Mastoiditis

Background
1. Definition
   - Inflammatory process of mastoid air cells in temporal bone
2. General information
   - Complication of acute otitis media (AOM)
   - Occurrence rate higher in countries with restricted antibiotic use

Pathophysiology
1. Pathology of disease
   - Most commonly extension of AOM through aditus and antrum into mastoid air cells
     - Inflammation of mastoid epithelium blocks adequate drainage and creates opportunity for infection
   - Causes
     - Consider usual organisms as AOM, plus P. aeruginosa
     - Consider drug resistance in recently treated AOM
     - Estimated prevalence of most common pathogens
       - Pseudomonas aeruginosa (12-34%)
       - Streptococcus pneumoniae (14-32%)
       - Haemophilus influenzae (14%)
       - Group A streptococcus (3-26%)
       - Polymicrobial (6%)
       - Staphylococcal epidermidis (5%)
       - Enterococcus (5-9%)
       - Staphylococcal aureus (2-5%)
       - Moraxella catarrhalis
     - Potential complications (total estimated rate 15-55%)
       - Hearing loss, labyrinthitis, and vertigo
       - Potential to spread to CNS
         - Meningitis, brain abscess, epidural abscess
       - Septic thrombosis of lateral venous sinus
       - Behold abscess (below pinna or behind sternomastoid m.)
       - Chronic mastoiditis (most commonly associated with gram-negative enteric bacteria)
       - Osteomyelitis
       - Sigmoid sinus thrombus
       - Gradenigo syndrome (otitis media, retro-orbital pain, abducens palsy)
       - Facial nerve (CN VII) palsy
       - Subperiosteal abscess and osteitis
2. Incidence, prevalence
   - 1.2/10,000 child-years incidence in UK between 1990-2006
   - Most common at age 6-13 mo
   - Equal incidence in males and females
   - May be severe in elderly
3. Risk factors
   - Inadequate treatment of acute otitis media
   - Cholesteatoma
4. Morbidity/mortality
   - Hearing loss, vertigo, facial weakness or other cranial nerve involvement, labyrinthitis

Diagnosis
1. History
   - Fever, earache, pain over mastoid region
2. Physical exam
   - Pain, swelling, erythema, and tenderness over mastoid prominence
   - Displacement of auricle anterior, lateral, and inferior
   - Fever
   - Virtually always otitis media (middle ear effusion with erythema of tympanic membrane or otalgia) or otorrhea, possible sagging of postero superior canal wall
   - May have hearing loss and otalgia
3. Diagnostic testing
   - Diagnosis can be made clinically; imaging can be reserved for suspected complications
   - Mastoid plain radiograph (low sensitivity) → hazy mastoid, opacification of normally air filled sinuses
   - CT of temporal bone → opacification of mastoid air cells
   - Culture, gram stain of tympanocentesis fluid
   - Audiography to evaluate for hearing loss
   - Consider MRI for evaluation of surrounding soft tissues
   - There is no consensus on definitive diagnostic criteria

Differential Diagnosis
1. Otitis media
2. Otitis externa
3. Trauma to pinna or postauricular area
4. Cellulitis
5. Inflammation of posterior auricular nodes
6. Tumors

Therapeutics
1. Admit for systemic abx
   - Cefotaxime 1 g IV q4hr OR
   - Ceftriaxone 2 g IV q24hr
2. Further mgmt
   - Consider myringotomy or tympanostomy; mastoidectomy if no response to IV antibiotics, surgical drainage of abscess if intracranial extension, fluctuant mass behind ear, bony destruction
Follow-Up
1. Two weeks of PO antibiotics after completed IV course
2. Follow-up with ENT specialist with audiogram to assess for hearing loss

Prognosis
1. Early stages reversible with appropriate antibiotic treatment; later stages may require surgical drainage
2. Full recovery if course uncomplicated

Prevention
1. Antibiotic treatment of AOM reduces the risk of mastoiditis by 50%, but the NNT is more than 2100^2

Patient Education
2. University of Virginia Health System patient information on Mastoiditis (http://www.healthsystem.virginia.edu/uvahealth/peds_ent/mastoid.cfm)

References