Acute Bacterial Sinusitis: Evaluation and Management in the Adult

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Disclosures

- Troy Woodard, MD
  - Consultant for Medtronic
- Kathleen Yappel Sinkko CNP, MSN
  - None

Objectives

- Identify normal nasal and sinus anatomy
- Define the term rhinosinusitis/sinusitis
- Identify at least 2 major and 2 minor symptoms of rhinosinusitis
- Distinguish at least one different characteristic between viral and bacterial sinusitis
- Participate in a discussion of the treatment of the patient who presents with acute bacterial sinusitis

Nasal Structures

- Turbinates
  - inferior
  - middle
  - superior
- Septum
- Olfactory cleft

What is the function of the nose?

- Breathe
- Warm, Clean, and Humidify the Air
- Aid in taste and smell

Paranasal sinuses
### Possible Functions of Sinuses

- Providing a buffer against blows to the face
- Decreasing the weight of the skull and face
- Increasing resonance of the voice
- Insulating structures from rapid temperature fluctuations

### Possible Functions of Sinuses

- Flotation of skull in water
- Humidifying and heating of inhaled air
- Regulation of intranasal and serum gas pressures
- Immunological Defense

### Epidemiology

- 29.8 million non-institutionalized adults diagnosed with sinusitis
- 13% of non-institutionalized adults
- 12.5 million were diagnosed with chronic sinusitis

*CDC: 2010 Summary Health Statistics for US Adults*

### $\text{S}inu\text{s}i\text{t}i$ $\text{S}$

- 3 billion dollars is the estimated cost of sinusitis in the US

### What is Rhinosinusitis?

- The *inflammation* of the nasal lining and paranasal sinuses.

### Etiology of Rhinosinusitis

- Infection (Viral and Bacterial)
- Allergies
- Environmental factors (Smoking, Pollution, Irritants)
- Structural abnormalities (Deviated septum, Nasal mass, Concha)
- Autoimmune (Wegner’s, Sarcoidosis, Sjogren’s)
- Immunodeficiency
- Cystic Fibrosis, Primary ciliary dyskinesia
- GERD
History is Important!

Acute vs. Chronic Sinusitis

- Acute - up to 4 weeks
- Subacute - > 4 weeks but < 12 weeks
- Chronic - > 12 weeks

Sinusitis Symptoms

- Major Symptoms
  - Purulent anterior nasal discharge
  - Purulent or discolored posterior nasal discharge
  - Facial congestion of fullness
  - Facial pain or pressure
  - Hyposmia or anosmia
  - Fever (for acute sinusitis only)

Sinusitis symptoms

- Minor Symptoms
  - Headache
  - Ear pain, pressure, or fullness
  - Halitosis
  - Dental pain
  - Cough
  - Fever (for subacute or chronic sinusitis)
  - Fatigue

Acute Sinusitis Diagnosis

- 2 Major symptoms
- OR
- 1 Major and 2 Minor symptoms

Viral vs. Bacterial sinusitis

- Which scan is viral? Which is bacterial?
Viral vs. Bacterial sinusitis

You can’t distinguish between viral (URI) and bacterial acute sinusitis on a CT scan.

Duration of Symptoms

<table>
<thead>
<tr>
<th>Viral</th>
<th>Bacterial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>&lt; 7-10 days</td>
<td>&gt; 7-10 days</td>
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</tbody>
</table>

Characteristics

Viral

- Nasal symptoms and/or cough, scratchy throat.
- Nasal discharge usually clear and watery, may turn thick and then become purulent for several days, then reverse to clear or dry.
- May have fever in first 24-48 hours.

Duration is < 7-10 days

Obtained from IDSA Guidelines March 20, 2012

Characteristics of ABRS (Acute Bacterial Rhinosinusitis)

Bacterial 3 typical presentations

- Persistent symptoms that last > 10 days and don’t improve (most common presentation)
- Severe symptoms, characterized by high fever of at least 39 degrees C (102 F) and purulent nasal discharge for at least 3-4 consecutive days.
- Worsening symptoms, characterized by typical URI symptoms that appear to improve and then get worse again after 5-6 days (”double-sickening”).

Obtained from the IDSA Guidelines March 20, 2012

Physical Exam

- Vital signs
- HEENT
- Respiratory exam
- Anterior rhinoscopy
- Nasal endoscopy

Culture
**Diagnostic tests**

**Culture**

**Pros:**
- Identify if there is bacteria in the sinuses, thus distinguishing from viral infection.
- Direct antimicrobial therapy, particularly helpful if there is a resistant bacteria, or patient has had treatment failure

**Cons:**
- Not practical for primary care providers – They see the majority of acute presentations.
- Unless performed properly can contaminate aspiration and lead to misinterpreted results
- Not cost effective in most acute URI presentations

**Diagnostic tests**

**CT sinus scan**

- Not appropriate to order for an uncomplicated URI
- Will not determine is infection is viral or bacterial

**Treatment**

**Empiric antimicrobial treatment is recommended**

- **Amoxicillin clavulanate** should be used initially
  - Increased resistance (varies from region to region)
  - H. flu (beta lactamase producing) was 27%-43%

**Treatment Recommendations for ABRS**

Graded by:
- Quality of evidence (high, moderate, low, very low)
  
  and

- Strength of Recommendation (strong, weak)

**IDSA (Infectious Disease Society of America) Guidelines 2012**
**Amoxicillin Clavulanate**

**Pros:**
- Increased coverage against the microorganism that are resistant to amoxicillin (H. flu, M. Catarrhalis)

**Cons:**
- Increased cost to adding clavulanate and also increased risk of GI effects and rare hypersensitivity reaction.

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**High Dose Amoxicillin Clavulanate**

**Recommended**
- Regions with high rates of PNS (penicillin nonsusceptible) S. pneumoniae
- Severe infection (systemic toxicity fever 102 F or 39 degrees Celsius or greater.
- Age >65
- Immuno-suppressed patients
- Recent hospitalization
- Antibiotic use within past month

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**Fluoroquinolones**

**Adverse effects:**
- Dizziness, headaches, seizures, sleep disorders, peripheral neuropathy,
- Photosensitivity with skin rash, disorders of glucose homeostasis, prolongation of QT intervals, hepatic dysfunction,
- Musculoskeletal complaints

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**Other Antimicrobial Treatments**

**Fluoroquinolones (levofloxacin, moxifloxacin)**
- Very effective against all common respiratory pathogens (S. pneumoniae (PNS), H. influenzae, M. catarrhalis)

**Reserve for:**
- Patients who have failed first line therapy
- PCN allergy
- Second line therapy for PNS S. pneumoniae

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**Fluoroquinolones**

**Adverse effects (cont):**
- Risk of Achilles tendon rupture, tendonitis (increases with age and steroid use).
**Macrolides, TMP-SMX**

- Previously were recommended as alternatives to amoxicillin or amoxicillin clavulanate.
- Now are **no longer** recommended because increased resistance among *S. pneumonia* and/or *H. influenzae*.

**Doxycycline**

- Remains active against all common respiratory pathogens.
  - *S. pneumonia*
  - *H. influenzae*
  - *M. Catarrhalis*

**Oral Cephalosporins**

- 2nd and 3rd generation oral cephalosporins are no longer recommended
  - Variable rates of resistance among *S. pneumonia*.
- If they must be used
  - Combination therapy with a 3rd generation and clindamycin in regions with high endemic rates of PNS *S. pneumonia*.

**Adjunctive Treatment in ABRS**

- Intranasal corticosteroids
- Intranasal saline irrigations
  - Isotonic or hypertonic solution

**Adjunctive Treatment in ABRS**

- Not recommended:
  - Oral decongestants
  - Antihistamines

**Non-responsive Patient**

- Non-responsive
  - No improvement or worsening symptoms after 3-5 days of treatment
  - Change antibiotics to a different antimicrobial class
Nonresponsive Patient

- If still nonresponsive:
  - CT scan or MRI to investigate noninfectious causes or complications
  - Endoscopic culture of the sinuses to direct antimicrobial therapy

Special Considerations

- Pts who are immunocompromised
- Severe infection
  - High persistent fever with temp > 102 F
  - Orbital edema
  - Visual changes
  - Severe headache
  - Altered mental status
- Multiple medical problems, drug allergies and sensitivities, organ transplant, liver or kidney disease

Case Presentation 1:

- 36 year old healthy female
  - CC: “My sinuses are killing me!”
  - 2 days of nasal congestion, clear drainage, facial pressure, loss of smell
  - No fever
  - No co-morbidities
  - Last treated with abx 1 year ago for URI

Case Presentation 1 cont:

- Examination
  - Normal vital signs,
  - Anterior rhinoscopy
    - Inflammation of inferior turbinates
    - Clear mucus
    - Frequently blowing nose
    - Rest of HEENT exam is normal

What is her diagnosis?

Viral Rhinosinusitis
**Why?**

- 3 major symptoms (Rhinosinusitis)
- Duration of symptoms is only 2 days (Viral)

  Treatment is supportive

**Case Presentation 2:**

- 50 year old male
  - CC: “Stuffy nose”
- HPI:
  - Had a “cold” 3 weeks ago with low grade fever, nasal congestion, facial pressure, loss of smell. It got better on its own
  - Now for the past week, has nasal congestion, yellow mucus, cough, loss of smell. No fever. Doesn’t feel like he is improving

**Case Presentation 2:**

- Hx:
  - Diabetes
- Allergies: Pcn
- Examination
  - Normal vital signs,
  - Anterior rhinoscopy
    - Inflammation of inferior turbinates
    - Purulent mucus
    - Sounds hyponasal
    - Rest of HEENT exam is normal

**What is his diagnosis?**

Acute Bacterial Rhinosinusitis

**How do you treat?**

- Fluoroquinolone or Doxycycline
  - If you use another abx, consider culturing because of resistance
- Topical Nasal Steroid
- Saline irrigations

**Why?**

- 3 major symptoms and 1 minor (Rhinosinusitis)
- Duration of symptoms is 3 weeks
  - Double sickening
Thank you!