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Risk Factors For *Acanthamoeba* Keratitis Infection And Poor Outcomes: A Multi-State Case-Series and Case-Control Investigation, 2008—2011

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- Nothing to disclose

ACADEMY 2012
PHOENIX

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Course Outline

- Acanthamoeba* Biology and Epidemiology
- 2007 Multi-state Investigation
- 2011 Multi-state Investigation
- Investigation of *Acanthamoeba* Keratitis: Risk Factors
- Investigation of Residential Water System Exposures as Potential Risk Factors
- Impact of Care-Seeking Behavior, Time-To-Diagnosis, and Diagnostic and Treatment Modalities on Clinical Outcomes
- Summary of Findings
- Recommendations
- Open Discussion

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Acanthamoeba

- Free-living protozoa
- Ubiquitous in nature
- Commonly in water, soil, and air, including tap water, cooling towers, HVAC (heating, ventilating, and air conditioning) systems, and sewage systems

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Life Cycle and Morphology

- Acanthamoeba* exists in two forms
 - Active, infective trophozoite
 - Dormant, environmentally hardy cyst
 - Resilient
 - Can survive extreme temperatures, pH, desiccation, chemical exposures
 - Resistant to most multipurpose contact lens solutions*

*Johnston, S. P. et. al. *J Clin Microbiol.* 2009; Imayasu, M. et. al. *Eye Contact Lens.* 2009

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Acanthamoeba keratitis (AK)

- A potentially blinding infection of the cornea
- Caused by *Acanthamoeba* spp.

Early epithelial stage of infection.
(Photo courtesy of Dan B. Jones, M.D.)

Typical advanced ring infiltrate.
(Photo courtesy of Dan B. Jones, M.D.)

Early inflammation due to *Acanthamoeba* keratitis.
Can resemble keratitis caused by herpes simplex.
(Photo courtesy of Dan B. Jones, M.D.)

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Epidemiology of AK

- Primarily affects otherwise healthy people
- In the United States, an estimated 85% of cases occur in contact lens wearers*
- Incidence in the U.S. estimated at 1–33 cases per million contact lens users†

*Schaumberg DA, Snow KK, Dana MR. *Cornea.* 1998.
†Yoder JS, Verani J, Heidman N, et. al. *Ophthalmol Epi.* 2012.

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Risk of AK

- Individuals who improperly store, handle, or disinfect their lenses are at increased risk of infection
- Individuals who exercise proper lens-care practices and non-contact lens wearers can also develop AK
- No known cases of person-to-person transmission have been reported

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Symptoms of AK

- Foreign body sensation
- Photophobia
- Decreased visual acuity
- Tearing
- Pain
- Redness of the eye

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Disease

- Infection involving both eyes can occur
- Pain out of proportion to clinical findings is classic feature, but lack of pain does not preclude the diagnosis

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Diagnosis of AK

- Requires high index of suspicion
- Diagnosis assisted by isolation of organisms from corneal culture or histopathology
- Negative culture does not necessarily rule out *Acanthamoeba* infection
- Confocal microscopy and PCR may assist

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Diagnosis of AK

- Clinical manifestations similar to viral, fungal, or bacterial infections may lead to misdiagnoses
- Improper therapy may initially alleviate symptoms but obscure the clinical picture and diagnosis
- Early diagnosis can greatly improve treatment efficacy

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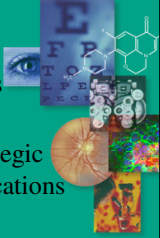
Treatment


- Infection can be difficult to treat due to the resilient nature of cyst
- Current treatment usually includes a topical cationic antiseptic agent
 - Polyhexamethylene biguanide (0.02%)
OR
 - Chlorhexidine (0.02%)
WITH OR WITHOUT
 - Diamidine
 - Propamidine (0.1%) OR Hexamidine (0.1%)

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Treatment

- Duration of therapy may be 6 months to a year
- Pain control helped by topical cyclopegic solutions and oral nonsteroidal medications
- Use of corticosteroids to control inflammation is controversial
- Penetrating keratoplasty may help restore visual acuity



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Resources

- CDC, *Acanthamoeba* Keratitis for Health Professionals
http://www.cdc.gov/parasites/acanthamoeba/health_professionals/acanthamoeba_keratitis_hcp.html
- The Medical Letter, Drugs for Parasitic Infections
http://www.cdc.gov/parasites/acanthamoeba/resources/Acanthamoeba_keratitis.pdf

