

**SINUSITISMY TEETH
HURT**

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System

Case No. 85

Review

- Sinusitis is defined as an inflammation of one or more of the paranasal sinuses.
- The four paranasal sinuses are: maxillary, frontal, ethmoid and sphenoid.
- Acute bacterial sinusitis usually occurs following an upper respiratory infection.
- Sinusitis is an upper respiratory infection which affects approximately one of three individuals at some point in their lives.

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Review

- Sinusitis is one of the most common conditions treated by primary care physicians.
- Accounts for greater than \$2 billion annually in healthcare costs.
- Annually approximately 300,000 patients require surgery for sinusitis.
- The NAMCS lists sinusitis as the fifth most common diagnosis for which an antibiotic is prescribed.

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Review

- Factors that may predispose to sinusitis include allergic or occupational rhinitis, vasomotor rhinitis, nasal polyps, rhinitis medicamentosa, and immunodeficiency.
- Up to 10% of cases of acute sinusitis are an extension of dental infection.
- Main factor is obstruction of the ostiameatal unit which may lead to mucous impaction and decrease oxygenation in the sinus cavities.

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Review

- New medical guidelines for both diagnosis and management of sinusitis have been published in the December (98) Journal of Allergy and Clinical Immunology. These guidelines titled "Parameters for the Diagnosis and Management of Sinusitis" are designed to provide current, accurate information for any physician who evaluates and treats a patient with suspected sinusitis.

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Review

- Classification of Sinusitis is frequently based on duration of symptoms and/or the specific sinus involved.
 - Acute sinusitis - symptoms for 3 to 4 weeks
 - Chronic sinusitis - symptoms for 3 to 8 weeks or longer of varying severity consisting of the same symptoms as seen in acute sinusitis
 - Recurrent sinusitis - three or more episodes of acute sinusitis per year

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Objectives

- After completing this case study, the students should be able to:
 - Identify the most likely pathogens associated with acute sinusitis.
 - Design an appropriate antibiotic regimen for patients with acute sinusitis.
 - Define monitoring parameters and therapeutic endpoints for acute sinusitis
 - Recommend adjunctive therapies for the treatment of the symptoms of sinusitis

Patient Presentation

- Chief Complaint
 - “The front of my face and even my teeth hurt, my chest hurts, and I’ve been coughing for a couple of days”

Patient Presentation

- HPI:
 - Marie Holmes is a 39 year old woman who presents to the ED short of breath with a cough productive of green sputum. She is currently afebrile, has some wheezing on expiration, and has had two episodes of post-tussive emesis. She complains of slight pleuritic pain and frontal sinus headache exacerbated by coughing.

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Patient Presentation

- She is diaphoretic, her lips are blue, and she reports fever and chills. She has had an upper respiratory tract infection (most likely viral) for approximately one week.

■ PMH

- Three months ago she was treated for bronchitis on an outpatient basis. The rest of the history is non-contributory, and she has no other medical problems.

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Patient Presentation

■ FH

- Non-contributory

■ SH

- Works as a nursing assistant at this hospital; smoked 1/2 ppd for 29 years until she stopped seven months ago; social use of alcohol

Patient Presentation

■ Meds

- No medications as an outpatient; denies recent use of OTC medications; denies illicit drug use

■ All

- NKDA

■ ROS

- Negative except for complaints noted above

Physical Exam

- VS
 - BP 114/84, P 114, RR 24,
 - T 37.6; Wt 59.5kg, HT 162 cm
- HEENT
 - Tenderness over frontal and ethmoid sinuses, thick, purulent green mucous seen in nasal passage; transillumination of the maxillary and frontal sinuses shows opacity in frontal sinus; bilateral TMs are clear

Physical Exam

- Lungs
 - Expiratory wheezing, O2 sat 90%
- Abd
 - Soft, ND/NT, (+) BS
- EXT
 - No edema or cyanosis
- CXR
 - Right middle lobe infiltrate, consistent with pneumonia

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Laboratory Results

- Sodium 139mEq/L
- Potassium 4.0mEq/L
 - Chloride 104mEq/l
- CO2 content 24mEq/L
 - BUN 27mg/dl
- Serum Creatinine 1.1mg/dl
- Glucose 148 mg/dl (NF)
- Hemoglobin 12.4 g/dl
 - Hematocrit 37.5%
 - Platelets 280,00/mm3
- WBC 12,2000/mm3 with 71%Pms
- 13% bands 15% lymphs 1% monos
- MCV 78um3, MCH 27.1pg, MCHC 33.1g/dl, RDW 14.3%

Emergency Room Treatment

- Ketorolac 60mg IM x 1
- Albuterol nebulization treatments Q 2h
- Methylprednisolone 125mg IVP, then 60mg Q6h
- Ceftriaxone 1g IVPB Q24H, first dose given in ED
- Guaifenesin LA 600mg po BID
- Detrose 5% normal saline 0.45% with 20mEq KCL at 120ml/hr
- Oxygen by nasal cannula at 4L

Clinical Course

- The patient required 36 hours of hospitalization until her O2 saturation increased to more than 95%. She required oxygen by nasal cannula for the first 24 hours. On the second hospital day, ceftriaxone was replaced by trimethoprim-sulfamethoxazole DS one tablet BID. Methylprednisolon IV was changed to oral prednisone 60mg daily, and guaifenesin LA was increased to 1200mg BID. The IV fluids and albuterol treatments were D/C. She remained afebrile throughout her hospitalization and was discharged on the fourth hospital day.

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Problem Identification

- 1. A. What items in the patient presentation indicate the presence or severity of pneumonia?
- Subjective Findings:
- "My chest hurt"... "Coughing for a couple of days"
- C/O slight pleuritic pain
- Reports fever and chills
- Respiratory tract infection (most likely viral) for approximately one week
- Treated three months ago for bronchitis (OPD)
- Reported risk factors (smoked 1/2 ppd for 29 years until stopped seven months ago)

Problem Identification

- Objective Findings

- SOB
- Cough productive of green sputum
- Post-tussive emesis (2 episodes)
- Afebrile
- Wheezing on expiration
- Diaphoretic
- Cyanosis of the lips

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Problem Identification

- Tachycardia -
- Slight tachypnea -
- Right middle lobe infiltrate on Chest X-Ray
- CO2 content 24mEq/L...O2 sat 90%
- WBC 12,200/mm3 with 71% PMNs
- 13% bands

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Problem Identification

- 1. B. What items in the patient presentation indicate the presence or severity of sinusitis
 - Subjective Findings:
 - " The front of my face and even my teeth hurt"
 - C/O frontal sinus headache exacerbated by coughing
 - Cough with episodes (2) post-tussive emesis

Problem Identification

- Past history of bronchitis
- Upper respiratory tract infection (most likely viral) approximately one week
- Reported fever
- Reported risk factor - history of smoking (stopped 7 months ago-smoked 1/2 ppd for 29 years)
- Objective Findings:
- Tenderness over frontal and ethmoid sinuses

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Problem Identification

- Thick, purulent green mucous in nasal passage
- Transillumination of the maxillary and frontal sinuses shows opacity in frontal sinus, bilateral TM's are clear
- WBC 12, 2000/mm³ with 71% PMNs, 13% bands

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Causative Organisms

- What are the likely causative organisms of sinusitis in this patient?

- Streptococcus pneumoniae
- Haemophilus influenzae
- Moraxella catarrhalis

Causative Organisms

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- Streptococcus Pneumoniae
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Desired Outcomes

- What are the goals of pharmacotherapy in this case?
 - Interrupt and resolve the growth of the organisms.
 - Reduce tissue edema in the region of the sinus ostia, to facilitate drainage of retained secretions
 - Maintain ostia patency both during and after therapy
 - Maintain normal body temperature

Desired Outcome

- Restore patency of airway
- Breathing pattern will be effective without pain
- Control the pain (pleuritic/headache) by medicating with an analgesic without depressing respirations
- Mobilize mucous
- Reduce the coughing activity, without aborting the expectorant activity

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Desired Outcomes

- Adequate hydration/ liquefy secretions
- Prevention of electrolyte depletion
- Obtain negative culture reports
- Alleviate nasal congestion

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Therapeutic Alternatives

- Which antimicrobials would provide appropriate empiric therapy for this patient?
 - Mrs. Holmes was hospitalized with an acute episode of community acquired pneumonia and an acute sinusitis. The literature review revealed that both the aforementioned respiratory infections are caused primarily by the same pathogens.

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Therapeutic Alternatives

- Based on the aforementioned knowledge the empiric therapy especially the antibiotic therapy for this patient should be effective for both infections and inflammation.
- Consideration prior to starting the antibiotic is: past resistive history if available, allergies, drug interactions and cost. **It is important that the drug selected must "cover" all of the likely pathogens, since the infected organism(s) have not been identified.**

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Therapeutic Alternatives

■ Streptococcus pneumoniae

– First Choice:

- Penicillin (sensitive) Penicillin/amoxicillin
- Penicillin (resistant) Ceftriaxone or cefotaxime/vacomycin

– Second Choice:

- Penicillin (sensitive) A cephalosporin (G1)/ Trimethoprim-sulfamethoxazole

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Therapeutic Alternatives

- Penicillin (resistant) Clindamycin

– Third Choice:

- Penicillin (sensitive) Chloramphenicol a macrolide Clindamycin
- Penicillin (resistant) Chloramphenicol/Trimethoprim-sulfamethoxazole

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Therapeutic Alternatives

■ Haemophilus influenzae

– First Choice:

- Trimethoprim-sulfamethoxazole
- Amoxicillin-clavulanate

– Second Choice:

- Cefuroxime axetil
- Amoxicillin or ampicillin

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Therapeutic Alternatives

- Third Choice:
- Ciprofloxacin
- Azithromycin

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Therapeutic Alternatives

■ Moraxella Catarrhalis

- First Choice:
- Trimethoprim- sulfamethoxazole
- Amoxicillin and clavulanate
- Ampicillin and sulbactam
- Second Choice:
- A cephalosporin (G2 or G3)2
- Third Choice:

5/24/00- Ciprofloxacin, Tetracycline, Erythromycin

Optimal Plan

- Design a complete therapeutic plan for this patient (including empirical antimicrobial therapy and other treatments) and compare your plan with the measures initiated in the ED.
- 1. In developing this plan I used the following guide from the article "Sinusitis: A Practical Guide for Physicians (97)". To identify appropriate antibiotic regimen and other

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- treatments for patient with acute sinusitis.

Guidelines

- Handout #1
 - provides the clinician guidelines in treating an acute sinusitis

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Optimal Plan

- 1. Ceftriaxone 1g IV q 24h, x 2 hospitalized days (first dose to be given in ER)
- 2. Switch ceftriaxone IV to amoxicillin/clavulanate 500mg (po) q 12hr. X 14 days
- 3. Methylprednisolone 125mg IVP (first dose in ER) then 60mg IV q 6h
- 4. Switch the methylprednisolone 60mg IV q 6h on day 2 of hospitalization to prednisone 60mg (PO).

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Optimal Plan

- 5. The reduce the Methylprednisolone 60mg (po) q day x 2 days
- 40mg (PO) q day x 2 days
- 20Mg (PO) q day x 2 days
- 10Mg (PO) q day x 2 days
- 5mg (PO) until reevaluation on follow up
- visit

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Optimal Plan

- 6. Gualifenesin LA 600mg (PO) q 12hours x 5days (reevaluate)
- 7. Ketorolac 60mg IM x1 then Tylenol grX (po) q4h prn for pain
- 8. Detrose 5% normal saline 0.45% with 20 mgEq KCL at 120 ml/hr
- 9. Oxygen by nasal cannula at 4L, D/C after O2 saturation of 95%
- 10. Vital signs q 4h (while in the hosp)

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Optimal Plan

- 11. Albuterol nebulization treatments 2inhalation q 4h x 2 days, then one inhalation q4h until discharge and home until return visit.
- 12. Pneumococcal vaccine and influenza vaccine
- 13. Nasal saline irrigation Bid PRN
- 14. Tuberculin test
- 15. ENT consult

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Optimal Plan

- The plan created by this writer had very little variation. The focus was on the tapering of the prednisone and adjusting the dosage of the expectorant. There is no significant difference in the cost. It is clear that the focus of the care was centered around the critical component, which was a complication - sinusitis. A review of the case from the emergency room I felt that each issue was addressed.

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Assessment Parameters

- How will you assess the efficacy and safety of the therapy you chose?
- Diagnostic Test
 - sputum culture, Blood cultures (identify the pathogen, modify treatment if needed)
 - monitor CBC, ABGs (return to normal ranges)
 - Chest X-ray (follow up visit, check for resolution of infiltrate)
 - intake and output (adequate)

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Assessment Parameters

- Pulse Oximetry (normal range)
- Glucose testing (normal range)
- serum electrolytes, hepatic enzymes (WNL)
- Pain complaints
- Observe changes in resp rate and depth
- Follow up visit in two weeks upon discharge
- Level of consciousness (alert/oriented)

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Assessment Parameters

- Monitor for hypersensitivity reaction
- Adequate ventilation

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Patient Counseling

- 1. Adequate fluids/diet
- 2. Medication education regarding compliance, and side effects
- 3. Return medical visit/test
- 4. Change/complication in condition
- 5. Avoiding allergens/annual vaccines
- 6. Adjunctive therapies
- 7. Risk factors (smoking)

Patient Counseling

- Use of acetamineophen if needed for comfort and
- avoid cough suppressants, herbal medication and OTC without checking with the physician.

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