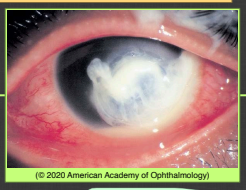
Corneal Ulcer

Case description
college student with history of contact lens wear complains of rapid onset of pain, redness, and decreased vision of his left eye over the past day

Image Description


large corneal ulcer with surrounding corneal edema and hypopyon

Differential Diagnosis

bacterial
- pseudomonas
- infectious crystalline keratopathy
  - risk factors
    - corticosteroid use
    - contact lens wear
    - previous corneal surgery
    - penetrating keratoplasty
  - causative agents
    - α-hemolytic Streptococcus species (Streptococcus viridans)
    - fungal

fungal
- septate filamentous Fungi
  - Fusarium
  - Aspergillus
- nonseptate filamentous Fungi
  - Zygomycetes
    - Mucor
    - Rhizopus
    - Absidia
  - Pneumocystis jiroveci (previously Pneumocystis carinii)
- yeast: Candida
- smear: Gomori methenamine silver (GMS) — not Gram stain, except Candida
- treatment
  - topical natamycin 5% suspension — for most filamentous fungi particularly Fusarium
  - topical voriconazole 1% — inferior to natamycin
  - topical amphotericin B (0.15%–0.30%)
    - for Aspergillus
    - for yeast keratitis

acanthamoeba
- pain
- perineural invasion
- satellite lesions
- ring-shaped infiltrate
- culture
  - nonnutrient agar with E coli or Enterobacter aerogenes overlay
  - characteristic trails
- smears
  - Giemsa (also for Chlamydia)
  - periodic acid–Schiff (PAS)
  - calcofluor white
  - acridine orange
- in vivo confocal microscopy shows the cyst forms
- topical administration
  - biguanides: chlorhexidine — efficacy against both cysts and trophozoites --> mainstay of pharmacologic treatment
  - diamidines: propamidine, hexamidine
  - aminoglycosides: neomycin, paromomycin
  - imidazoles/triazoles: voriconazole, miconazole, clotrimazole, ketoconazole, itraconazole

herpes virus
- lid vesicles
- corneal dendrite

atypical mycobacteria
- vegetable injury
- post-surgery
- after refractive surgery
- indolent course
- keep culture plates x 8 weeks

topical anesthetic abuse
- large ring opacity

Data acquistion

History
- CL wear
  - overnight CL wear
  - expired CL wear
  - continuous CL wear
  - CL wear in hot tub/sauna/lake/ocean
- care/cleaning
  - home-made saline solution
    - tap water
    - distilled water
  - expired solutions
  - particular brand of solution
- prior episodes of eye redness
  - herpes
- topical anesthetic use
- recent trauma/surgery

Physical Exam
- corneal epithelial defect
  - size
- corneal infiltrate
  - size
  - depth
  - ring infiltrate
- corneal perineuritis
  - acanthamoeba
- endothelial plaque
- AC reaction
  - hypopyon

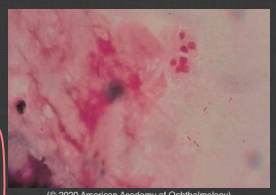
Treatment

Medical
- pseudomonas corneal ulcer
- **Assessment**
- broad spectrum fortified topical antibiotics
  - vancomycin
  - ceftazidime
  - q1h
- cycloplegia
- steroids worsen keratitis, especially ⚠
  - fungus
  - atypical mycobacteria
  - pseudomonas
- systemic antibiotics
  - oral fluoroquinolone
    - scleral extension
    - impending/frank perforation
  - neisseria gonorrhea
    - conjunctivitis
      - outpatient
      - IM ceftriaxone
        - 1 gr
        - single
    - keratitis
      - admit
      - IV ceftriaxone
        - 1 gr
        - X3 days
        - q12-24 hr
  - oral amoxicillin/clavulanate
    - haemophilus
- types
  - low-risk
    - criteria: small, nonstaining peripheral infiltrate with no more than minimal anterior chamber reaction
    - non-CL wearer: fluoroquinolone or polymyxin B/trimethoprim — q1-2 hr while awake
    - CL wearer: fluoroquinolone +- polymyxin B/trimethoprim — q1 hr while awake
  - borderline vision threatening
    - loading dose: 1 drop q5 min x 5
    - fluoroquinolone ± polymyxin B/trimethoprim q1h around the clock
  - vision threatening
    - criteria: size >1.5-2 mm; involves visual axis; unresponsive to treatment
    - Gram (-): fortified tobramycin (gentamicin) or ceftazidime
    - alternating with
    - Gram (+): fortified cefazolin or vancomycin
    - loading dose: 1 drop q5 min x 5

Surgical
- keratitis is unresponsive to antimicrobial therapy
- descemetocele formation or perforation occurs
- indications
- corneal transplant

Patient Education
- Dos
  - discontinue CL wear
  - throw out all open CLs, cases, solutions
  - protective eyewear
- Prognosis
  - guarded prognosis
- Complications
  - corneal perforation
  - corneal transplant
  - dense central scar
- Follow-up
  - criteria for monitoring
    - pain
    - size of corneal epithelial defect
    - size & depth of infiltrate
    - AC rxn
  - daily until improvement

Additional Testing

stain
- gram stain
  - 

  - slender gram-negative rods (Gram stain, original magnification ×1000.)
- acanthamoeba: giemsa stain

culture
- corneal ulcer
- contact lens & contact lens case
- use calcium alginate swab
- culture agar
  - blood agar
  - chocolate agar
  - thioglycolate agar
  - Sabourad agar
- indications for culture
  - infiltrates that extend
    - to the middle of the cornea
    - into deep stroma
    - across a large area (>2 mm)
  - history or clinical features suggest fungal, amebic, mycobacterial, or drug-resistant organisms
  - cases unresponsive to initial empiric therapy
  - +- discontinuation of antibiotics for 12–24 hours