Curious Cases: Preseptal versus Orbital Cellulitis

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Disclosure Statement:
Nothing to disclose

Preseptal Cellulitis
Orbital Cellulitis

Orbit Anatomy

Sinus Anatomy
Preseptal Cellulitis

• Symptoms
  – Tender, red swollen lids and adnexa

• Signs
  – Eyelid erythema, edema, warmth
  – Mild fever possible
  – Photo credit: Kanski

Preseptal Cellulitis

• NEGATIVE findings
  – Proptosis
  – Optic neuropathy
  – EOM restriction
  – Conjunctival injection
  – Pain

Preseptal Cellulitis

• Causes
  – Local skin trauma
  – Infection

• Organisms
  – Staphylococcus aureus and streptococcus
  – Haemophilus influenzae
  – Herpes

Orbital Cellulitis

• Symptoms
  – Red eye
  – Pain
  – Blur
  – Diplopia
  – Eyelid swelling
  – Nasal congestion
  – Hypoesthesia of skin

Orbital Cellulitis

• Signs
  – Eyelid edema
  – Erythema
  – Warmth
  – Conjunctival injection
  – Proptosis
  – Ophthalmoplegia
  – Optic neuropathy

Orbital Cellulitis

• Causes
  – Direct extension from local infection
    • Sinus
    • Preseptal
    • Dacryocystitis or dacryoadenitis
    • Dental infection
  – Post orbital trauma
  – Post orbital or paranasal sinus surgery
Orbital Cellulitis

• Organisms
  – Adult: Staphylococcus, Streptococcus
  – Child: Haemophilus influenza
  – Post trauma: gram negative rods
  – Dental abscess: mixed, aggressive aerobes and anaerobes
  – Immunocompromised: fungal

Causes of Vision Loss in Orbital Cellulitis

- Proptosis and conjunctival chemosis causing lagophthalmos and corneal exposure
- Endophthalmitis
- Elevated intraocular pressure
- Orbital compartment syndrome or thromboembolus leading to occlusion of the ophthalmic, central retinal, short posterior ciliary arteries, or superior ophthalmic vein
- Mechanical compression of the optic nerve from subperiosteal or intraorbital abscess
- Optic neuritis

Albert & Jakobiec’s Principles & Practice of Ophthalmology

Preseptal Cellulitis

• Differential Diagnoses
  – Orbital cellulitis
  – Chalazion
  – Allergic
  – Erysipelas
  – Necrotizing fasciitis
  – Viral conjunctivitis
  – Cavernous sinus thrombosis
  – Zoster
  – Trauma

Orbital Cellulitis

• Differential Diagnoses
  – Preseptal cellulitis
  – Thyroid orbitopathy
  – Idiopathic orbital inflammatory pseudotumor
  – Subperiosteal abscess
  – Acute dacryoadenitis
  – Orbital tumor
  – Cavernous sinus thrombosis

Orbital Cellulitis Work Up

• History
• Complete eye exam
• Vital signs
• Mental status
• CT orbits and sinuses***
• CBC with differential and blood cultures
• Culture and Gram stain any drainage

Lumbar puncture

Consults
  – ENT
  – Infectious Disease
  – Neurology
  – Oral surgeon

Patient with severe Preseptal or Orbital Cellulitis will be admitted to the hospital***
**Treatment-Preseptal Cellulitis**

- **Mild**
  - Oral antibiotics for 10 days such as:
  - Amoxicillin/clavulanate 500 mg po tid
  - Cephalexin 500mg po tid
  - Trimethoprim 320 mg/sulfamathoxazole 1600mg po bid
  - Moxifloxacin 400mg po qd

- **Moderate to severe**
  - Admit to hospital for IV antibiotics
  - Order CT scan of orbits and sinuses

**Treatment-Orbital Cellulitis**

- Admit to hospital and consult Infectious Disease
- Broad spectrum IV antibiotics
- Nasal decongestant spray
- Polysporin oph ung
- Canthotomy/cantholysis prn

**Orbital Cellulitis**

- Risk
  - Blindness
  - Intracranial spread of infection
    - Cavernous sinus thrombosis
    - Superior orbital fissure syndrome
    - meningitis
    - stroke
    - death

**CASE 1**

- 41 white male with facial and tooth pain for 1 week
- Pain=9/10
- +Fever, chills, nausea and left frontal headache
CASE 1

• Medical History
  – Alcohol, tobacco, cannabis, heroin abuse
  – Hyperlipidemia
  – Schizophrenia, psychotic and mood disorder
  – Dental disorder

Medications

• 1) FLUOXETINE HCL
• 2) FOLIC ACID
• 3) GABAPENTIN
• 4) IBUPROFEN
• 5) NALTREXONE HCL
• 6) OLANZAPINE
• 7) PENICILLIN VK 500MG TAB TAKE ONE TABLET BY MOUTH FOUR TIMES A DAY FOR INFECTION
• 8) THIAMINE HCL
• 9) TRAZODONE

Objective

• Vision
  – OD 20/20
  – OS 20/30 pinhole same
• Pupils: ERRL no APD
• EOM
  – Full without diplopia, but pain OS
• Tonometry @ 1628 hours
  – OD 16
  – OS 15
• DFE—normal OU

External Photos
Assessment/Plan

- Severe preseptal and facial cellulitis
- Stat CT scan of orbits, brain, face
- Admit to hospital ward
- IV Ketorolac
- IV Ampicillin NA/Sulbactam

CT scan

- Soft tissue swelling over the left malar and infraorbital region consistent with preseptal cellulitis

Follow up

- Next day:
  - Pain resolved
  - Erythema and edema improved
  - Vision corrects to 20/20 OD and OS
  - Converted to oral Amoxicillin/clavulanic acid when released from hospital ward

CASE 2

- 67 white male

- Consult from the Medical Team:
  - “cellulitis/impetigo around right eye.”

- Chief complaint: OD swollen shut and multiple facial lesions

CASE 2

- Medical History
  - Job’s Syndrome
  - Neurofibromatosis type 1
  - Hyperlipidemia
  - Osteoarthritis
Inpatient Medications

- 1) ARTIFICIAL TEARS SOLN, OPH DROP(S) TO EYE(S) TID
- 2) ENOXAPARIN INJ 40MG/0.4ML SQ QD
- 3) IBUPROFEN TAB 400MG PO Q6HR PRN
- 4) MOXIFLOXACIN SOLN, OPH 1 DROP OD BID
- 5) MUPIROCIN CREAM, TOP THIN LAYER TOP BID
- 6) SIMVASTATIN TAB 10MG PO QD
- 7) VANCOMYCIN INJ VANCOMYCIN 1.5 GM in SODIUM CHLORIDE 0.9% INJ 500 ML INFUSE OVER 120 MINUTES IVPB QD

Objective

- Vision
  - OD 20/25 pinhole no improvement
  - OS 20/30 pinhole no improvement
  - Pupils: ERLL no APD
  - EOM—smooth and full without diplopia or pain

Assessment

- Severe Preseptal Cellulitis OD and facial impetigo associated with Job's Syndrome

Plan

- Stat CT of orbits/brain
- Continue
  - IV Vancomycin
  - Mupirocin Top BID
  - Moxifloxacin BID OU
- Polysporin ung BID OU & around eyelid
- Carboxymethylcellulose Sodium 0.5% QID OU

Orbit CT scan

Follow up day 3
Discussion

- Job’s Syndrome
  - rare, inherited disease
  - Equal gender prevalence
  - high levels of immunoglobulin E (IgE)
  - multi-system ailments
    - Bone
    - Lungs
    - Skin
  - also known as
    o hyperimmunoglobulinemia E syndrome

CASE 3

- 60 year old White Male
- Chief complaint: “Droopy Left Eyelid” that waxed and waned over 2 weeks
  - Left upper lid—Swollen and mildly painful to the touch

Medical History

- Non-Small Cell Lung Cancer*
- Chronic sinusitis*
- Asthma
- Stable angina
- Small bowel obstruction
- Rosacea

Impetigo Ecchyma

- Impetigo
- Ecthyma

Medications

- Docetaxel
- Albuterol
- Gabapentin
- Lansoprazole
- Lovastatin
- Metronidazole cream prn
- Ibuprofen
- Vicodin
- Multivitamin po qd
- Calcium
- Vitamin E
- B Complex
- Vitamin C
- OTC Sinus tablet po prn
- Tylenol
Overview

- **4 courses of antibiotic therapy over 6 weeks:**
  - Ampicillin Na 3 gm/ Sulbactam 3 gm Inj in Sodium chloride .9% Inj 100 ml infused over 30 min.
  - Amoxicillin/clavulanic acid 500 mg po x 7 days
  - Keflex 500 mg po q12 h x 7 days
  - Keflex 500 mg po q12 h x 14 days

- **CT scan of his head and orbits**
  - Ordered at 2nd Visit, not done until after 6th Visit

Objective

- **Vision cc:**
  - OD: 20/20
  - OS: 20/25 +/-

At all 7 visits

- PERRL D&C – APD
- EOMS: SAFE (-) diplopia, (-) pain
- Confrontations: FULL OD and OS
- Exophthalmometry: OD=OS at 18 mm OU
- Cover test sc: For: Constant Left XT
  - Near: Orthophoria

Fourth Visit

Seventh Visit

Objective

- **Tonometry**
  - Normal OD, OS

- **Biomicroscopy:**
  - Initial visit through Fifth visit: WNL OU
  - Sixth visit:
    - trace injection of bulbar conjunctiva OS.
  - Seventh visit:
    - 2+ injection of bulbar conjunctiva OS
    - 2- Superficial punctuate keratitis OS.

Objective

- **Fundus Exam:**
  - Lens: 1+ NSC OU
  - Vitreous: PVD OU, mild asteroid hyalosis OD
  - Macula: WNL OD, mild ERM with beginning of pseudohole and mild traction OS
  - ONH: Distinct margins OU, OD: .25 h/v OS: .30 h/v
  - Vasculature: WNL OU
  - Periphery: WNL OU
Objective

- **HVF 24-2**: OD: Reliable with no defects, OS: Reliable with no defects.

- **CN Testing**: At all 7 visits
  - I-XII: Intact and WNL

CT scan

- **CT Scan of Head and Orbits**: Soft tissue swelling in the left eyelid is apparently due to extension of presumed inflammatory process in the frontal sinus. There is a fenestration of frontal sinus (postoperative change cannot be excluded) and the frontal sinus is opacified. The sphenoid and both maxillary antra are nearly obliterated by bony overgrowth, presumably secondary to severe sinusitis (perhaps from an atypical agent) and there is also significant periosteal thickening in the ethmoid sinuses. Correlation with previous ENT history is recommended.

Osteomyelitis Frontal Bone

- Frontal skull infection from paranasal sinuses
- Osteomyelitis leads to fenestration
- Initial cases were traumatic

- Staphylococcus most common pathogen

- CT scan to diagnose
- Treatment: Refer to ENT
  - Drain abscess with craniectomy
  - Broad spectrum antibiotics

Discussion - Pott’s Puffy Tumor
Pott’s Puffy Tumor

- Only 20-25 cases reported in literature in post-antibiotic era
- Most frequently seen in teenagers, children, and immunocompromised individuals as a result of trauma or chronic sinusitis.

Pott’s Puffy Tumor

- Sinus trephination followed by long term IV antibiotics successful
- Mortality rates 5-25% in patients with intracranial complications


Pott’s puffy tumour – report of a grotesque case

Case 4

- 65 Caucasian male
  - Eye pain OS s/p foreign body 4 days ago
  - Watery eye, swollen shut

Medical History

- Dermatophytosis (Athlete’s foot/jock itch)
- Hyperkeratosis
- Sensorineural Hearing Loss
- Metatarsalgia / foot deformity
- Dystrophic toenail
- Rheumatoid arthritis
- Osteoarthritis
- Barrett’s Esophagitis
Medications
• Folic Acid 1mg QD
• Loperamide HCL 2mg QD
• Methotrexate 2.5mg Q/W
• Omeprazole 2mg BID
• Urea 20% cream

Objective-Exam 1
• Vision cc
  – OD 20/20
  – OS 20/20
• EOM smooth, full no pain or diplopia
• Confrontations full OD, OS
• Pupils EERRL no APD
• +photophobia OS

Objective
• Orbits/adnexae: painful when touching nasolacrimal sac LLL
• No Proptosis or chemosis OU

Objective
• Slit lamp
  – Sclera/conj: Grade 2/3 injection of inferonasal bulbar and palpebral conj OS
  – Cornea: clear OU
  – AC: VH3 OU, 1 pigmented cell OS, no flare OU
  – Iris normal OU
  – IOP @128pm
    • OD 14
    • OS 18

Objective
• DFE
  – Lenses: Trace NS OU
  – Vitreous: clear OU
  – Nerves: healthy, distinct rims OU
    • OD 0.5
    • OS 0.45
  – Maculae: normal pigment, no edema OU
  – Vessels: normal OU
  – Retinae: flat, intact 360° OU

Assessment/Plan
• Dacryocytis OS
• Rx Cephalexin 500mg tab QID PO x 14 days
• Rx Polytrim gtt QID OS x 14 days
Urgent exam 3 days later

• Patient returns to clinic with worsening eye pain and the eye swollen shut

• Pain = 4 to 10/10 on infero-TEMPORAL lid OS

• Photophobia 5/10 OS only

Urgent exam 3 days later

• Gross exam:
  – Left lower lid periorbital edema TEMPORALLY
  – Scabbed lesion on the edematous region

• Slit lamp
  – Left lower lid: tunneled lesion with serous fluid beneath the scab showing pulsatile movement
“Get it OUT!”

• Instilled topical alcaine and moxifloxacin to the lesion

• Remove parasite with jeweler forceps while applying forceful digital pressure

Assessment

• Cutaneous myiasis of left lower lid

Plan

• Finish course of oral Cephalexin

• Send larva to lab for identification

Myiasis

• Infection of a fly larva in human tissue

• Occurs in tropical and subtropical areas such as Africa and South America
Orbital Cellulitis

Pediatric Orbital Cellulitis

Clinical Pearls

- For any case of preseptal cellulitis, you must rule out an orbital cellulitis
  - History
  - Complete ocular exam
  - Pupils
  - EOM
  - Proptosis
  - Optic nerve evaluation
  - CT scan when indicated***
Clinical Pearls

- Some cases of preseptal cellulitis are high risk and managed the same as orbital cellulitis
  - Hospital admission
  - Broad spectrum IV antibiotics
  - Consult
    • ENT
    • Infectious Disease
    • Neurology

Acknowledgements

- Crystal Tong, OD—Job’s Syndrome
- Julie Blacksmith Cole, OD—Pott’s Puffy Tumor
- Jon Andrews, OD—Bot Fly

References

- Netters anatomy
- Kanski
- Wills Eye Manual
- Albert & Jakobiec’s Principles & Practice of Ophthalmology
- Paintings: Maxfield Parrish