Severe Bacterial Corneal Ulcer associated with self-neglect

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Abstract: Microbial keratitis can be sight threatening and in some cases, life threatening. This patient presents to our clinic with a severe bacterial corneal ulcer in his left eye that has impending perforation from unknown etiology.

Case History: 92-year-old Caucasian male presents (07/31/17) with painful vision loss in his left eye that started 3–4 weeks prior. Eye pain has an associated constant ‘milky-white discharge.’ Patient describes his pain level as 9 out of 10. He denies exposure to toxic agents or vegetable matter. He confirms that his left eye has light sensitivity and is tender to touch. Patient’s wife reports recent weight loss due to him “not being able to eat” and that he is in overall poor health.

At his last eye exam, 06/21/16, diagnoses included dry eye syndrome, trichiasis lower lid OS, mild/moderate macular degeneration OU, and vitreous prolapse (due to complicated cataract extraction) OS. Systemic history includes: coronary artery disease, carotid artery disease, hypertension, hypercholesterolemia, and chronic obstructive pulmonary disease. His medications include: amlodipine, metoprolol, albuterol, tiotropium, aspirin, and nitroglycerine patch.

Pertinent findings: Visual acuity is 20/25 OD and light perception OS (previously 20/25 OS). Pupils revealed a moderate afferent pupillary defect OS on reverse testing and extra ocular motilities are full OU. Slit lamp exam OD is unremarkable; OS findings are:
- External adnexa: 3+ upper lid and lower lid edema with erythema
- Conjunctiva: 3-4+ diffuse injection, 3+ mucous discharge
- Cornea: Diffusely thin with loss of epithelium and extensive edema/infiltrate involving ~90% of cornea; no definitive Seidel’s sign or iris prolapse into cornea.
- Anterior chamber: poor view but appears very shallow, particularly nasally and temporally; cell/flare present but difficult to quantify
- Iris: Grossly normal but difficult to see detail; old LPI @ 1:00

Assessment: Acute painful corneal infection OS with concern for perforation
- Symptomatic for one month without seeking care
- Differential diagnosis: Infectious corneal ulcer (bacterial, fungal, viral, amoebic); endophthalmitis (primary or secondary); herpetic keratitis

Workup results:
1. Gram stain: no organisms seen
2. Cultures identifies:
   - Gram negative stain: Moraxella species
   - Gram positive: few Streptococcus, Corynebacterium SP
   - Mycology reports pending
Systemic Labs ordered:
- CBC: normal except for mild anemia
- Metabolic profile normal except for elevated glucose (133) but non-fasting
- CRP: <5 mg/L (within reference); ESR: 20

**Diagnosis and discussion:** Central bacterial ulcers are relatively uncommon, with an estimated incidence of 30,000 cases per year in the United States. The risk factors to which this patient had were dry eye disease, lower lid trichiasis causing corneal disruption, reduced systemic immunity and current cigar smoker. This case is classified as a severe ulcer due to the size of the epithelial defect with underlying corneal infiltrate, involving over 1/3 of the cornea and necrosis of corneal tissue with impending perforation. A trend analysis study investigated the prevalence of the most common causes of bacterial infections in the San Francisco, CA region from 1976-1999, found that 59% were gram positive, 31% gram negative, 3% Acanthamoeba and 8% fungi. The most common organism was Staphylococcus aureus (20%), then followed by Strep pneumoniae (11%), Pseudomonas aeruginosa (6%), Moraxella spp (5%) and Serratia marcescens (3%).

**Treatment, management:** This patient given same day referral to local corneal specialist for evaluation. At that exam, gram stain cultures were repeated and unremarkable expect for Moraxella. Empiric antibiotics were initiated and included:
- Fortified Vancomycin 25mg/ml q1H OS
- Fortified Tobramycin 14mg/ml q1hOS
- Vigamox QID OS

Fortified tobramycin was found to have the same empirical coverage as compared to gentamicin and moxifloxacin in a retrospective study from 1993 to 2010 with the Ophthalmic Microbiology Laboratory at the Pittsburgh Medical Center. At a one-week follow-up visit with the corneal specialist, the cornea was showing some signs of improvement. An amniotic membrane was then applied to OS in conjunction to medical therapy. Amniotic membranes have been shown to speed the healing time of corneal ulcers due to the basement membrane of the amniotic membrane resembling the basement membrane of conjunctiva and cornea. This then can work as a scaffold for epithelial cells migration and a mechanical barrier for eyelid interaction.

**Conclusion:** Due to the severity of the case, and our patient’s ill health, this case has a guarded prognosis for any recovery of vision. Even when gram-stain and culture results do not identify the offending organism, empirical antibiotic treatment needs to be initiated immediately. The standard of care for a visually threatening corneal ulcer remains fortified antibiotics.

**Bibliography:**