



Chronic Sinusitis

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Disclosures

- Dr. Chou and Dr. Murthy have no commercial disclosures.



But first...

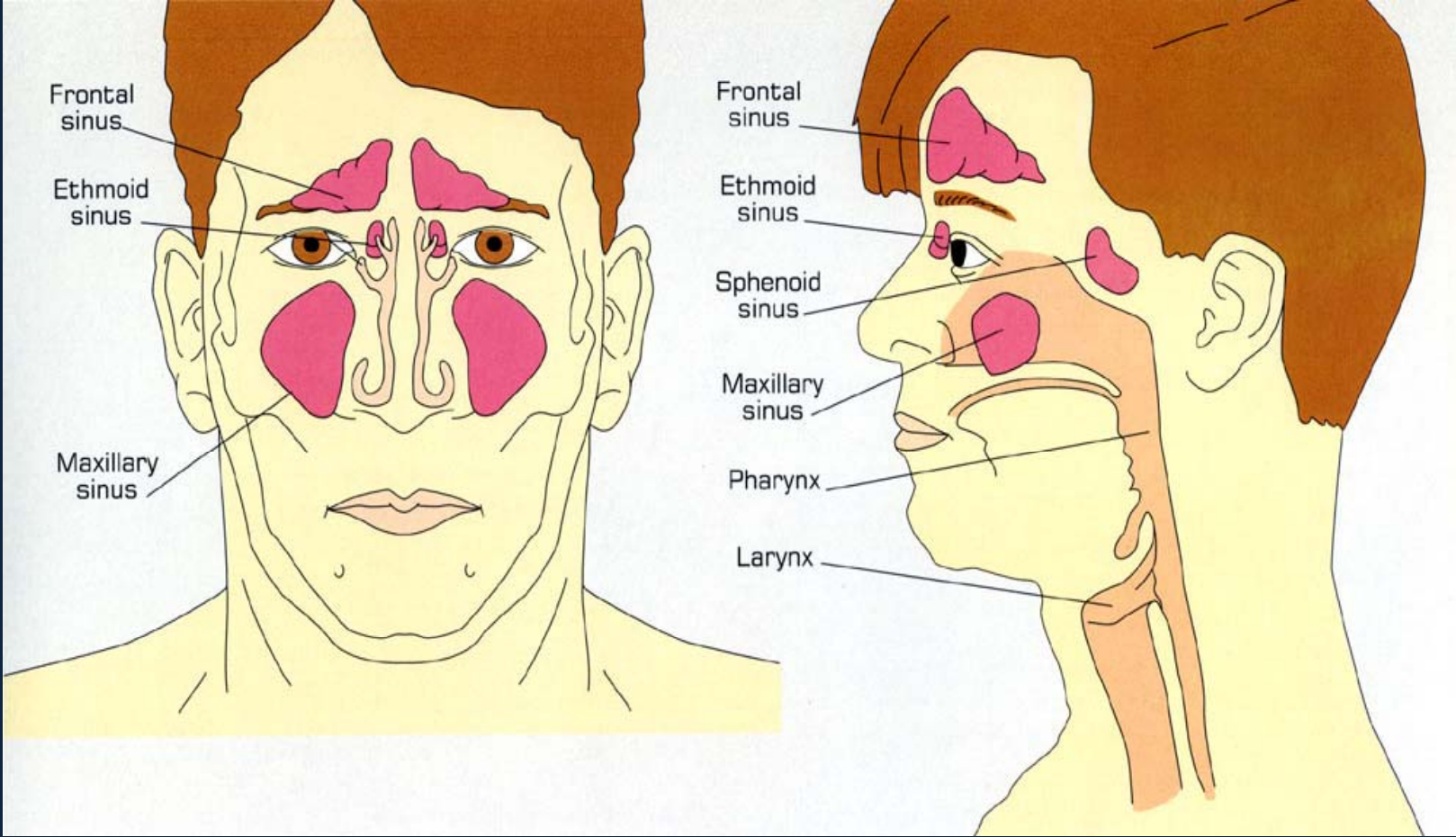
- Congratulations!
- Peanut-free skybox announced at Wrigley Field.





Overview

- Acute sinusitis
 - Anatomy
 - Diagnosis
 - Treatment
- Chronic sinusitis
 - Diagnosis
 - Mechanisms
 - Contributing factors
 - Role of allergies and asthma
 - Associated conditions
 - Treatment





Definitions

- Acute sinusitis < 4 weeks
 - Etiology is usually *infectious*
- Subacute sinusitis – between 4-12 weeks
- Chronic sinusitis >12 weeks
 - Etiology is usually *inflammatory* (polyps, allergies, underlying systemic condition)



Acute Rhinosinusitis (ARS): Diagnosis

- 2 major OR 1 major & 2 minor symptoms

- Major symptoms
 - Purulent anterior nasal drainage
 - Purulent posterior nasal drainage
 - Cough
- Minor symptoms
 - Headache
 - Facial pain
 - Periorbital edema
 - Earache
 - Halitosis
 - Tooth pain
 - Sore throat
 - Increased wheeze
 - Fever

Acute rhinosinusitis (ARS): Treatment



- *When does my child need antibiotics?*
 - Not all sinusitis episodes necessitate antibiotics immediately.
 - Standard of care is treatment with antibiotics after 10-14 days of symptoms
 - Only 2% of acute sinusitis cases involve bacteria – the rest are viral.
 - Overuse of antibiotics can be detrimental.



In our midst: Community-acquired MRSA

Chicago Tribune

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3 drug-resistant staph infections at Naperville high school

Students have been treated
cases 'seemingly isolated,' officials say

April 08, 2010

Naperville Community Unit School District 203 officials this week alerted parents to a "small cluster" of staph infections at Naperville Central High School but said there was no immediate health danger to students or staff.

In a statement Thursday, District 203 officials said three cases of methicillin-resistant *Staphylococcus aureus* were confirmed. The students have been treated by their personal physicians and were back at school this week.

One of the MRSA cases was confirmed before spring break and the other two cases were suspected and later confirmed. As a precaution, extra cleaning was performed during spring break, officials said. Officials said the three cases were "seemingly isolated."

Cochrane Review 2002: Antibiotics for persistent nasal discharge in children.



- To determine the effectiveness of antibiotics vs. placebo in treating children with persistent nasal discharge (rhinosinusitis) for at least **10 days**.
- 6 studies, 562 children compared
- 40% did not have a clinical success documented when reviewed two to six weeks later.
- However, some evidence suggests that antibiotics given for 10 days will reduce the probability of persistence in the short to medium-term.
- The benefits appear to be modest
 - ~eight children must be treated in order to achieve one additional cure (NNT 8, 95% CI 5 to 29).
- No long term benefits have been documented.



Cochrane Review 2007: Antibiotics for acute maxillary sinusitis (adults)

- 57 studies total; 6 placebo-controlled and 51 studies comparing different classes of antibiotics.
- 5 studies involving 631 participants provided data for comparison of antibiotics to placebo.
- 80% of participants treated without antibiotics improve within two weeks; 90% of the antibiotic group improved.
- None of the antibiotic preparations was superior to each other.
- Clinicians need to weigh the small benefits of antibiotic treatment against the potential for adverse effects at both the individual and general population level.



Chronic sinusitis (CRS): Subtypes

- 1) Sinusitis without nasal polyps
- 2) Sinusitis with nasal polyps
 - “Samter’s Triad” – nasal polyps, aspirin intolerance, and asthma
- 3) Allergic fungal sinusitis
 - allergy to cultured fungi
 - production of eosinophilic mucin that contains noninvasive fungi
 - nasal polyposis
 - characteristic radiographic changes
 - immunocompetence



Chronic sinusitis (CRS): Diagnosis

- Symptoms for > 12 weeks
- Can be recurrent episodes (3 per year) of acute sinusitis that never completely resolve
- 1) Diagnosis is confirmed by:
 - CT scan of the sinuses, which can show mucosal thickening or air fluid level
 - Laryngoscopy
- 2) Two or more symptoms must be present to make the diagnosis
 - anterior and/or posterior mucopurulent drainage
 - nasal obstruction or blockage
 - facial pain, pressure, and/or fullness
 - decreased sense of smell

Meltzer EO, Hamilos DL, Hadley JA, Lanza DC, Marple BF, Nicklas RA, et al. Rhinosinusitis: establishing definitions for clinical research and patient care. *J Allergy Clin Immunol.* 2004;114:155–212

Dykewicz MS, Hamilos ML. Rhinitis and sinusitis. *J Allergy Clin Immunol.* 2010; S103-S114.

Mechanisms of CRS



LOCAL

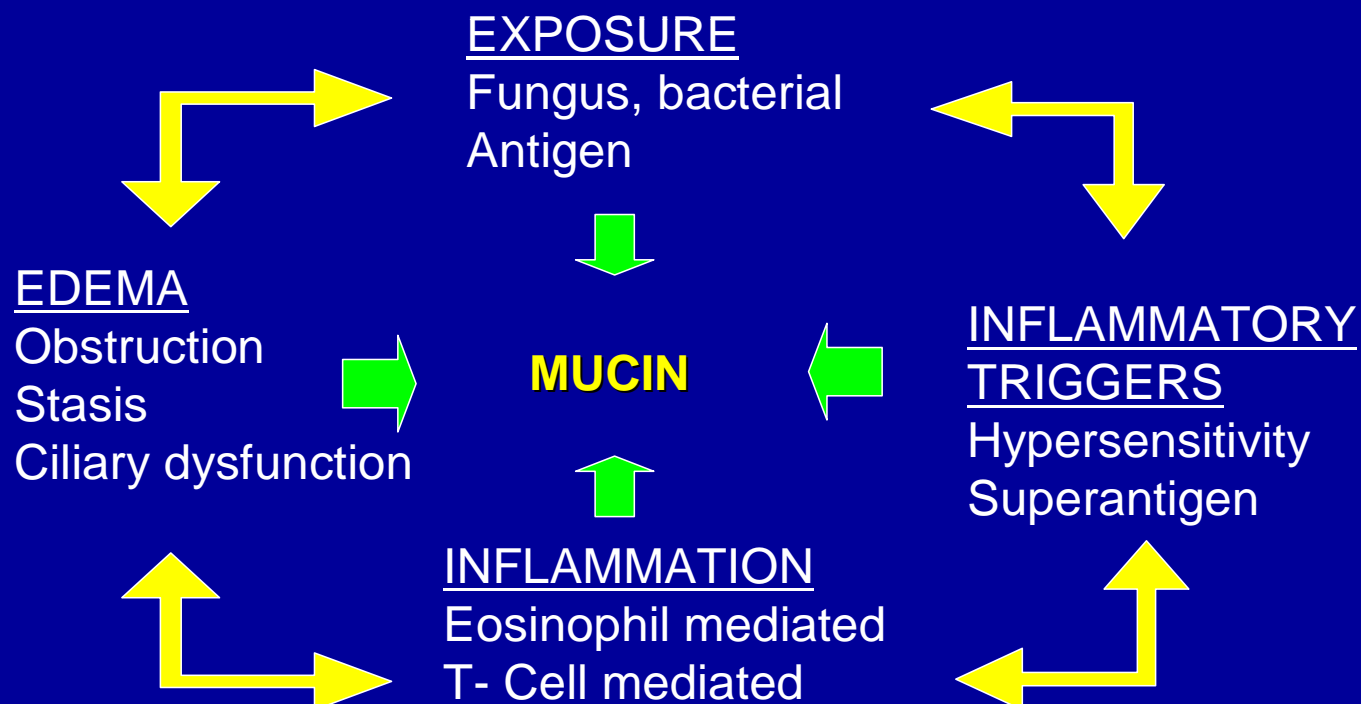
Mucostasis
Anatomic abnormality

ENVIRONMENTAL

Fungal, bacterial, allergen
Geographic

GENETIC

Atopy
HLA



Marple B, Laryngoscop 2001



Contributing factors

- Infection
- GERD (heartburn)
 - Proton pump inhibitor therapy can be helpful
- Smoking
- Foreign body
- Trauma
- Diving
- Structural abnormalities
 - Deviated septum
 - Nasal polyps
- Tumor
- **Allergic rhinitis (hayfever)**
 - **Perennial allergens (dust mite, cockroach, mold, and pet dander) often involved**



Relationship of Allergy to CRS

- Gunman et al¹
 - Chart review of 113 sinus surgery patients; 48 patients included
 - Allergy testing by IgE (blood) or skin testing
 - 57.4% had a positive allergy test
- Emanuel et al²
 - Retrospective review of 200 patients with FESS (sinus surgery).
 - 84% with allergic rhinitis; Perennial allergens in particular (dust mite)
- Practice Parameter Update³:
 - CRS is associated with allergic rhinitis in 60% of adults and 36% to 60% of children
 - Allergy evaluation, implementation of environmental control measures, interventions appropriate for allergic disease

1. Guman et al. *Otolaryngol Head Neck Surg* 2004;130:545

2. Emanuel et al. *Oto H&S*. 2000; 123:687-91

3. Slavin RG, Spector SL, Bernstein IL, Kaliner MA, Kennedy DW, Virant FS, et al. The diagnosis and management of sinusitis: a practice parameter update. *J Allergy Clin Immunol*. 2005;116(suppl):S13–S47



Relationship with Asthma

- Asthma and chronic sinusitis often go hand-in-hand.
- Both conditions must be treated effectively for patients to improve
- “One airway” – the sinus passages, nose, trachea (windpipe), and lungs are all connected



Associated systemic conditions

- Churg Strauss
 - Chronic rhinosinusitis, asthma, and blood eosinophilia
- Wegener's granulomatosis
 - Nasal or oral inflammation is common
- Sarcoidosis
 - Noncaseating granulomas in affected organs, including sinuses
- Cystic Fibrosis
 - 10-32% of CF patients have nasal polyps
- Ciliary dyskinesia
 - Congenital impairment of mucociliary clearance
- **Immune system disorder**
 - HIV
 - * **Common variable immunodeficiency**
 - * **Selective antibody deficiency**
 - * **IgA deficiency**



Immunodeficiencies linked with CRS

- What immune system testing will be done for my child?
 - Quantitative antibodies (IgG, IgA, IgM levels)
 - Humoral immunity panel (measures antibodies against specific bacteria, such as strep pneumoniae and h. influenzae)
- Common variable immunodeficiency (CVID)
 - Lack of antibodies to fight infection (very low IgG, low IgA and IgM)
 - Treated with IVIG (antibody replacement)
- Selective antibody deficiency
 - Antibodies present, but poor response to vaccines (Pneumovax, Hib)
 - Can be treated with IVIG in select cases
- IgA deficiency
 - No treatment, but vigilance required to monitor for recurrent infections



Complications of Rhinosinusitis

- Orbital cellulitis (ethmoid)
- Meningitis
- Subdural/epidural empyema (frontal)
- Brain abscess (frontal)
- Cavernous sinus thrombosis (sphenoid)
- Osteomyelitis (frontal)
- Asthma exacerbation



Danger signs → ***immediate medical attention!***

- Facial swelling or redness over the infected sinus
- Changes in vision
- Bulging of the eye
- Redness or swelling around the eye
- Meningismus



CRS Treatment: Antibiotics

- Amoxicillin is first-line
- For patients who do not respond to amoxicillin, amoxicillin-clavulanate is recommended.
- Alternatives include cephalosporins, TMP-SMX, macrolides, or quinolones.
- Generally, cure rates are similar between classes.
- Practice Parameter update (AAAAI, ACAA and JCAA)
 - 3 to 4 weeks of treatment
 - Continue for 1 week after the patient is symptom-free
 - *Must* complete treatment to avoid antibiotic resistance



CRS Treatment: Steroids

- Nasal steroids
 - Can help reduce local inflammation
- Oral steroids (prednisone)
 - Often needed to reduce swelling in the sinuses
 - Patients might benefit from a brief course (10-14 days) of oral corticosteroids to shrink nasal polyps
 - Often used in combination with antibiotics
 - Regular use can be detrimental due to medication side effects (growth stunting, weight gain, adrenal imbalance, bone density loss, mood changes)

Cochrane Review 2008: Intranasal steroids for acute sinusitis



- 4 studies with 1943 participants met the inclusion criteria.
- Double-blind, placebo controlled studies in which the included participants had acute sinusitis.
- Patients receiving INCS were more likely to have resolution or improvement of symptoms than those receiving placebo (73% versus 66.4%).
- Higher doses of INCS had a stronger effect on improvement or complete relief of symptoms.
- No significant adverse events were reported.
- For acute sinusitis confirmed by radiology or nasal endoscopy, current evidence is limited, but supports the use of INCS as a monotherapy or as an adjuvant therapy to antibiotics.



CRS Treatment: Adjunctive Therapy

- Sinus rinse or Netipot twice daily
 - Neti = Sanskrit for “nasal cleansing”
 - Salt water and baking soda irrigation
 - Cleans out mucus
 - Regular compliance may curb overuse of antibiotics
- If your child likes swimming, he or she will probably tolerate it!
 - Our youngest patient who uses it regularly is a three-year-old girl.



Cochrane Review 2006: Nasal saline irrigations for the symptoms of chronic rhinosinusitis

- 8 randomized controlled trials met the inclusion criteria.
 - 3 compared topical saline against no treatment, 1 against placebo, 1 as an adjunct to and 1 against an intranasal steroid spray. 2 studies compared different hypertonic solutions against isotonic saline.
- There is evidence that saline is beneficial in the treatment of the symptoms of chronic rhinosinusitis when used as the sole modality of treatment.
- Saline is not as effective as an intranasal steroid.
- Some evidence suggests that hypertonic solutions improve objective measures but the impact on symptoms is less clear.
- No recommendations can be made regarding specific solutions, dosage or delivery.
- There are no significant side-effects reported in trials.



CRS Treatment: Alpha-Adrenergic Decongestants

- Topical decongestants (e.g., oxymetazoline and phenylephrine) and oral decongestants (e.g., pseudoephedrine) reduce mucosal blood flow, decrease tissue edema and nasal resistance, and might enhance drainage of secretions from the sinus ostia.
- The use of topical decongestants beyond 3 to 5 days might induce rhinitis medicamentosa, with associated increased congestion and resistance to subsequent decongestant therapy.



CRS Treatment: Allergic Therapies

- Allergen immunotherapy (allergy shots)
 - Small amounts of allergen are given weekly
 - Builds up tolerance to the allergen over time
- Nathan et al.
 - 114 patients with perennial allergic rhinitis and sinusitis, surveyed using the Sinusitis Outcomes Questionnaire.
 - 99% of patients surveyed believed immunotherapy was helpful
 - 72% decrease in days lost from work or school
 - 26% reduction in the use of medications
 - 51% reduction in the overall symptom score



CRS Treatment: Allergic Therapies

- Omalizumab (Xolair) – anti-IgE antibody
 - FDA-approved for severe allergic rhinitis and asthma
 - Studies have shown benefit in chronic sinusitis
 - Antibody that binds IgE, the “allergy antibody,” decreasing mucus and congestion.



CRS Treatment: What's old is new again

- Zileuton (Zyflo)
 - 5-lipoxygenase inhibitor
 - Can inhibit regrowth of nasal polyps
 - Must have baseline bloodwork drawn, then monitor liver enzyme tests monthly for three months, then yearly
 - Twice daily dosing
 - Treats asthma as well as nasal polyps

Ravikumar R. Case series of two anosmic patients with chronic hyperplastic sinusitis with nasal polyposis, who experienced sustained restoration of smell and notable reduction of polyp tissue within nose and maxillary sinus using zileuton. *J Allergy Clin Immunol.* 2005 Feb; 114(2):S201



Surgical Evaluation

- Anatomical abnormalities may require further evaluation by the ENT physician
- Functional endoscopic sinus surgery (FESS)
 - Restores patency to the ostiomeatal unit, the key anatomic area of drainage of the maxillary and anterior ethmoid sinuses
 - Correction of septal deformities
 - Removal of severe concha bullosa deformity
 - Restoration of patency to the frontal sinus.
 - Several studies have reported a high success rate for FESS in improving the symptoms of CRS



Summary

- Acute rhinosinusitis is usually *infectious*
 - If symptoms persist for over 10 days, appropriate antibiotic management is first line
- Chronic rhinosinusitis is usually *inflammatory*
 - Investigation of an underlying allergic condition
 - Workup of immune deficiency
 - Elucidation of structural abnormalities
 - Management is often a team effort between the allergist/immunologist and the ENT physician.



Thank you.

