของกระจกตา ร่วมกับการรักษาด้วยยาปฏิชีวนะและยาต้านเชื้อราแล้วอาการไม่ดีขึ้น

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Acanthamoeba keratitis has been recently described as an epidemic and is recognized in almost every part of the world. Evidence from several studies have suggested that soft contact lens wear as its great risk factor, although some studies have reported the development of *Acanthamoeba keratitis* in patient who have no apparent predisposing factor.^(1,2) Most of the report focusing on contact lens related *Acanthamoeba keratitis*, therefore ophthalmologists may hesitate to diagnose this disease in patient who does not wear contact lens.



Figure 1. Corneal ulcer with totally absence of corneal epithelium and Bowman's Membrane (above). The anterior chamber shows neutrophil accumulation (below) formed as hypopyon. (Hematoxylin-eosin, original magnification x 100)

Case report

A 65 year-old woman presented with redness, pain and decreased visual acuity of her left eye for 20 days. She gave a history of trauma with dust and presented with redness, watering and diffuse infiltrate exhibiting corneal opacity. She was treated as fungal infection with amphotericin B and fluconazole eyedrops every hour and 100 mg. Itraconazole. Later vancomycin eyedrops and amikin eyedrops were added, there was no clinical improvement. Her visual acuity was reduced to light projection. Corneal scrapings for potassium hydroxide (KOH), Gomori methenamine silver (GMS), Gram's stain and culture were negative results. Her left eye was eviscerated owing to painful, progressively decreased visual acuity from light projection to light perception and uncontrolable infection.

The submitted left cornea measured 0.7 cm. in greatest dimension and revealed opacity. Histopathological examination of the cornea showed a large ulcer of anterior cornea with totally absence of epithelium and Bowman's membrane. Whereas the anterior chamber reaction with hypopyon was noted (Figure 1). The corneal stroma was diffusely infiltrated with neutrophils and a number of organisms in which trophozoites and cysts of *acanthamoeba* were also revealed (Figure 2,3).

Discussion

Acanthamoeba keratitis in non-contact lens wearers has developed into a distinctive disease of the eye, although it is still an uncommon, ophthalmic problem.^(1-3,12) It is now established that *Acanthamoeba* can directly infect the cornea in various ways and with varying intensity. Generally, trauma with either

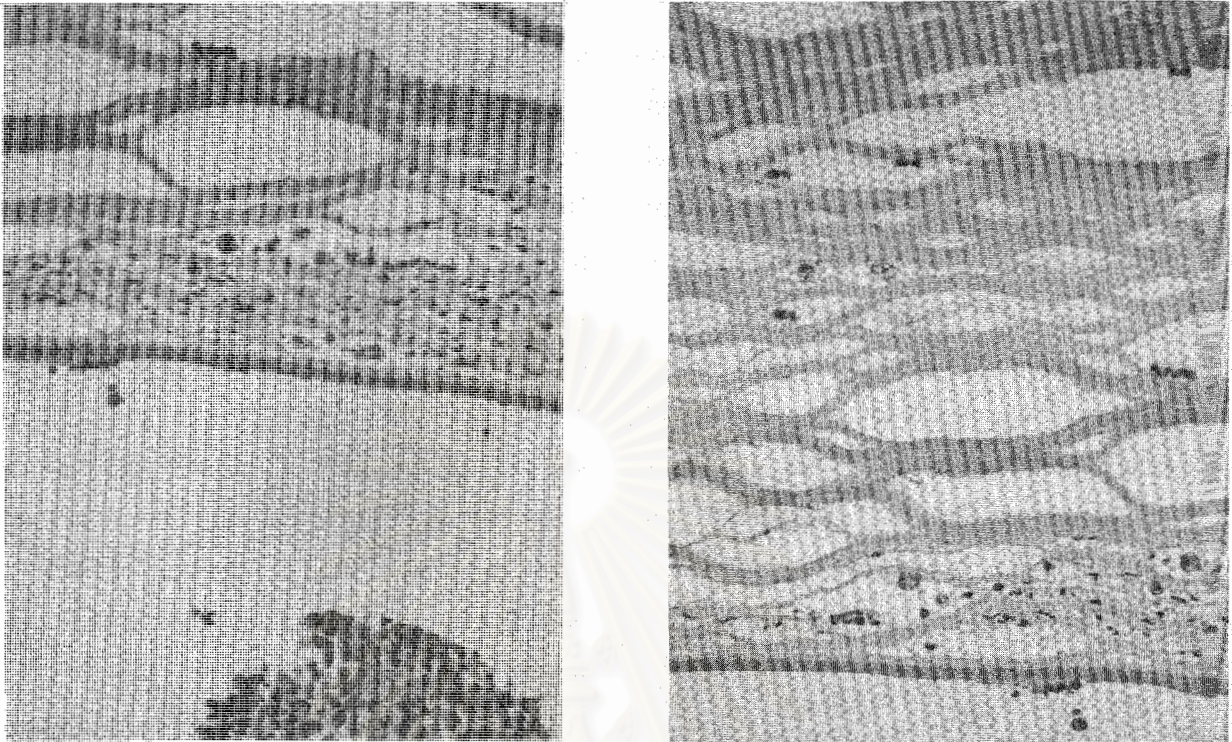


Figure 2,3. Neutrophil infiltration the corneal stroma with presence of trophozoites (arrowheads) and cysts (arrows) of *Acanthamoeba*. (Periodic Acid-Schiff, original magnification x 400)

vegetative matter, stone, dust and contaminated contact lens solutions resulting in serious visual impairment or even a loss of the eye.

Acanthamoebas occur worldwide in water, dust and on plants and undergo life-cycle alterations between cysts and trophozoites.^(6,10-13) They are small, free-living amoebas which their trophozoites encyst in an unfavorable environment. The cysts are very resistant to dryness, cold and various antimicrobial agents. When the environment is favorable, the amoebas excyst within 3 days. Both pathogenic and nonpathogenic species of the amoebas are now recognized as micro-organisms commonly present, for instance, soil, water, dust, air filters, human and animal feces, tissues and organs of diseased hosts and cooling towers.

When trauma is severe enough to cause

corneal abrasion, a more rapid process usually develops, with corneal ulcerations, increasing corneal infiltration and clouding, iritis and scleritis, severe pain, hypopyon, and marked loss of vision.^(1,10,12)

Where no obvious trauma has occurred, the early corneal findings may be non-specific or suggestive of herpes simplex infection. In some patients the condition waxes and wanes and reappears before taking a rapidly progression into corneal abscess, characterized by unique ring-shape morphology of definite diagnostic significance.

A recent report indicates that elevated corneal epithelial lines^(1,9,12) are another clinical sign in *acanthamoeba* corneal infection.

In general, pathologic studies of involved cornea show destruction of the anterior cornea, with infiltration of acute inflammatory cells into the

superficial and middle layers of the corneal stroma. Usually, infiltrating amoebic organisms between the lamellae of the cornea are apparent. In size, a single amoeba is measured 15-20 μm in diameter. The organism exhibits an irregular polygonal cyst wall. Gomori methenamine silver stain and periodic acid-schiff stain are valuable for outlining the cyst wall.

Diagnosis is based on the demonstration of acanthamoebic cysts or trophozoites in corneal scraping by smear examination and/or culture.^(9,12)

Acanthamoeba infections are highly resistant to chemotherapeutic agents, especially in encysted stage. Several reports describe a combined therapy^(1,7,13) of 2 or 3 biocides such as polyhexa-methylene biguanine and chlorhexidine digluconate, sometime with antibacterial antibiotics and/or surgical removal by deep lamellar keratectomy and conjunctival flap.⁽⁵⁾

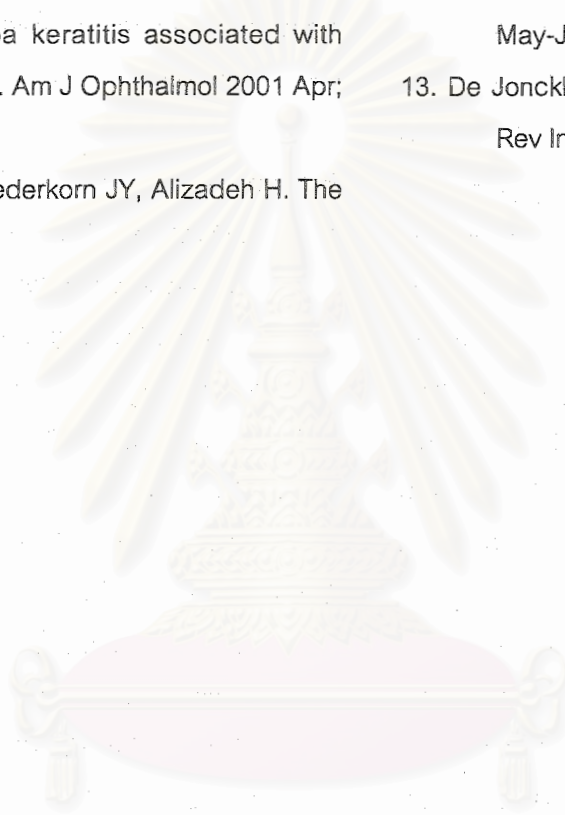
In this case, the patient presented with redness, pain and decreased in vision which were non-specific clinical features. Subsequently, the patient was treated for presumed bacterial and fungal keratitis. Finally, the patient's left eye was eviscerated owing to the failed treatment. The presence of corneal ulcer and the history of trauma pointed toward fungal etiology which lacked the clinical signs, such as excessive pain, a radial keratoneuritis and in a later phase a stromal ring infiltrate, at presentation and included unsatisfactory microbiological examination which was a cause for the underdiagnosis. In addition, there is a wide variability in virulence among the strains of acanthamoeba^(9,11-13) in different geographical areas, as well as differences in host immune responses⁽³⁾, which may contribute to the variability in their clinical presentation.

In this case, the disease was already advanced at its presentation; its pathognomonic clinical features were not seen. The disease progression was rapid and the visual outcome was usually poor. The ophthalmologists should have been aware, should have recognized and made proper management of the devastating corneal disease in non-contact lens wearers.

References

1. Sharma S, Garg P, Rao GN. Patient characteristics, diagnosis and treatment of non-contact lens related Acanthamoeba keratitis. *Br J Ophthalmol* 2000 Oct; 84(10): 1103 - 8
2. Parya SC, Prakash MR, Rao VA, Vellaniparambil RJ. Acanthamoeba keratitis in Pondicherry. *J Commun Dis* 2001 Jun; 33(2):126 - 9
3. Hansen B, Kronborg G. Acanthamoeba keratitis in a non-contact lens wearer with human immunodeficiency virus. *Scand J Infect Dis* 2003; 35(3): 207 - 9
4. Kumar R, Lloyd D. Recent advance in the treatment of Acanthamoeba keratitis. *Clin Infect Dis* 2002 Aug 15; 35(4): 434 - 41
5. Cremona G, Carrasco MA, Tytiun A, Cosentino MJ. Treatment of advanced acanthamoba keratitis with deep lamellar keratectomy and conjunctival flap. *Cornea* 2002 Oct; 21(7):705-8
6. Jongwutiwes S, Pariyakanok L, Charoenkorn M, Yagita K, Endo T. Heterogeneity in cyst morphology within isolates of Acanthamoeba from keratitis patients in Thailand. *Trop Med Int Health* 2000 May; 5(5): 335 - 40
7. Lindquist TD. Treatment of Acanthamoeba keratitis. *Cornea* 1998 Jan; 17(1): 11 - 6. Review

8. Claerhout I, Kestelyn P. Acanthamoeba Keratitis: a review. Bull Soc Belge Ophthalmol 1999; 274: 71 - 82
9. Khan NA. Pathogenesis of Acanthamoeba infections. Microb Pathog 2003 Jun; 34(6): 277 - 85
10. Froumis NA, Mondino BJ, Glasgow BJ. Acanthamoeba keratitis associated with fungal keratitis. Am J Ophthalmol 2001 Apr; 131(4): 508 - 9
11. Hurt M, Prog V, Niederkorn JY, Alizadeh H. The interaction of Acanthamoeba castellanii cysts with macrophages and neutrophils. J Parasitol 2003; 89(3): 565 - 72
12. Visvesvara GS, Martinez AJ, Theodore FH, Daggett PM, Sawyer TK. Naegleria and Acanthamoeba Infections: Review. Rev Infect Dis.1990 May-Jun; 12(3): 490 - 513
13. De Jonckheere JF. Ecology of Acanthamoeba. Rev Infect Dis.1991;13(Suppl 5): S385 - 7



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย