Chronic Sinus Disease

Upon completion of this activity, the participant should be able to:

- Explain the basic anatomy of the paranasal sinuses
- Distinguish the types of sinusitis
- Identify patients who have aspirin sensitivity driving their airways disease

What is the most likely cause of an acute sinusitis episode?

- A. Cigarette smoke
- B. Allergies
- C. Antecedent viral upper respiratory tract infection
- D. Nasal septum deformity

A patient with Samter’s Triad has nasal polyp disease, asthma and _____?

- A. Multiple antibiotic sensitivity syndrome
- B. Aspirin sensitivity
- C. Allergic rhinitis
- D. Atrophic rhinitis
- E. Rhinitis medicamentosa
- F. Inverted papilloma

A patient with non-resolving sinusitis develops high fever and diplopia. This patient _______.

- A. Can have another antibiotic sent to the pharmacy for 7 days.
- B. May have an ophthalmic emergency requiring a surgical consult
- C. Should be treated with a steroid injection
- D. Should be given an OTC antihistamine.

Anatomy

- Paranasal Sinuses
Anatomy

- Lateral View of Sinuses

Normal Sinuses: Computed Tomography

Introduction to the sinuses

- The paranasal sinuses are hollow, air-filled cavities lined by mucous membrane.
- Each sinus has an opening into the nasal passage lined with mucus membrane for the free exchange of air and mucus.
- The ethmoid and maxillary sinuses are present at birth. The frontal sinus develops during the 2nd year of life and the sphenoid sinus develops during the 3rd year.

Sinusitis

- Infection of paranasal sinuses

What is Sinusitis?

- Sinuses are normally sterile, but the proximity to nasopharyngeal flora allows bacterial and viral inoculation following rhinitis.
- An inflammatory process or infection involving one or more of the paranasal sinuses, most frequently the maxillary and ethmoid.

What is Sinusitis?
Factors Leading to Sinusitis

- Diseases that obstruct drainage (e.g. allergies, nasal irritants, viral URIs) can result in a reduced ability of the paranasal sinuses to function normally.
  - Sinus ostia occlusion >>> mucosal congestion.
  - Mucociliary impairment >>> secretion stagnation
  - Decreased oxygen tension >>> bacterial growth.
- Local and systemic immune competency

Common Predisposing Factors

- Allergies, nasal deformities, cystic fibrosis, nasal polyps, and HIV infection.
- Cold weather
- High pollen counts
- Day care attendance
- Smoking in the home
- Reinfection from siblings
- Profound abnormalities of the nasal septum and/or sinus ostia

Rhinosinusitis Classification

Recurrent Acute Rhinosinusitis

- A. Recurrent acute rhinosinusitis >3 times per year
- B. Requires >2 of the following symptoms
  - Mucopurulent drainage
  - Nasal congestion
  - Facial pain/pressure
  - Decreased sense of smell
- Normal between episodes

Chronic Rhinosinusitis w/ Nasal Polyps

- A. Symptoms present for >12 weeks
- B. Requires >2 of the following symptoms
  - Anterior or posterior mucopurulent drainage
  - Nasal congestion
  - Facial pain/pressure
  - Decreased sense of smell
- C. Objective documentation
  - Rhinoscopic examination OR
  - Radiograph (sinus CT scan preferred)
- D. Bilateral nasal polyps in middle meatus
- E. 20-33% of CRS cases

Chronic Rhinosinusitis w/o Nasal Polyps

- A. Symptoms present for >12 weeks
- B. Requires >2 of the following symptoms:
  - Anterior or posterior mucopurulent drainage
  - Nasal congestion
  - Facial pain/pressure
  - Decreased sense of smell
- C. Objective documentation
  - Rhinoscopic examination OR
  - Radiography (sinus CT preferred)
- D. 60% of CRS cases
Allergic Fungal Rhinosinusitis (AFRS)

- A. Symptoms present for >12 weeks
- B. Requires >2 of the following symptoms
  - Anterior or posterior mucopurulent drainage
  - Nasal congestion
  - Facial pain/pressure
  - Decreased sense of smell
- C. Objective documentation
  - Rhinoscopic examination OR
  - Radiography (sinus CT scan preferred)
- D. AFRS criteria
  - Positive fungal stain or culture of allergic mucin AND
  - IgE-mediated fungal allergy

ACUTE SINUSITIS

- Most cases of acute sinusitis start with a common cold (acute rhinitis), which is caused by a virus.
- In about 0.5-2% of cases, viral sinusitis can progress to acute bacterial sinusitis
  - The most common culprits in acute viral rhinosinusitis are rhinovirus, influenza virus, and parainfluenza virus.

Microbiology of Sinusitis

70% of bacterial sinusitis is caused by:
- Streptococcus pneumoniae
- Haemophilus influenzae
- Moraxella catarrhalis

Other causative organisms are:
- Staphylococcus aureus
- Streptococcus pyogenes,
- Gram-negative bacilli
- Respiratory viruses

4 Major Symptoms of CRS

- Mucopurulent rhinorrhea
- Nasal congestion
- Facial pain, pressure, or fullness
- Decreased sense of smell

Subjective Symptoms of Sinusitis

- History of URI or allergic rhinitis
- History of pressure change
- Pressure, pain, or tenderness over sinuses
- Increased pain in the morning, subsiding in the afternoon
- Malaise
- Low-grade temperature
- Persistent nasal discharge, often purulent
- Postnasal drip: thick nasal secretions that are yellow, green, or blood-tinged drain in the back of the throat and are difficult to clear
- Cough, worsens at night
- Mounthing breathing, snoring
- History of previous episodes of sinusitis
- Sore throat, bad breath
- Headache

Samter’s Triad

- Max Samter, MD
  - 1908-1999
  - U of I, Chicago
  - Allergy/Immunology
- Samter’s Triad
  - Asthma
  - ASA sensitivity
  - Nasal polyposis
Laboratory Investigation

- Quantitative immunoglobulins to screen for a defect in the humoral (antibody-associated) immune system
- Sweat chloride test to rule out cystic fibrosis
- Staining (e.g., GMS) for fungal hyphae on surgical specimen

Antimicrobial Treatment of Sinusitis

- If <10 days, consider supportive only
- Acute:
  - Amoxicillin 1000mg Q8h x 10d
  - Doxycycline 100mg q12h x 10d
- Chronic:
  - Amoxicillin/Clavulanate 875mg Q12h for 10-20d
  - Cefuroxime 500mg Q12h x 10d
  - Moxifloxacin 400mg Q24h x 10d

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Additional Treatment of Sinusitis

• Consider systemic corticosteroids along with antimicrobial therapy,
  – Especially in those patients with known nasal polyps (eosinophil-predominant)
• Consider addition of an inhaled nasal corticosteroid
• Leukotriene modifiers are not FDA-approved for CRS
• For aspirin-exacerbated respiratory disease (AERD) patients, consider aspirin desensitization!!!
• Otolaryngology consultation

Indications for Immediate Referral

• Extrasinus extension is rare, but possibly fatal complication of acute rhinosinusitis or CRS:
  – Double or reduced vision
  – Proptosis
  – Dramatic periorbital edema
  – Ophthalmoplegia, other focal neurologic signs
  – Severe headache
  – Meningeal signs
• Complications of acute sinusitis include orbital cellulitis, cavernous vein thrombosis, brain abscess, meningitis, localized osteomyelitis, and oral-antral fistula.
• Complications of chronic sinusitis include localized osteomyelitis, oral-antral fistula, mucocele, and brain abscess.

Summary

• Acute sinusitis is almost always preceded by a viral infection
• Chronic sinusitis can be characterized by both bacterial and fungal colonization
• Aspirin sensitivity should be determined in known nasal polyp patients