Infectious Keratitis Course Outline
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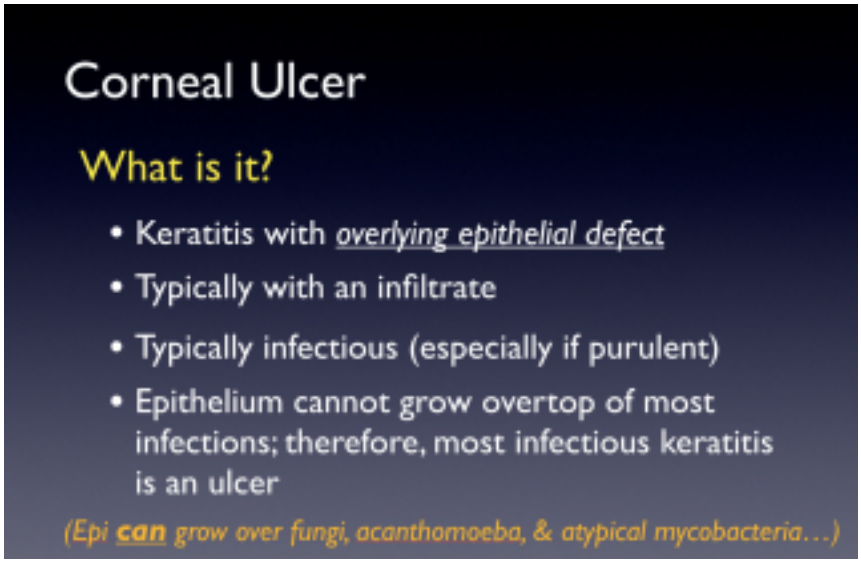
I. Introduction
- A. Objectives: risk factors, symptoms, presentation, diagnosis, treatment, prognosis for various etiologies of infectious keratitis
- B. Keratitis defined - inflammation of the cornea
  1. Etiologies include mechanical, autoimmune, infectious
- C. Common signs and symptoms of keratitis
  1. Infiltrate, discharge, conjunctival injection, limbal injection
  2. FBS, burning, tearing, pain, blurry vision
- D. Infectious keratitis defined - inflammation of cornea due to infection
- E. Corneal ulcer defined - keratitis with epithelial defect and infiltrate
  1. Epithelial cells cannot grow over most infections
  2. Exception is fungi, acanthomoeba, and atypical mycobacteria



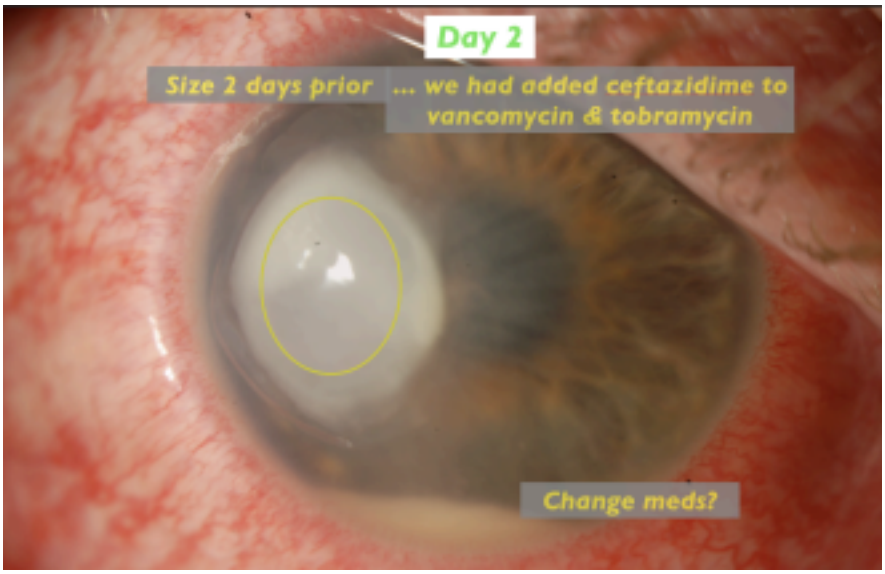
II. Infectious Keratitis
- A. Epidemiology
  1. Epithelial trauma
     - a) Recent surgery
     - b) Entropion
     - c) Exposed sutures
     - d) Bullous keratopathy
     - e) Viral infection
     - f) Medication toxicity
     - g) Stem cell deficiency
  2. Contact lens use
  3. Dry eye
  4. Immunosuppression

5. PK/DALK (corneal surgeries)

B. Exam Findings

1. Proof of etiology with culture
2. Gram Positives
    a) Small, circular in shape
    b) Sharp borders
3. Gram Negatives
    a) Less distinct borders
    b) More mucopurulent discharge
    c) “Stop getting worse before start getting better”

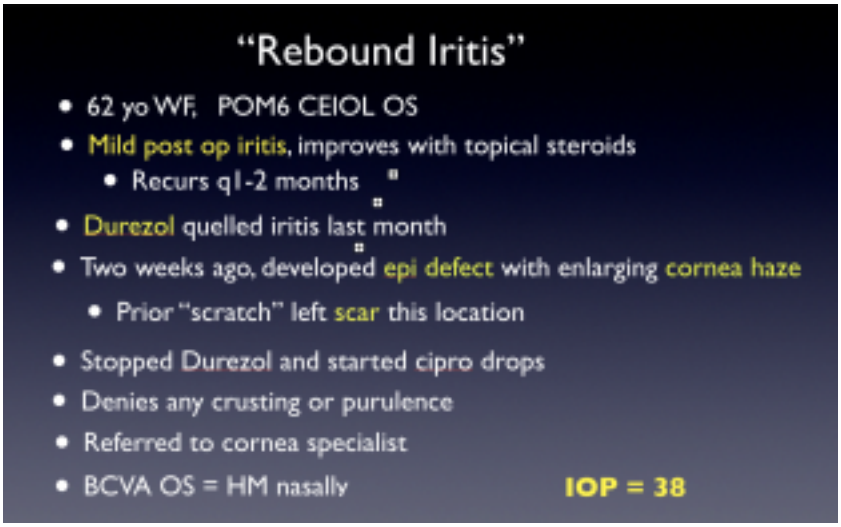
III. Case 1



A. Pseudomonas ulcer

1. Day by day photos
2. Example of stop getting worse before starts getting better
3. Signs to watch for:
    a) Epithelial growth
    b) Infiltrate break up
    c) Hypopyon improvement
    d) Corneal toxicity + inflammation from strong abx tx
        (1) Reduce abx dosing
        (2) Add Pred cautiously
        (3) Frequent follow up

IV. Case 2



1. Patient on and off topical steroids since cataract surgery 2. Durezol works best for rebound iritis

3. Management:

a) Culture

b) Topical Cipro to prevent superinfection

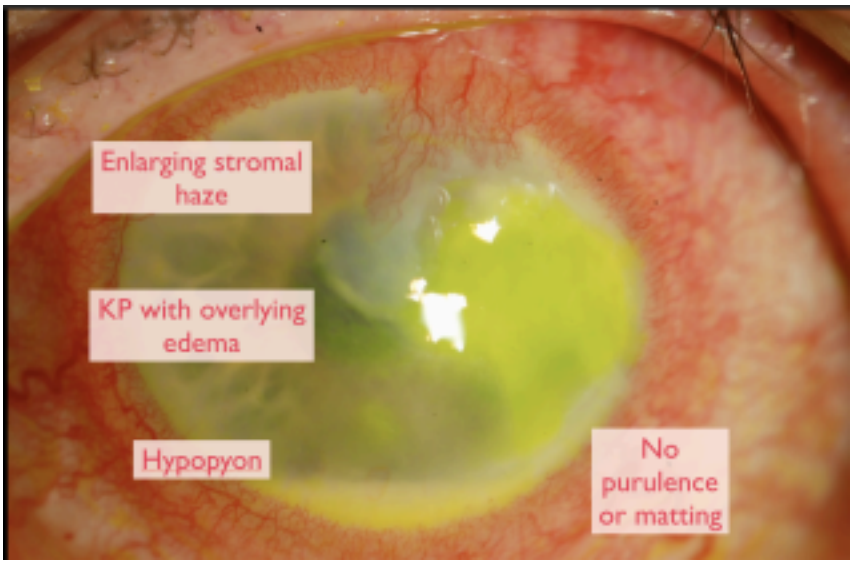
c) Topical Zirgan 5x/day

d) Oral Acyclovir 800mg TID

e) IOP lowering drops

f) Stoppage of steroids (temporarily)

g)



B. HSV Pan Keratitis

1. Infectious epitheliitis

a) Active dendrites

b) Geographic ulcer

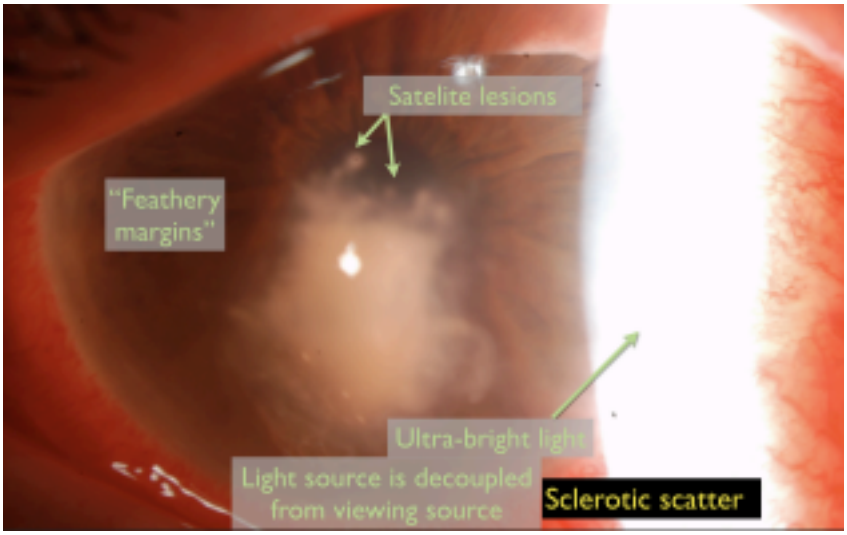
c) MUST STOP STEROIDS

d) Treat with oral and topical antivirals

2. Stromal Keratitis
    a) Disciform or Nummular
    b) Needs steroids + oral antivirals
3. Endothelitis
    a) Keratic precipitates
    b) Edema
    c) Trabeculitis
    d) Needs steroids
4. Iritis
    a) See above

C. After 1 week of antiviral coverage can cautiously add steroids (topical + oral)
D. Dilated exam shows Acute Retinal Necrosis (ARN)
1. Send to Retina ASAP

V. Cases 3 and 4

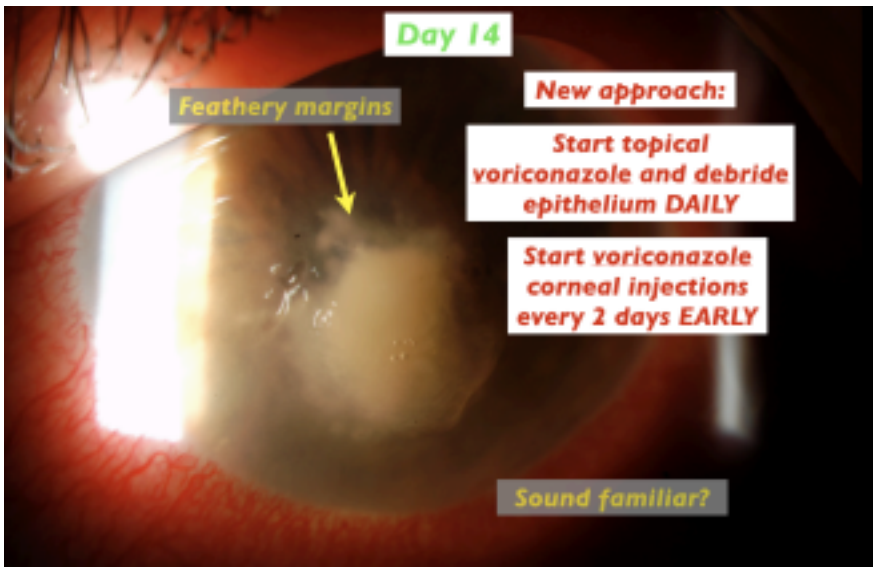


A. Fungal ulcer
1. Plant or vegetative trauma
2. Grows slow
3. Feathery margins
4. Satellite lesions
5. Penetrates corneal stroma quick and deep in early stages
6. Epithelium can heal over fungus
    a) Fungus “hiding” from treatment beneath epithelium

B. Videos of PK, synechiolysis, cataract extraction
C. New approach to treatment
1. Start topical antifungal drops EARLY
    a) Cultures may be negative due to infection spreading deep and epithelium healing overtop

b) Treat based on appearance, signs and suspicion

2. Debride epithelium to allow medication penetration
    a) Infection may be too deep for topical meds to reach
3. Start corneal injections of antifungal medication
    a) Under corneal specialist supervision/direction

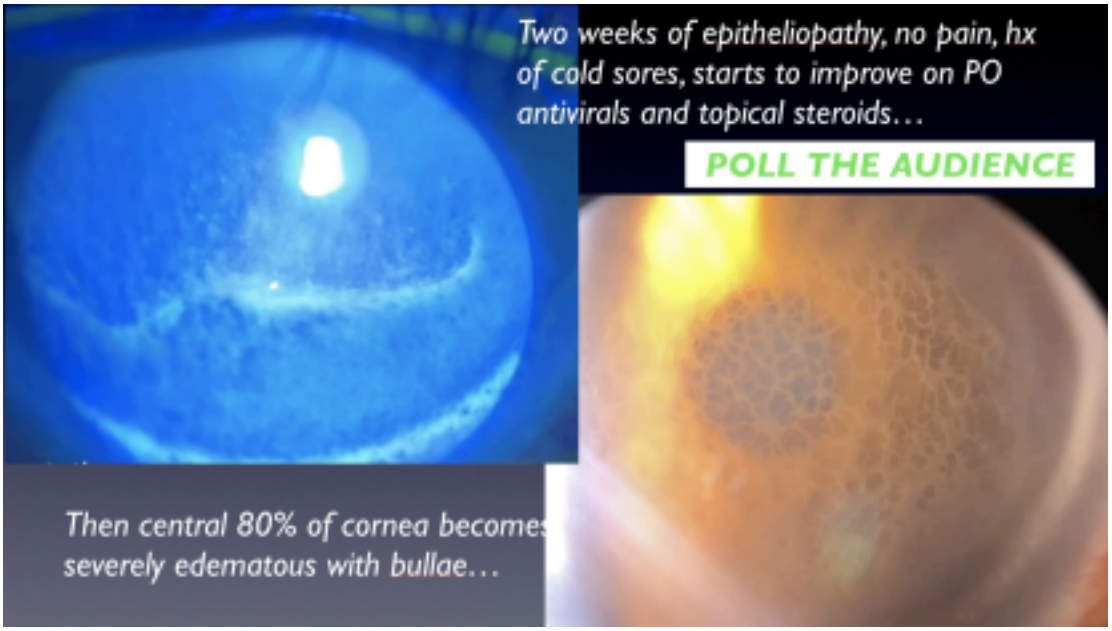
D. 

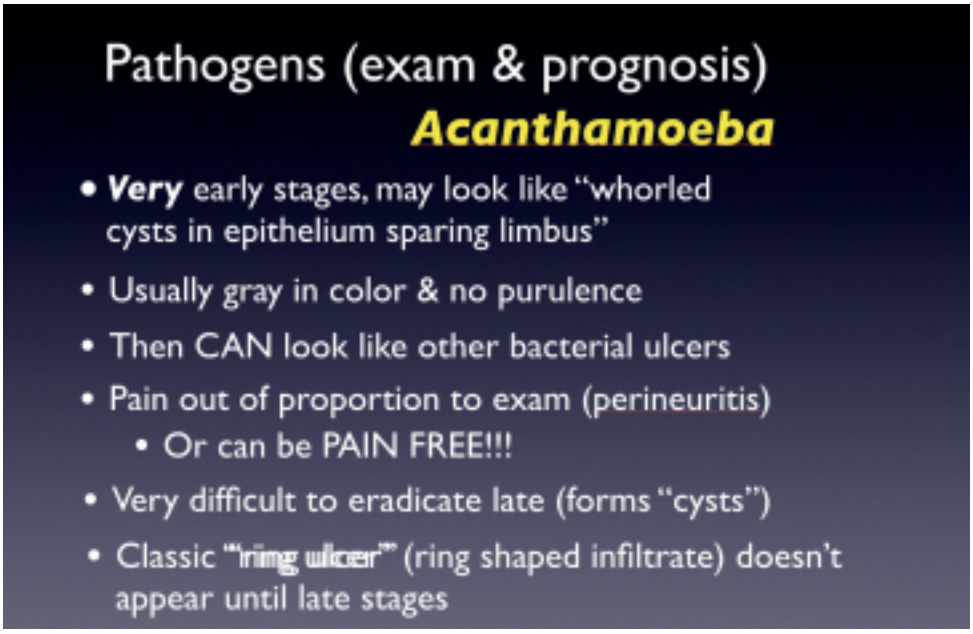
VI. Case 5

A. Acanthomoeba

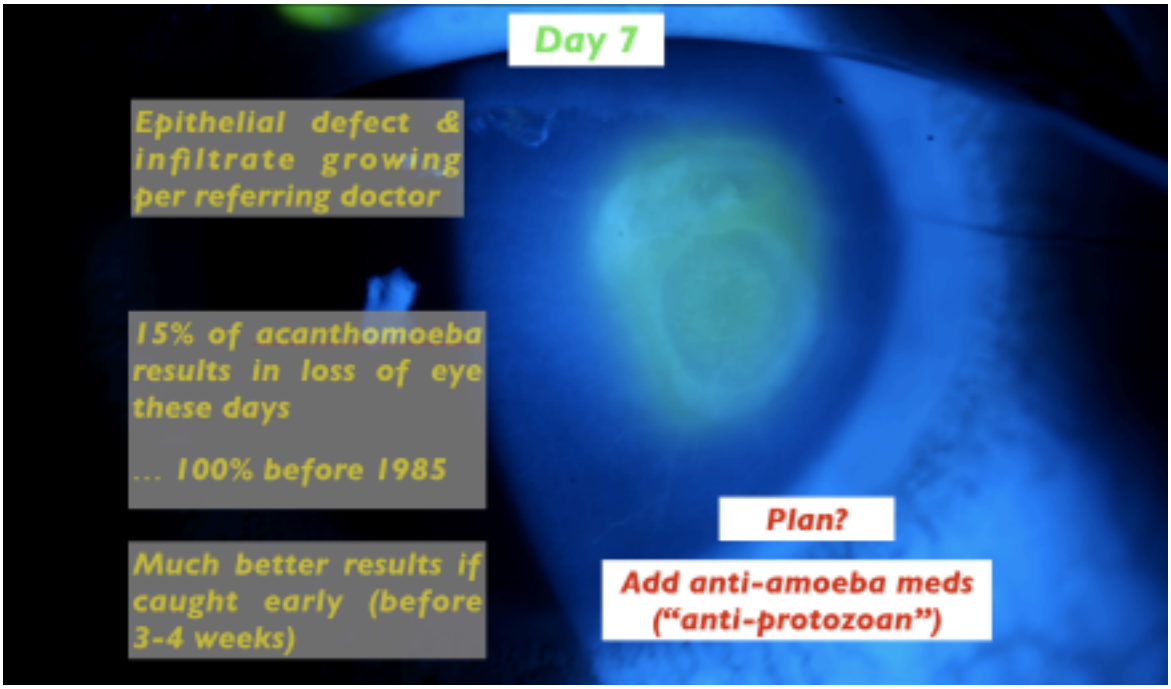
B. Early diagnosis was extremely difficult

1. Non-specific epitheliopathy + bullae
2. Ring shaped infiltrate delayed appearance
3. Videos showing PK + KPro

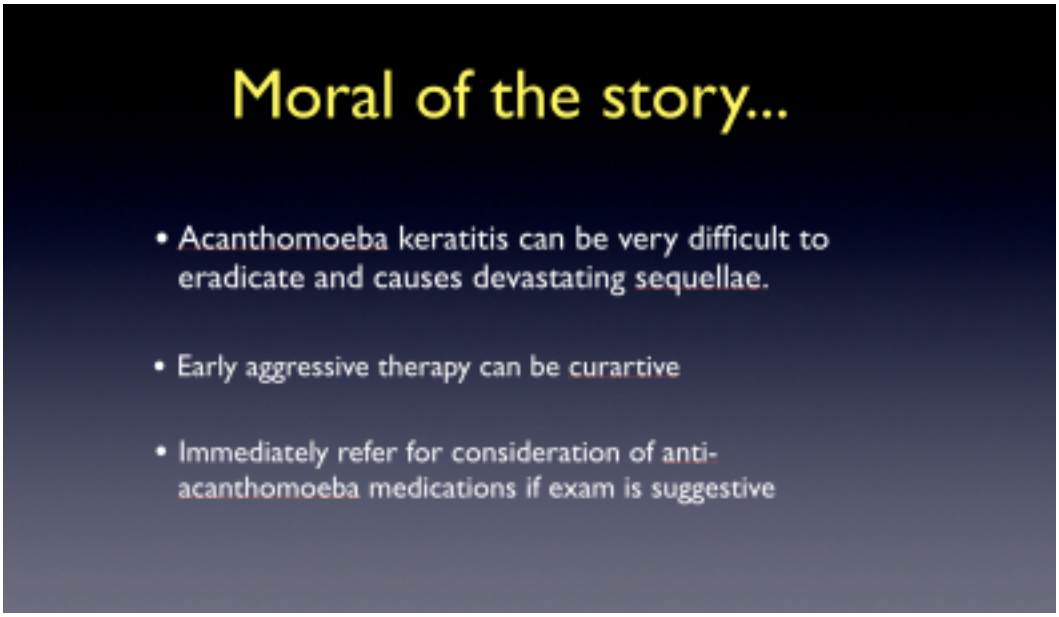




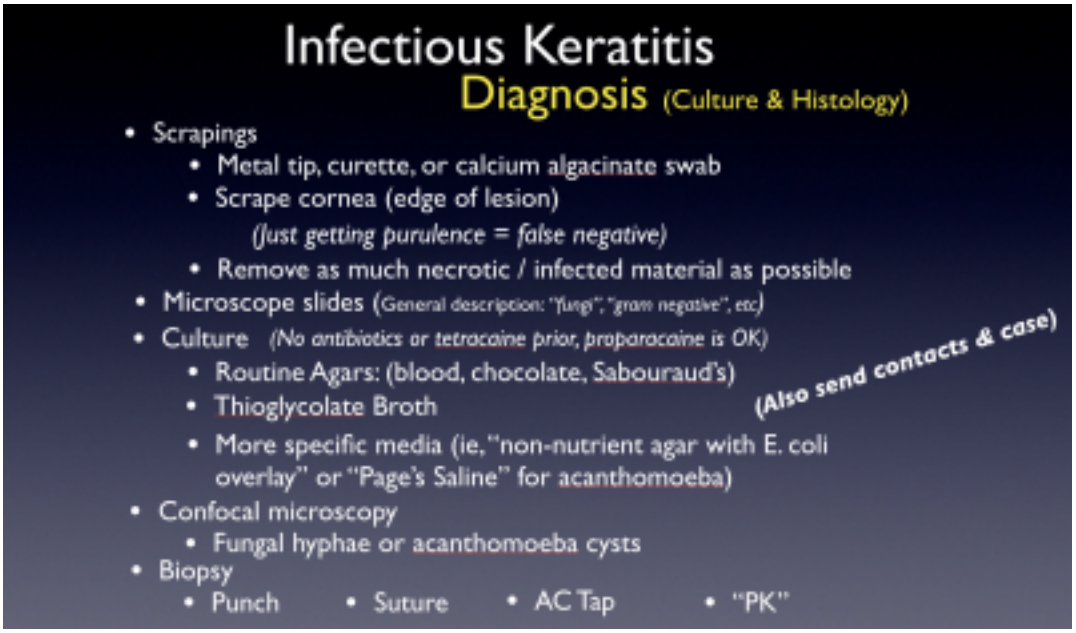
VII. Cases 6 and 7



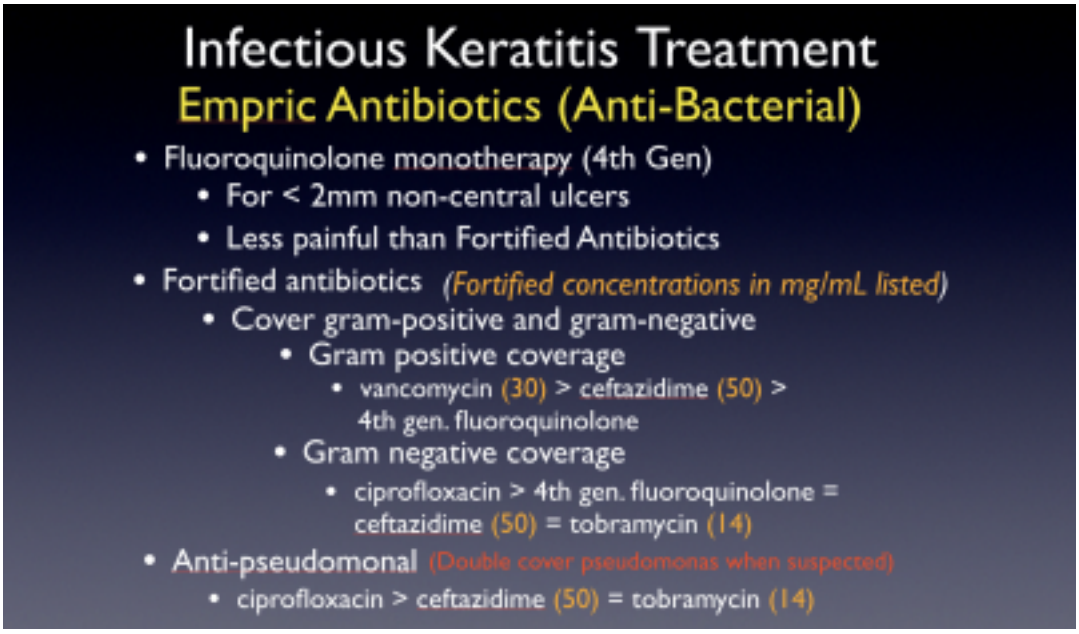
A. Acanthomoeba
B. Meds: Chlorhexidine and PHMB
C. Perineuritis - inflammation of corneal nerves = pain higher than signs
D. Early treatment yields better outcome



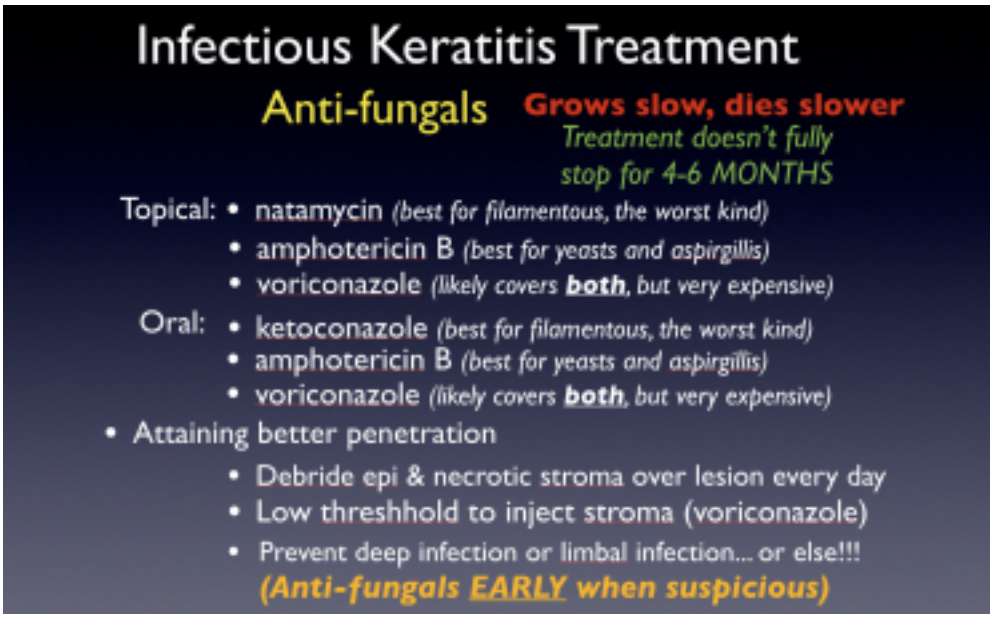
VIII. Review of types cultures + fortified treatment options A.



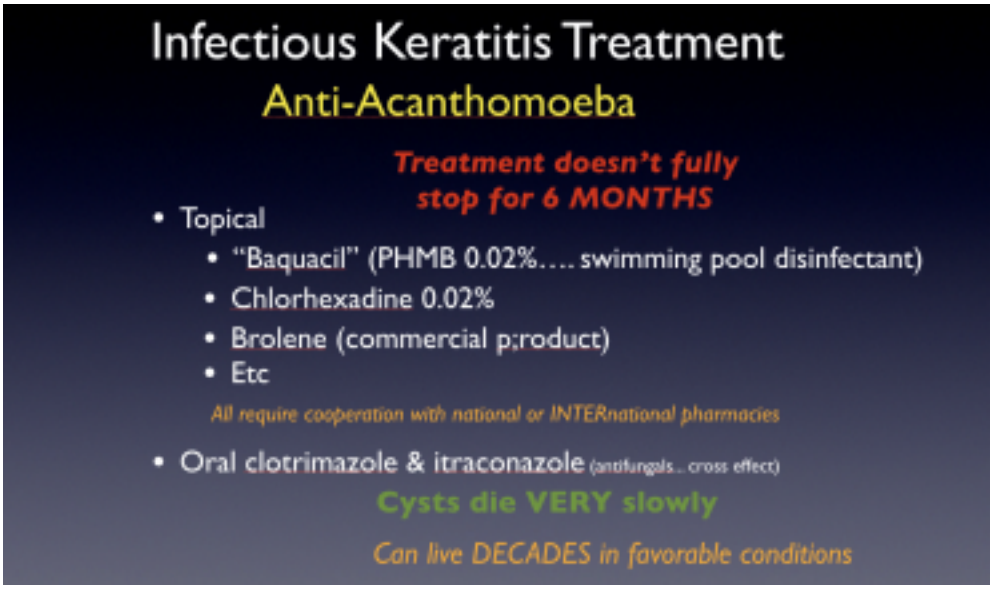
B.


Infectious Keratitis Treatment
Empric Antibiotics (Anti-Bacterial)
• Fluoroquinolone monotherapy (4th Gen)
• For < 2mm non-central ulcers
• Less painful than Fortified Antibiotics
• Fortified antibiotics (Fortified concentrations in mg/mL listed)
• Cover gram-positive and gram-negative
• Gram positive coverage
• vancomycin (30) > ceftazidime (50) > 4th gen. fluoroquinolone
• Gram negative coverage
• ciprofloxacin > 4th gen. fluoroquinolone = ceftazidime (50) = tobramycin (14)
• Anti-pseudomonal (Double cover pseudomonas when suspected)
• ciprofloxacin > ceftazidime (50) = tobramycin (14)

C.


Infectious Keratitis Treatment
Anti-fungals
Grows slow, dies slower
Treatment doesn't fully stop for 4-6 MONTHS
Topical:
• natamycin (best for filamentous, the worst kind)
• amphotericin B (best for yeasts and aspirgillis)
• voriconazole (likely covers both, but very expensive)
Oral:
• ketoconazole (best for filamentous, the worst kind)
• amphotericin B (best for yeasts and aspirgillis)
• voriconazole (likely covers both, but very expensive)
• Attaining better penetration
• Debride epi & necrotic stroma over lesion every day
• Low threshhold to inject stroma (voriconazole)
• Prevent deep infection or limbal infection... or else!!!
(Anti-fungals EARLY when suspicious)

D.



E. Modifying Treatment

1. Initial dose frequency
    a) Hour of power
        (1) Start in office
        (2) Dose abx every 5 minutes, alternating if more than one
    b) Around the clock treatment q1h
        (1) Can do q2h at night
    c) Betadine in office
2. Negative culture?
    a) Be slow to change meds
    b) Only 60% of infections yield a positive culture
3. Tapering meds
    a) Signs and symptoms improving
    b) Don't breed antibiotic resistance
        (1) No need to taper below QID
4. Cycloplegia can lessen inflammation and pain
5. Steroids
    a) Add after 48 hours of solo abx treatment
        (1) Have to see improvement before adding
    b) Watch closely after adding
    c) Consider waiting until culture comes back
6. Conjunctival flap
    a) Full flap for limited VA potential
    b) Partial for marginal infections that are slow to heal
        (1) Or extreme corneal thinning
    c) Doesn't work for acanthomoeba
    d) Delivers systemic meds to area of infection
    e) Protects against corneal thinning

f) Does not adhere to corneal epithelium, only bare stroma

7. PK
8. Antibiotic injections into stroma
    a) Lock and Load corneal injections video