SUNY Downstate Grand Rounds
April 14, 2016

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Case Presentation

**HPI:** 40 y/o Hispanic male presents to the ED of Staten Island University Hospital North with left>right periorbital swelling. He works in a kitchen and reports falling on a counter two days prior, hitting his left eye. He did not endorse immediate pain/swelling but states that swelling has progressed over the past two days and the pain is mild. He endorses itchiness and mucopurulent discharge. He endorses recent URI. He denies sinus pain or pressure. He denies subjective fevers or chills.
Case Presentation

**POH:** none

**PMH:** DM, ?h/o cirrhosis

**PSH:** none

**FH:** no glaucoma/blindness

**Social:** EtOH abuse

**Meds:** none

**Current gtt:** none

**All:** NKDA
Case Presentation

**Vitals:** T 99.0, P 101, BP 123/74

**NVAsc:** 20/40 OD, 20/100 OS

**Pupils:** no obvious RAPD

**EOM:** full OD/OS

**Tpen:** 18/45

**MSE:** AAOx3

**External:** bilateral periorbital edema L>>R with tense lids and erythema on the left, small LUL abrasion, no obvious proptosis

**PLE:** conjunctival injection OS

**DFE:** wnl
**Case Presentation**

**Labs:**
- **CBC:** 11.7 (83% PMN) > 12.5/34.5 < 26
- **BMP:** 130/3.1/94/24/12/0.68<136, Ca 8.0
- **LFT:** TP 7.4, Alb 3.0, Tbili 4.5, ALT 35, AST 103, AP 65
- **Coags:** PT 22.5, INR 2.1, PTT 37.8

**CT orbits:** left preseptal edema and inflammation, no post-septal inflammation, no sinusitis, no orbital fractures or hemorrhage, ON wnl, no EOM enlargement
Case Presentation

**Working Diagnosis:** preseptal cellulitis with in the setting of possible chronic liver disease

**Plan:** Patient was admitted to the Medical service in the evening for IV antibiotics and supportive therapy. Began receiving IV antibiotics later that night with vancomycin and zosyn.
Case Presentation

**Hospital Day 1 Morning:**
- 102.1 and 102.5 fevers previous evening (before abx 1st doses)
- appears more lethargic, AAOx2
- BP dropped to 94/52 started on IV fluids
- persistent lid edema/erythema appears with expansion of LUL excoriated area
- induration tracking down left maxilla is noted
- STAT repeat CT scan ordered

**Hospital Day 1 Afternoon:**
- BP dropped 79/40 with declining MS
- Coded, intubated and transferred to the MICU
Case Presentation

Hospital Day 1 Late Afternoon:

- persistent lid and cheek edema and erythema
- now with complete sloughing of LUL skin and color change noted
- high clinical suspicion for necrotizing soft tissue infection involving the left periorbit
- no post-septal involvement on CT scan
Case Presentation

CT SCANS
Case Presentation

Hospital Day 1 Evening:
• Patient taken to the OR for immediate surgical debridement with General Plastic Surgery and Ophthalmology

**Culture:** S. pyogenes

**Path:** inflammation with soft tissue necrosis
Infectious Orbit

- Bacterial Cellulitis
  - Preseptal
  - Orbital
- Necrotizing Fasciitis
- Orbital tuberculosis
- Mucormycosis
- Aspergillosis
- Parasitic
  - Trichinosis
  - Echinococcosis
Bacterial Cellulitis

Bacterial spread from three primary sources:
• direct spread from adjacent sinusitis or dacryocystitis
• direct inoculation following trauma or skin infection
• bacteremic spread from distant focus
Preseptal Cellulitis

**Children:**
- sinusitis
- H. influenza with bacteremia and meningitis (rare now with routine childhood Hib vaccination)

**Adults:**
- penetrating cutaneous trauma
- dacryocystitis

**Presentation:**
- eyelid edema, erythema, and inflammation without globe/orbit involvement
- abscess may present (MRSA)
Preseptal Cellulitis

• CT imaging to evaluate sinuses and orbit
• Appropriate antibiotic coverage
  • *S. aureus* (including CA-MRSA & HA-MRSA)
• Admit for IV antibiotics in some cases
• Abscess drainage as necessary
Orbital Cellulitis

- Secondary extension of sinusitis (90%)
- Adults (multiorganism); Children (GPC)
- Fever, Leukocytosis (75%)
- Proptosis, chemosis, ptosis, EOM restriction/pain

Decreased VA
Decreased color vision
Constricted visual fields
Pupillary abnormalities

CT imaging
ENT consultation
Admission for broad IV antibiotic coverage

Compressive optic neuropathy!
Orbital Cellulitis

Complications:
- Blindness
- cavernous sinus thrombosis
- cranial neuropathy
- brain abscess
- Death

Subperiosteal abscess
Subperiosteal Abscess

**Surgical Management Criteria:** Garcia and Harris (2000)
- older than 9
- presence of frontal sinusitis
- nonmedial location
- large SPA
- suspicion of anaerobic infection
- recurrence of SPA after prior drainage
- evidence of chronic sinusitis (e.g. nasal polyps)
- acute optic nerve or retinal compromise
- infection of dental origin (high risk anaerobic)
Mucormycosis

• *Mucor or rhizopus*
• Severe fungal infection of sinus/nasal cavity that may directly extend to the orbit
• Systemic disease with metabolic acidosis, diabetes, malignancy
• Immunocompromised status, including steroids or antimetabolites
Mucormycosis

• Vascular wall invasion → thrombosing vasculitis → tissue necrosis and spread

• Orbital apex syndrome
• Proptosis
• Ptosis
• Decreased corneal sensation
• Decreased vision

Nonseptate large branching hyphae on H&E
Mucormycosis

- Systemic control of underlying medical/immunologic abnormality
- IV amphotericin B or liposomal amphotericin B
- Aggressive surgical debridement possibly including exenteration
Aspergillosis

**Acute invasive:**
- fulminant sinus infection with secondary orbital invasion
- severe infection in immunosuppressed patients
- aggressive management with surgical excision and administration of amphotericin B, flucytosine, rifampin, or a combination

Septate branching hyphae of uniform width on Grocott-Gomori methenamine-silver-nitrate
Aspergillosis

**Chronic invasive**
- may include intraorbital and intracranial extension

**Chronic noninvasive sinusitis**
- immunocompetent patients without atopic disease necessarily
- sinus disease with tightly packed fungus ball

**Allergic aspergillosis sinusitis**
- immunocompetent patients with nasal polyps and chronic sinusitis
- eosinophilia, elevated total IgE, positive fungal IgE/IgG
- positive skin test for fungal antigens
- endoscopic debridement
Periorbital necrotizing fasciitis

Overview
• Severe necrotizing soft tissue infection
• Track along superficial fascia and subcutaneous fat (muscle fibers/fascia spared due to blood supply)
• Gangrenous infections associated with high M/M

Epidemiology
• Invasive GAS infections 3.5/100,000 from 2000-2004 in the US (includes sepsis, pneumonia, NF, strep. TSS)
• 8,950-11,500 cases/year → 1,050-1,800 deaths
• Periorbital NF incidence 0.24/100,000 in UK
Periorbital necrotizing fasciitis

**Microbiology**
- Type 1 = polymicrobial involving at least 1 anaerobe
- Type 2 = GAS, toxic shock syndrome present ~50%
- Amrith et al (2013): review of 94 cases of periorbital NF
  - 51.1% GAS

**Risk Factors**
- Immunocompromised with systemic disease, diabetes, alcohol abuse, malignancy, chemotherapy
- Immunocompetent patients (Type 2 infections)
- Tambe et al (2012): 11 patient cohort on periorbital NF
  - 6/11 immunocompetent/healthy
  - 52.9% immunocompetent/healthy
Periorbital necrotizing fasciitis

**Pathogenesis**

- For necrotizing fasciitis in general, source is identified 70% (mostly penetrating trauma)
- Wladis et al (2015): 52.9% without source
- Vasculitis/microthrombi $\Rightarrow$ tissue necrosis/spread
Periorbital necrotizing fasciitis

**Presentation**
- Early: erythema, edema, warmth, pain out of proportion
- Progressing: skin breakdown, bullae with violaceous fluid, cutaneous gangrene
- Later: anesthesia
- Crepitus suggests subcutaneous gas
Periorbital necrotizing fasciitis

Diagnosis

• High suspicion with clinical signs:
  • pain out of proportion
  • induration beyond borders of skin involvement
  • failed initial antibiotic response
  • declining/altered mental status
  • exam changes with skin involvement (bullae, necrosis, ecchymosis)
  • crepitus

• Radiographic signs:
  • Gas (16.9%) and is a late finding

• Labs
Periorbital necrotizing fasciitis

**LRINEC Score**: Wong et al (2004)
- Laboratory Risk Indicator for Necrotizing Fasciitis Score
- >6 associated with 92% PPV and 96% NPV

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<tr>
<th>Variable</th>
<th>Value</th>
<th>Points</th>
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<tr>
<td>C-Reactive Protein (mg/L)</td>
<td>&lt; 150</td>
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<td></td>
<td>≥ 150</td>
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<tr>
<td>WBC (cells/mm³)</td>
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<td></td>
<td>&gt; 25</td>
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<td>Hemoglobin (g/dL)</td>
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<td></td>
<td>&lt; 11</td>
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<tr>
<td>Serum sodium (mmol/L)</td>
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<td></td>
<td>&lt; 135</td>
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<tr>
<td>Serum creatinine (mg/dL)</td>
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<td></td>
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<td>Plasma glucose (mg/dL)</td>
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</tr>
<tr>
<td></td>
<td>&gt; 180</td>
<td>2</td>
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**Risk**  

<table>
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<th>Total Score</th>
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<tr>
<td>&lt; 50%</td>
<td>≤ 5</td>
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<td>50-75%</td>
<td>6-7</td>
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<td>&gt; 75%</td>
<td>≥ 8</td>
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Periorbital necrotizing fasciitis

Management:
• Admission with broad IV antibiotics, may require ICU
  • Note: clindamycin adds antitoxin properties
• Prompt/aggressive surgical exploration
• Better mortality outcomes if within 24 hours of presentation
• Often requires return to OR within 24-36 hours
• Luksich et al (2002): conservative management if limited to eyelids without signs of toxic shock
### Periorbital necrotizing fasciitis

**Outcomes:**
- Necrotizing fasciitis in general with up to 70% mortality
- Lower mortality in periorbital NF:
  - 8/94 (8.95%) in Amrith et al (2013), associated with type 1 infections, toxic shock, facial involvement and blindness

  - VA 20/40 or better (68.75%)
  - Immunosuppression correlated with exenteration

- Amrith et al (2013):
  - Vision loss (13.8%)
  - Surgical debridement done (85.1%)
Back to Our Patient

- Suboptimal initial debridement about 36 hours after initial presentation; Ophthalmology recommends further debridement during the case
- Ophthalmology continues to recommend further debridement recommended as well as hospital transfer for Oculoplastics
- Unable to be transferred, as is medically unstable
- Continued on IV antibiotics in the ICU
- Died about 1 week following initial presentation
Reflective Practice

This case yielded a dramatic presentation of severe periocular infection with high morbidity/mortality and fostered a thorough review of the literature for management.

Thank You
Dr. Mostafavi
Dr. Edghill
Dr. Shinder
Patient
Core Competencies

Patient Care: The case involved thorough patient care and careful, timely and appropriate follow up.

Medical Knowledge: This presentation allowed me to review the presentation, work-up and management of necrotizing fasciitis.

Practice-Based Learning and Improvement: This presentation included a literature search of risk factors and current treatment modalities for necrotizing fasciitis.

Interpersonal and Communication Skills: This case allowed me to interact and discuss with the patient the diagnosis of necrotizing fasciitis.

Professionalism: The patient was provided with testing studies and appropriate follow-up.

Systems-Based Practice: This case allowed the integration of diagnostic services available at SIUH with management of patients in our Eye clinic.
Sources

Thank You!