7.4.1. Orbital Infections (I)

Orbital cellulitis

- etiology
  - extension from periorbital structures
    - usually a secondary extension of acute or chronic bacterial sinusitis
      - sinusitis
      - dacryocystitis
      - dental infection
  - exogenous
    - trauma
    - surgery
  - endogenous
    - bacteremia
    - dacryoadenitis
    - endophthalmitis
  - intraorbital
- clinical presentation
  - fever
  - 75% leukocytosis
  - erythema
  - chemosis
  - ptosis
  - proptosis
  - restriction of and pain with ocular movement
  - optic neuropathy
    - decreased vision
    - impaired color vision
    - restricted visual fields
    - pupillary abnormalities
  - demands immediate investigation and aggressive management

Figure 4-1 (Courtesy of American Academy of Ophthalmology)

- management
  - imaging of the orbit and paranasal sinuses is essential
  - identification of sinusitis is an indication for otolaryngologic consultation
  - IV antibiotic therapy
    - broad-spectrum coverage
    - adults
      - multiple organisms
        - gram-positive cocci
        - H influenzae
        - Moraxella catarrhalis
        - anaerobes
      - early surgical intervention to drain the involved sinus is usually indicated
        - especially if orbital findings progress during treatment
    - children
      - single gram-positive organism
      - less likely to require surgical drainage of the infected sinus
  - nasal decongestants
  - steroids
    - when used in addition to antibiotic therapy, may hasten recovery
    - low risk of worsening infection
  - orbital cellulitis following blowout fractures
    - limited to patients with underlying sinus disease
    - prophylactic antibiotics are recommended if CT scan suggests ongoing sinusitis
- subperiosteal abscess
  - clinical presentation
    - progressive proptosis
    - globe displacement
    - failure to show clinical improvement despite appropriate antibiotic therapy

Figure 4-2 (Courtesy of American Academy of Ophthalmology)

    - adjacent to the infected sinus
    - usually localize in the subperiosteal space
    - may extend through the periosteum into the orbital soft tissues
  - treatment
    - medical
      - isolated ethmoid sinusitis, intact vision, and only moderate proptosis
      - isolated medial or inferior subperiosteal abscess in child <3 years
      - multiple pathogens that are drug resistant
    - surgical (+ medical)
      - patient aged ≥9 years
      - presence of frontal sinusitis
      - nonmedial location of subperiosteal abscess (SPA)
      - large SPA
      - suspicion of anaerobic infection (presence of gas in abscess on CT)
      - recurrence of SPA after prior drainage
      - evidence of chronic sinusitis (eg, nasal polyps)
      - acute optic nerve or retinal compromise
      - infection of dental origin (anaerobic infection more likely)
    - concomitant sinus surgery
      - if sinusitis is present
      - particularly anaerobic organisms
    - most patients with orbital cellulitis + abscess respond to appropriate medical ± surgical treatment within 24–48 hours
- complications
  - cavernous sinus thrombosis
    - rapid progression of proptosis
    - development of ipsilateral ophthalmoplegia
    - onset of anesthesia in both the first and second divisions of the trigeminal nerve
    - rare
      - contralateral ophthalmoplegia
  - meningitis/brain abscess
    - lumbar puncture
    - MRI confirms the diagnosis
  - cranial neuropathy
  - blindness
  - death

preseptal cellulitis

- Introduction to orbital inflammations
  - etiology
    - specific inflammations
      - identifiable cause
        - infection
        - autoimmune disease
    - nonspecific inflammations
      - no known local or systemic cause
        - particularly if no obvious source of inoculation is noted
      - diagnosis of exclusion
- Cellulitis
  - most common cause of cellulitis is bacterial infection
    - direct spread from adjacent sinusitis, dacryocystitis, or dacryoadenitis
      - most commonly caused by underlying sinusitis
    - direct inoculation following trauma or skin infection
    - hematologic spread from a distant focus (eg, otitis media, pneumonia)
  - anatomic classification
    - preseptal cellulitis
      - anterior to orbital septum
    - orbital cellulitis
      - posterior to orbital septum
    - often represent a continuum
- source of infection
  - adults
    - penetrating cutaneous trauma
    - dacryocystitis
  - children
    - a common cause is underlying sinusitis
    - organisms
      - past
        - Haemophilus influenzae
          - infants and children < 5 years
          - bacteremia
          - septicemia
          - meningitis
          - H influenzae type b vaccine has significantly diminished this etiology
      - currently
        - gram-positive cocci
- clinical presentation
  - eyelid edema, erythema, and inflammation
  - globe is uninvolved
    - pupillary reaction, vision, and ocular motility are normal
  - pain on eye movement and chemosis are absent
- diagnostic workup
  - workup should proceed quickly, particularly in children
  - CT of the orbit and sinuses
    - if eyelid swelling is profound enough to preclude examination of the globe and exclude orbital cellulitis
    - if no direct inoculation site is identified
- management
  - children
    - outpatient therapy
      - if examination of child is reliable and follow-up examinations can be ensured
      - oral antibiotics
        - anterior etiology
          - cephalexin
        - infection originating in the sinuses
          - amoxicillin clavulanate
        - if CA-MRSA is a possible etiologic agent
          - trimethoprim-sulfamethoxazole (TMP-SMX)
    - hospitalization
      - intravenous (IV) antibiotics
        - ceftriaxone
        - vancomycin
      - indications
        - in some infants
        - if cellulitis progresses despite outpatient therapy
    - frequent warm compresses
    - nasal decongestants
      - if associated sinusitis
  - teenagers and adults
    - usually arises from a superficial source
      - responds quickly to appropriate oral antibiotics
        - ampicillin-sulbactam
        - TMP-SMX
        - doxycycline
        - clindamycin
      - warm compresses
    - Staphylococcus aureus
      - MRSA
        - most common pathogen in patients with preseptal cellulitis resulting from trauma
        - responds rapidly to a penicillinase-resistant penicillin
          - methicillin
          - ampicillin-sulbactam
        - community-associated (CA-MRSA)
          - fluctuant abscess with surrounding cellulitis
          - pain out of proportion to findings
          - susceptible to a range of antibiotics
            - TMP-SMX
            - rifampin
            - clindamycin
        - hospital-associated MRSA
          - sensitive only to
            - vancomycin
            - linezolid
        - both types of MRSA may result in acute morbidity and long-term disability
        - MRSA has also been associated with
          - necrotizing fasciitis
          - orbital cellulitis
          - endogenous endophthalmitis
          - panophthalmitis
          - cavernous sinus thrombosis
        - successful management demands a high degree of clinical suspicion and prompt medical and surgical intervention
        - consult with infectious diseases specialist
  - older adults
    - may not manifest the typical signs of inflammation
    - may not be associated with febrile reaction
    - response to antibiotics may be delayed
    - surgical intervention to excise devitalized tissue may be necessary
  - start antibiotics as promptly as possible
    - prompt sensitivity studies are indicated
  - prompt hospital admission, CT, and IV antibiotics
    - if no response to oral antibiotics within 48 hours
    - if orbital involvement becomes evident
  - consult the primary care physician or a specialist in infectious diseases
  - surgical drainage
    - localized abscess
    - incision and drainage can usually be performed directly over the abscess
    - care should be taken to avoid
      - damaging the levator aponeurosis in the upper eyelid
      - opening the orbital septum

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