A Presentation of *Pseudomonas aeruginosa* Keratitis Secondary to Contact Lens Overwear
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Abstract
Microbial Keratitis due to contact lens overwear can be a serious vision threatening condition. We present a case involving the central cornea which was found to be secondary to *Pseudomonas aeruginosa*.

I. Case History
- 54 y.o. African American female
- Sudden, worsening pain with yellow discharge and extreme photophobia OS x 3 days
- Ocular/Medical Hx: contact lens related red eye – unknown diagnosis, breast cancer
- Meds: ibuprofen, visine; NKDA
- “trial period” for contact lenses, 2 week lens, current pair 3-4 weeks old, sleeps in lenses, h/o swimming in lenses but hasn’t for over 2 months, using unknown generic contact lens solution

II. Pertinent findings
- BCVA: 20/20 OD, 1/400 – PH: NI OS
- SLE (photos): OS: 3+ lid edema c thickened margins, lashes matted together, 4+ conjunctival injection, 4+ chemosis, 2.4mmx2.7mm central ulcer c infiltrate, discharge, peripheral corneal neovascularization 360, 1.8mm hypopyon, 4+ cell, 2+ flare
- IOP: deferred 2’ corneal pathology
- DFE: no view 2’ corneal pathology
- Pt referred same day to Corneal Specialist for corneal culture
- Laboratory studies: eye culture and stain, acanthamoeba culture and stain, eye fungal culture
  - Results: moderate *Pseudomonas aeruginosa*, few *Staphylococcus epidermidis*

III. Differential diagnosis
- Bacterial keratitis
- Acanthomeba keratitis
- Herpes Simplex Virus keratitis

IV. Diagnosis and discussion:
- Diagnosis: Bacterial Keratitis secondary to *Pseudomonas aeruginosa*
- *Pseudomonas aeruginosa* is a virulent and rapidly progressing Gram-negative bacterium that can be found in soil and water
  - Produces proteases which invade or kill corneal cells
  - Coordinate expression of virulence factors
  - Activate immune system pathways via toll-like receptors (TLRs) which consequently causes continued destruction
- *P. aeruginosa* has a more severe presentation when compared to a cohort of microbial keratitis
  - Large and deep infiltrate
  - Significant decrease in visual acuity
  - Suppurative
  - Associated hypopyon
- 30,000 cases of microbial keratitis in the US every year
- *P. aeruginosa* responsible for up to 39% of microbial keratitis cases in the US
- 3-5 per 10,000 contact lens wearers per year affected
- Low Dk contact lenses can cause corneal hypoxia which can be exacerbated under closed-eye conditions
- Reduced epithelial cell turnover with contact lens wear creates opportunity for infection

V. Treatment, management
- Vision threatening, severe keratitis
- Deep stromal involvement or infiltrate larger than 2mm with extensive suppuration
- Fluoroquinolone loading dose after obtaining culture
  - Every 5-15 minutes for the first 30-60 minutes, then, every 30-60 minutes for 24 hours
- Cycloplegic agent to decrease synechia formation and pain
- Fortified tobramycin or gentamicin (15mg/mL) q1hr altered with fortified cefazolin (50mg/mL) or vancomycin (25mg/mL) q1hr
  - Taper antibiotics as directed, based on clinical situation
- Adjunct corticosteroid recommended when infection is controlled
  - Potentially decrease scarring - SCUT trial
- Contact lens wear must be discontinued
- Systemic antibiotics necessary if adjacent tissues become infected or impending or frank perforation of the cornea is evident
- Follow-up examinations performed daily unless hospitalization is required due to concern for noncompliance or need for intravenous antibiotics
- This patient was cultured and then empirically treated with tobramycin 1.53% q2hr OS which was alternated every hour with vancomycin 5% q2hr OS, as well as cyclopentolate 1% BID OS.
- Medications then altered after pathology confirmation of Pseudomonas aeruginosa
  - Fortified tobramycin 1.53% q2hr OS, ciprofloxacin gttos q2hr OS and ung qhs OS, cyclopentolate BID OS
  - Antibiotics tapered as infection resolved
  - Pred Forte TID OS added 2 weeks after initial onset

VI. Conclusion
- Understanding the array of clinical presentations of microbial keratitis increases effectiveness of empirical treatment and management
- The incidence of microbial keratitis can be minimized with increased patient education of risk factors and preventative measures

-Bibliography
