

ACANTHAMOEBA KERATITIS:
RECOGNIZING IT AND
TREATING IT

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ACANTHAMOEBA KERATITIS

- The referring physician first saw Billy for pain in the eye on Nov 29, 2007.
- He is a 42-year-old male with dry eyes.

Nov 29, 2007

- His vision was 20/80.
- The MD saw only redness and SPK.
- He prescribed Tobradex ointment and patched the eye.

Dec. 3, 2007

- Billy had removed the patch.
- The pain was much worse than on the 29th.
- VA was 20/400 with a large central epithelial defect.
- DX was floppy lid syndrome and a bandage contact lens was placed.



Billy's right eye on December 3, 2007

Dec 6, 2007

- Vision drops to HM.
- Everything is worse:
 - Pain
 - Larger epithelial defect
 - Stromal haze
 - Increased redness
 - Central edema

He sends the patient to me.

Dec 7, 2008

- He arrives in my office with a painful, red, HM eye.
- At SLE I see:
 - A firm white base
 - No pus, no hypopyon
 - A 4 x 5 mm epithelial defect
 - A very red, angry eye.

Dec 7, 2008

- I write on my notes that this may not be infected, but I do a culture anyway.
- I ask him to stop his steroid and begin Tobradex ointment q. 3 hours.

Dec 10, 2007

- The culture grows Staph aureus and alpha hemolytic strep – both.
- I start him on gatifloxacin (Zymar) and vancomycin every hour.

Dec 11, 2007

- No change.
- Old axiom:
 - *If you have made the diagnosis and instituted the proper treatment and the patient is not improving – then the diagnosis is wrong.*

Jan 10, 2008

- Confocal microscopy showed *acanthamoeba* cysts throughout cornea.
- How embarrassing is it that I give lectures on *acanthamoeba*.

Jan 10, 2008

- He was started on:
 - Chlorhexidine drops 0.02%
 - PHMB .01% drops
 - Brolene drops

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- Billy had no risk factors
 - He did not wear contacts
 - He had no exposure to contaminated water
 - He had no corneal trauma

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- The organism exists in two forms:
 - Trophozoite – slowly motile
 - Cyst – has a thick double wall

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- Ubiquitous
 - Seawater, lakes, rivers, streams
 - Tap water
 - Bottled water
 - Drinking fountains
 - Eye wash stations
 - Dental units
 - Dialysis machines

Anger and Lally, *Acanthamoeba*: A Review of Its Potential to Cause Keratitis. *Eye & Contact Lens* 34(5): 247-253, 2008.

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- The trophozoite transforms to cyst under adverse conditions:
 - Temperature changes
 - Desiccation
 - Food depletion
 - pH changes
 - Low oxygen concentration
 - Noxious medication

Contact lens wear

- Epithelial breaks
- Improper handling
- Amoeba adherence to the lens
- Contaminated lens care system
 - Home made saline
 - Amoeba need bacteria for food

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- Symptoms
 - Blurred vision
 - Severe pain
 - Photophobia
 - Tearing
 - Foreign body sensation

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- Signs

- Elevated epithelial dendritiform lines
- Gray-white infiltrate with epithelial defect
- Ring infiltrate

- Most early cases of AK (70%) are misdiagnosed as herpes keratitis.

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- Diagnosis
 - Scraping and plating on *Escherichia coli*
 - *Scraping and staining with Calcofluor white*
 - *Scraping and staining with Diff-Quik*
 - *Methanol fixation*
 - *Methylene blue*
 - *eosin*
 - *Confocal microscopy*

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- Treatment
 - Propamidine (Broline) drops
 - Polyhexamethylene biguanide (PHMB) 0.02% drops
 - Neomycin

Treatment need to be pulsed

ACANTHAMOEBA PEARLS



- Risk factors are not required
- If it's not getting better the diagnosis may be wrong
- Medication transforms the organism to cyst formation – therefore pulse treatment.
- To date, nowhere in the world are Acanthamoeba challenges included in approval of SCL disinfection products.



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- The number of AK cases is increasing
- The two standards for microbial challenge testing:
 - ISO/FDIS 14729
 - US FDA premarket notification 510(k)
- Neither require efficacy testing against *acanthamoeba*!



ACANTHAMOEBA PEARLS

- The use of hydrogen peroxide solution for SCL disinfection has been shown to produce greater kill rates of acanthamoeba than multipurpose solutions.
- Kill rates were highest for 6 hours (compared to 4 hours)



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Dwight Cavanagh's Editorial

- There is no approved drug for treating AK in the US.
- Confocal microscopy is rarely reimbursed.
- The FDA has set no standard to disinfection of cysts or trophs.



Cavanagh, HD. Acanthamoeba Keratitis: 2007: A Train Wreck in Slow Motion. *Eye & Contact Lens* 2007;33:209.

Dwight Cavanagh's Editorial cont.

- Recently the U.S. public health authorities have approved a decrease in public water chlorination.
- This lead to an increase in AK in communities in Illinois where instituted.

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2007: A Train Wreck in Slow Motion. *Eye &
Contact Lens* 2007;33:209



ACANTHAMOEBA PEARLS

- FRUSTRATINGLY our best defense against AK may be nothing better than patient education.

