

Chronic Sinus Disease

Jason Knuffman, M.D.
Quincy Medical Group
Quincy, IL
Allergy and Immunology Section

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 _____?

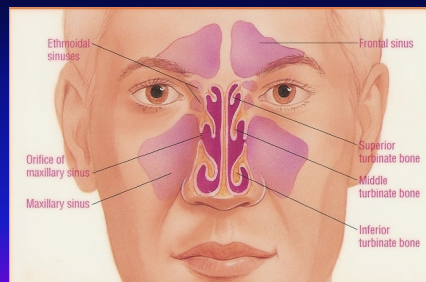
- A. Multiple antibiotic sensitivity syndrome
- B. Aspirin sensitivity
- C. Allergic rhinitis
- D. Atrophic rhinitis
- E. Rhinitis medicamentosa
- F. Inverted papilloma

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

This diagram shows a lateral view of the human head and neck. The sinuses are highlighted in yellow. Labels include: Superior, Middle, Inferior, Frontal sinus, Sphenoid sinus, Adenoid, Nasal passage, Nasopharynx, Opening of Eustachian tube, Fossa, Oropharynx, Epiglottis, Vocal cord, Larynx, Esophagus, Tongue, and Trachea.

Normal Sinuses: Computed Tomography

The left image is a frontal view of a CT scan of the sinuses, with labels for Eyes, Brain, Ethmoid Sinuses, and Sphenoid Sinuses. The right image is a coronal view of a CT scan of the sinuses, with labels for Eyes, Brain, Uncinate Process, Middle Turbinate, Inferior Turbinate, Ethmoid Sinuses, and Nasal Septum.

Normal Sinuses: Computed Tomography

This CT scan image shows a coronal view of the sinuses. Labels include: Eyes, Brain, Superior Turbinate, Middle Turbinate, Inferior Turbinate, Ethmoid Sinuses, Maxillary Sinuses, and Nasal Septum.

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 mucous 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

This diagram shows a frontal view of a human face with the sinuses highlighted in yellow to indicate infection. Labels include: Ethmoidal sinuses, Frontal sinus, Superior turbinate bone, Middle turbinate bone, Inferior turbinate bone, Maxillary sinus, and Orifice of maxillary sinus.

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

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

Dukewicz and Hamilos JAOI February 2014

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

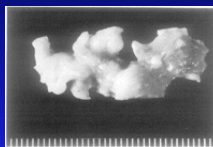
- A. Symptoms present for >12 weeks
- B. Requires >2 of the following symptoms
 - -Anterior or posterior mucopurulent drainage
 - -Nasal congestion
 - -Facial pain/pressure
 - -Decreased sense of smell
- C. Objective documentation
 - -Rhinoscopic examination OR
 - -Radiograph (sinus CT scan preferred)
- 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.*

Dykewicz and Hamilos JACI February 2010

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

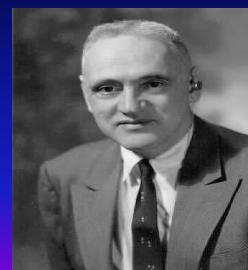
- Mucopurulent rhinorrhea
- Nasal congestion
- Facial pain, pressure, or fullness
- Decreased sense of smell

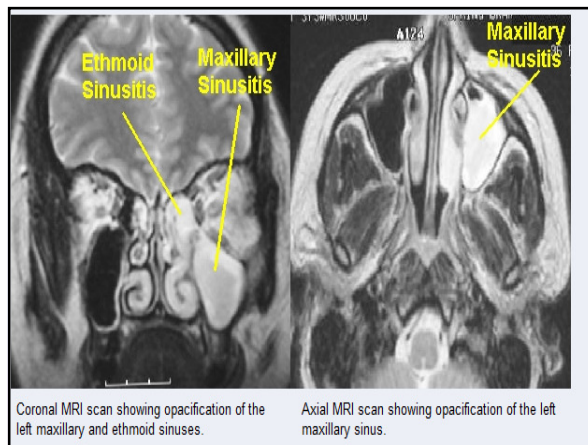
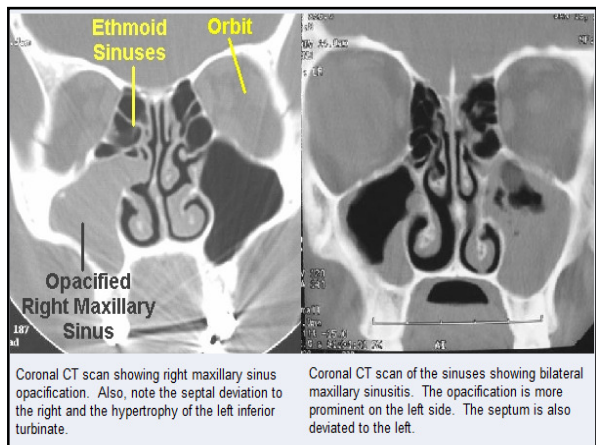
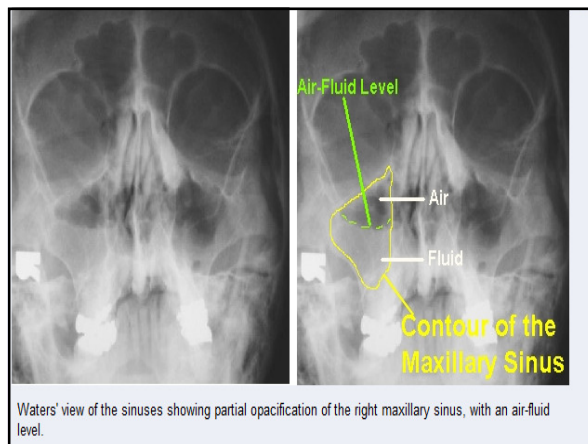
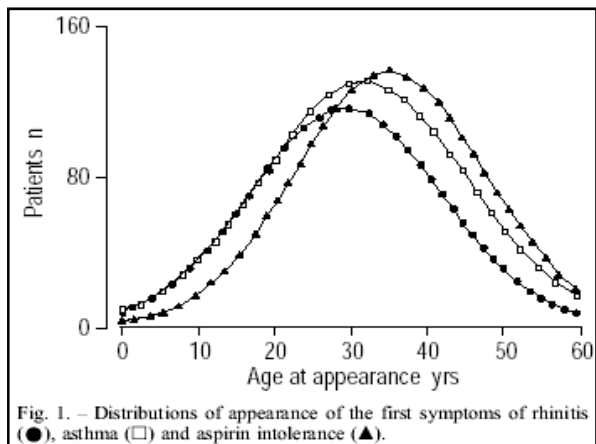
Subjective Symptoms of Sinusitis

- 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
- Mouthing 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 (eg. 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

Gundersen Lutheran, Section of Infectious Disease, January 2010

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

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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