RHINITIS OR SINUSITIS:
HOW CAN YOU TELL?

Sanford M. Archer, M.D.
Professor of Surgery & Pediatrics
Otolaryngology–Head & Neck Surgery

What is Rhinitis?

- Inflammation of the nasal membranes from ANY cause
- Hard to differentiate from sinusitis
- Now considered part of the spectrum of *rhinosinusitis*

Rhinosinusitis Host Factors

- Allergy
- Septal deformity: Inhibits drainage of sinuses into the middle meatus
- Molar tooth abscess:
  Leads to unilateral maxillary sinusitis
- Immunocompromised: leukemia, chemotherapy, diabetes, AIDS
- Aspirin sensitivity
- Intranasal foreign body
- Polyposis, nasal tumors

Definition of Allergic Rhinitis

IgE-mediated reaction to airborne allergens
- Results in inflammation of the nasal mucosa

Characterized by:
- Nasal congestion
- Episodic rhinorrhea
- Paroxysmal sneezing
- Nasal itching
- Itchy, watery eyes

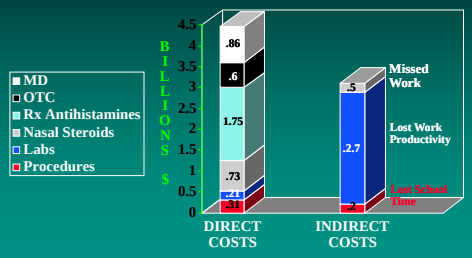
Impact of Allergic Rhinitis

- Affects over 36 million Americans
- Fifth most common illness
- Most prevalent chronic condition in patients under 18 years of age
- Both physical and mental health status are adversely affected

Impact of Allergic Rhinitis

- Yearly Impact
  - 10 million office visits
  - 28 million days of restricted activity
  - 2 million days of missed school
  - 10 million missed work days
- 10,000 children absent from school on a typical school day

Economic Effects of Allergic Rhinitis



What is the Significance of Rhinosinusitis?

- Acute maxillary sinusitis
  - 31 million cases per year
  - 2 million patient visits per year
    - 87% go to primary care physicians
- Chronic sinusitis
  - 35 million cases per year
  - Most common chronic ailment in US
    - 134.4 cases per 1,000 Americans
  - 11.9 million patient visits per year
  - 645,000 ER visits last year
- 6% of 1° care MD visits annually

Allergic Rhinitis Associated Conditions

- Asthma (38% have AR)
- Chronic sinusitis (25% have AR)
- Allergic conjunctivitis
- Otitis media w/ effusion (35% have AR)
- Nasal polyps (29% have AR)
- Atopic dermatitis

Etiology of Rhinitis

- Viral
- Allergy
- Non-Allergic (Vasomotor)
  - Medication related
  - Hormone related
  - Disuse
  - Abuse

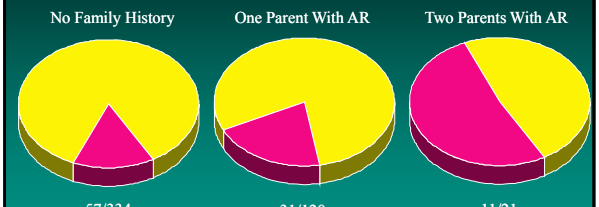
Rhinitis Medicamentosum

- Chronic nose spray use
  - 5 or more days
- Use intranasal steroids
- May require systemic steroids

Vasomotor Rhinitis

- Afebrile, clear nasal drainage
- Allergy tests negative
- IgE negative
- Family history negative

Diagnosis of AR: Family History



57/334
17.2%

31/120
25.8%

11/21
52.4%

N=819, n=99 with rhinitis

Gerrard JW, et al. *Ann Allergy*. 1976;36:10-15.

Allergic Rhinitis Symptoms

- Nasal obstruction
- Clear nasal drainage
- Itchy, watery eyes
- Facial pressure & pain
- Headaches
- Sneezing
- Asthma

Seasonal Allergy

Seasonal causality
- Pollen
- Grasses
- Weeds
- Trees

Ideal for Medical Therapy
- Antihistamines/Decongestants
- Nasal Steroid Spray

Distinguishing Allergic Rhinitis from the Common Cold

	Allergic Rhinitis	Common Cold
Symptoms	Rhinorrhea or congestion, sneezing, watery and itchy eyes	Same as allergic rhinitis, can also include fever, aches, and pains
Warning time	Symptoms begin almost immediately after exposure	Symptoms most severe after a few days
Duration	Symptoms last as long as exposure continues and until the reaction triggered by the allergen ends	Symptoms resolve within several days to a week

American Academy of Allergy, Asthma, and Clinical Immunology. Fast facts: allergies. Available at: http://www.aaaai.org/public/fastfacts/allergies.htm. Accessed November 6, 2001.

Seasonal Symptoms

Ideal for Medical Therapy
- Antihistamines/Decongestants
- Nasal Steroid Spray

Perennial Allergy: Avoidance of Allergens

- Dust
  - Bedding
  - Carpets
  - Stuffed animals
  - Ductwork
- Pet dander
- Cockroach
- Molds
  - Houseplants
  - Damp basements & crawlspaces
  - Windowsills
- Pollens, trees, weeds

Perennial Allergy Control

- Animals outside
- No smoking in the house
- Molds are found in:
  - House plants
  - Basements
  - Showers
  - Humidifiers (also increases house mites)
- Minimize use of rugs

Allergy Evaluation & Therapy

- Avoidance of allergens (Testing?)
  - Environmental
  - Food
- Symptom relief
  (Congestion, PND, Systemic Sx)
  - Nasal steroid sprays
  - Antihistamines
  - Mast cell stabilizers
  - Leukotriene inhibitors
  - Immunotherapy

Allergic Rhinitis Pharmacotherapy

OTC Treatments

- Intranasal cromolyn sodium
- Intranasal decongestants
- Intranasal saline
- Oral antihistamines
- Oral decongestants

Rx Treatments

- Antihistamines
  - Intranasal
  - Systemic
- Decongestants
  - Intranasal
  - Systemic
- Intranasal ipratropium bromide
- Leukotriene inhibitors

Antihistamines for Allergic Rhinitis

- Most common OTC medication
- Relieve sneezing, itching, rhinorrhea, & ocular symptoms
- Oral & intranasal formulations available
- Generally not effective for relieving congestion

Allergy Pharmacotherapy Antihistamines

- First generation
  - OTC
  - CNS side effects
  - TID, QID
- Second generation
  - Selective action
  - Less side effects
  - QD dosing

Intranasal Corticosteroids Mechanism of Action in Allergic Rhinitis

- Precise mechanism of action not known
- Intranasal therapy
  - Administration directly to inflamed tissues
  - Adverse effects limited to local administration
- Reduce inflammatory cell infiltration of nasal mucosa
- Suppress eosinophil, lymphocyte, mast cell & basophil function
- Reduce vascular permeability
- Reduce edema of nasal mucosa
- Effective against early and late phase reactions

Allergy Pharmacotherapy
Intranasal Corticosteroids

- Indicated for ages 3 & up
- Low bioavailability with newer meds
- High safety profile
- No HPA suppression at recommended doses
- No rebound effects
- Growth suppression?
- Cataract formation?
- Teach correct usage!

Allergy Pharmacotherapy
Cromolyn Sodium

- OTC, dosed QID
- Only for allergic rhinitis
- Reduces degranulation of mast cells
- Best results when started before pollen exposure and continued through allergy season

Allergy Pharmacotherapy
Decongestants

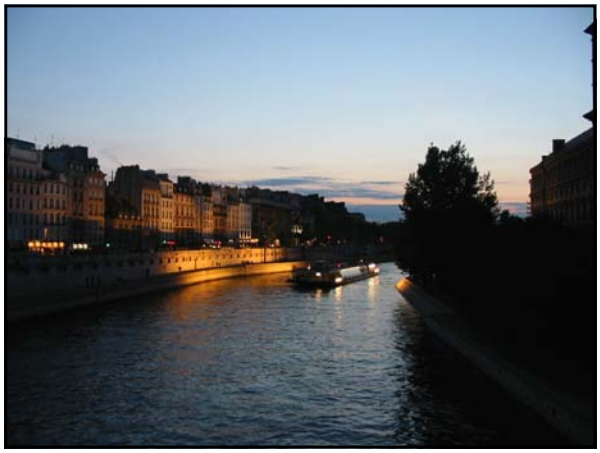
- Drugs
  - Pseudophedrine
  - Phenylpropanolamine – No longer avail.
- Short term benefits
- Tolerance
- Trouble sleeping

Allergy Pharmacotherapy
Antihistamine/Decongestant Combos

- Helps in reducing the congestion of allergic rhinitis
- One pill for both symptoms
- Easier to titrate BID dosing
- Can take the "D" prep in the AM & the plain capsule at night

Surgical Management of Allergic Rhinitis

- Steroid injection of turbinate
- Turbinate surgery
- Septoplasty

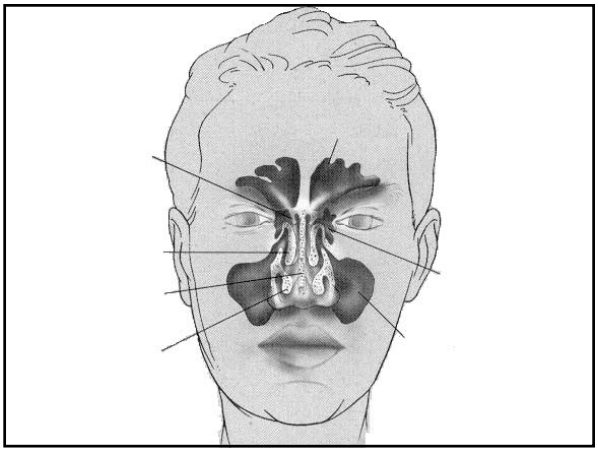


Allergy & Rhinosinusitis

- Increased sinus mucous
- Decreased mucociliary function
- Nasal mucous membrane edema with inflammation
- Obstruction of sinus ostia
- Early allergy treatment may prevent chronic rhinosinusitis

What Do Paranasal Sinuses Do?

- Provide secretions & lubrication for the nasal membranes
- Lighten the skull
- Provide resonance to the voice
- Keep Otolaryngologists busy



Paranasal Sinuses Normal Physiology

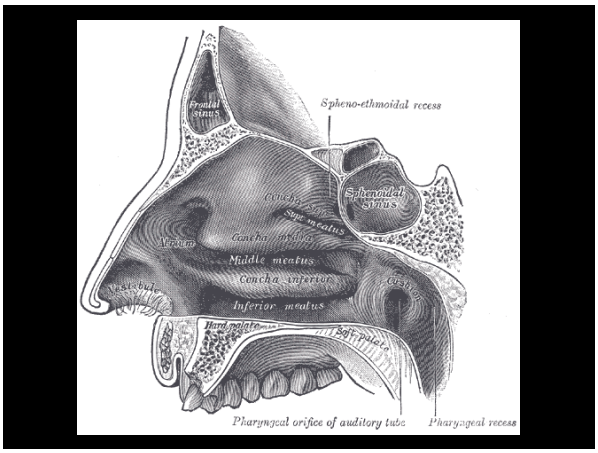
- Pseudostratified, ciliated, columnar epithelium
- Goblet cells
- Biphasic mucous blanket
  - Upper layer thick and viscid
  - Deep layer contacts cilia
- Mucous blanket moves in spiral pattern to and through the **ostium**
- Complete clearing every 10 minutes

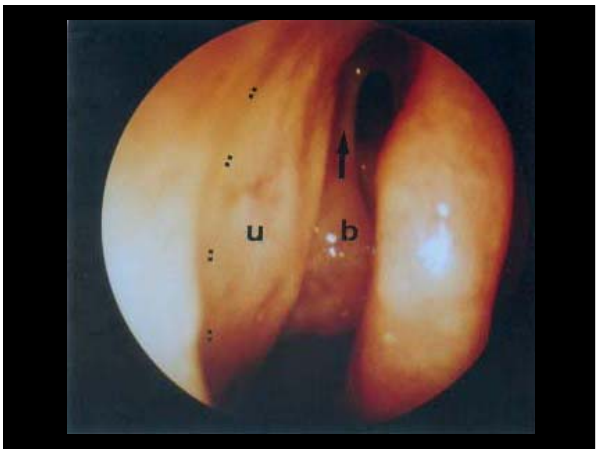
Sinus Development

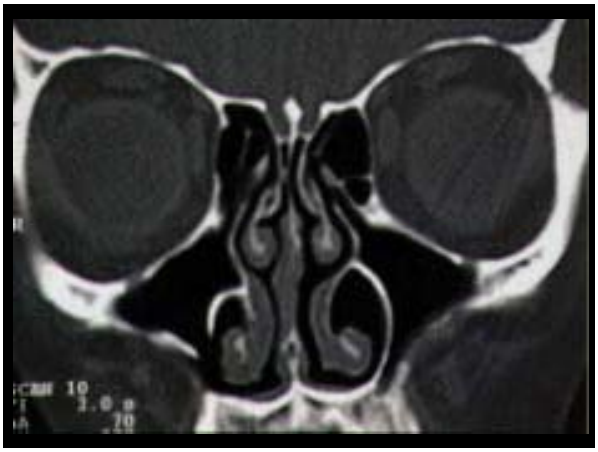
- Maxillary: Birth
- Ethmoid: Birth
- Frontal: 4-7 years of age
- Sphenoid: 7-10 years of age

Ostiomeatal Complex

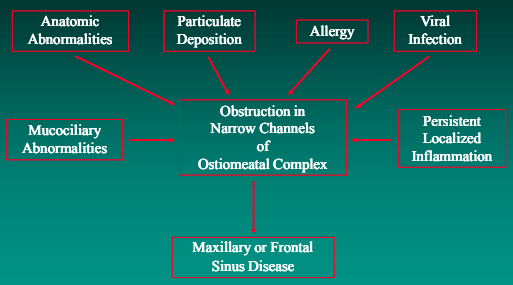
- Most common site of sinus blockage (Hajek, Herrman, Messerklinger, Proctor, Nauman)
- Poorly visualized
- Not well seen radiographically
- Symptoms mild and overshadowed
- Minor swelling causes obstruction







Ostiomeatal Complex Disease



Rhinosinusitis Classifications

- Acute: ≤ 4 weeks
- Subacute: 4-12 weeks
- Recurrent Acute: > 4 episodes/yr, each lasting 7-10 days, resolution of symptoms between episodes
- Chronic: ≥ 12 weeks

Factors for Diagnosis of Rhinosinusitis

Major Factors	*Minor Factors*
Facial pain/pressure	Headache
Facial congestion/ fullness	Fever (nonacute)
Nasal obstruction/ blockage	Halitosis
Nasal discharge/ purulence / discolored postnasal drainage	Fatigue
Hyposmia/anosmia	Dental pain
Purulence in nasal cavity on exam	Cough
	Ear pain/pressure/ fullness

Lanza DC, Kennedy DW et al. Adult rhinosinusitis defined. Report of the Rhinosinusitis Task Force Committee Meeting. Otolaryngol Head Neck Surg 1997; 117: S4-S5.

Acute Rhinosinusitis: Diagnosis

- Symptoms ≤4 weeks duration
- ≥ 2 major factors, or
  1 major factor & 2 minor factors, or
  nasal purulence on examination
- In differential if:
  - 1 major factor or ≥ 2 minor factors or
  - Sx worsen after 5 days or
  - Sx persist > 10 days or
  - Sx out of proportion to typical viral infection
- Fever +/or facial pain not enough!

Recurrent Acute Rhinosinusitis: Diagnosis

- > 4 episodes/yr.
- Each lasting ≥ 7-10 days
- Resolution of symptoms between episodes
- History same as acute
- Evaluate for predisposing factors
  - Allergy, septal deformity, polyps, etc.

Chronic Rhinosinusitis: Diagnosis

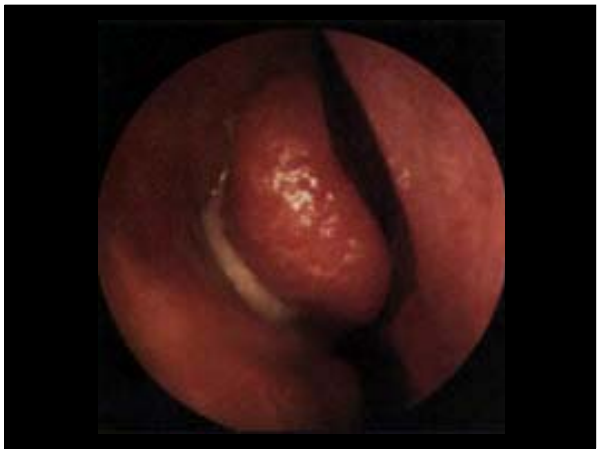
- Symptoms ≥ 12 weeks duration
- ≥ 2 major factors, or
  1 major factor & 2 minor factors, or
  nasal purulence on examination
- In differential if:
  - 1 major factor or ≥ 2 minor factors
- Facial pain not enough!
- Previous history of acute sinusitis

Acute Rhinosinusitis: Symptoms & Signs

- Moderate to severe facial pain/pressure
- Fever
- Purulent nasal discharge
- Tearing
- Facial tenderness

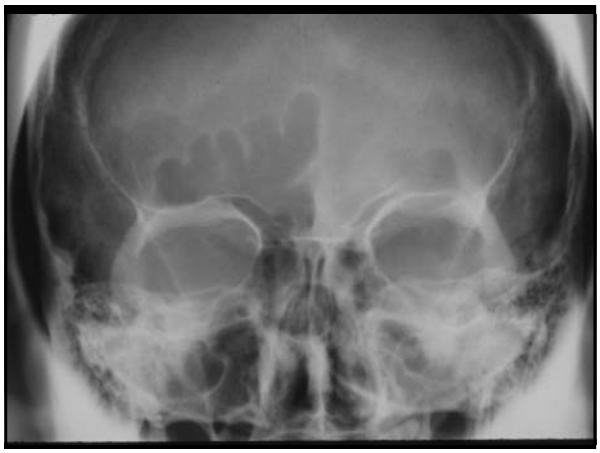
Rhinosinusitis: Diagnosis

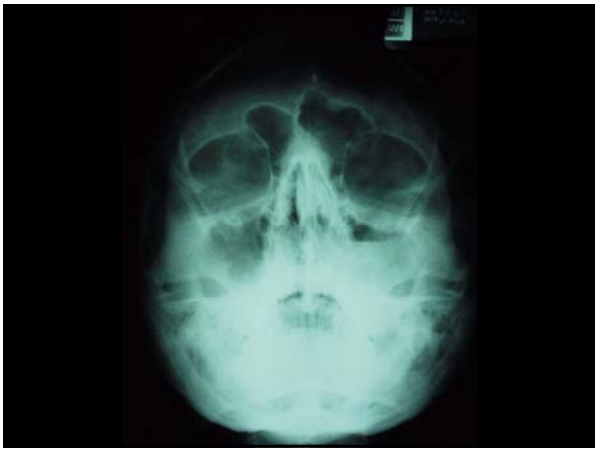
- Anterior rhinoscopy
- Nasal endoscopy
- Transillumination
- Palpation
- Imaging

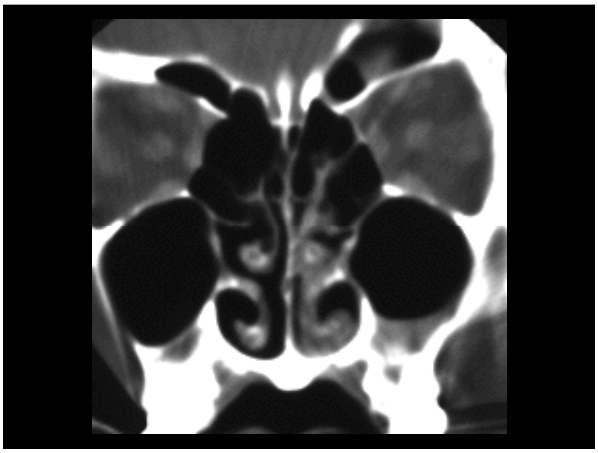


Imaging in Acute Sinusitis

- Not necessary for diagnosis
- Plain films:
  - Caldwell view
  - Waters view
  - Lateral skull view
- A/F level or complete opacification
- CT can reveal similar findings







Indications for Sinus Aspiration / Irrigation

- Clinically unresponsive to adequate conventional therapy
- An immunocompromised patient
- Symptoms of severe facial pain
- Impending or presenting complications (intraorbital or intracranial)
- Surface cultures of nose & nasopharynx do not usually correlate with sinus aspirates; directed cultures may be helpful

Bacteriology of Acute Rhinosinusitis

Adults	Children
S. pneumoniae	*S. pneumoniae*
H. influenzae	*H. influenzae*
M. catarrhalis	*M. catarrhalis*

Others

Anaerobes

S. pyogenes

Treatment of: Acute (Uncomplicated) Rhinosinusitis

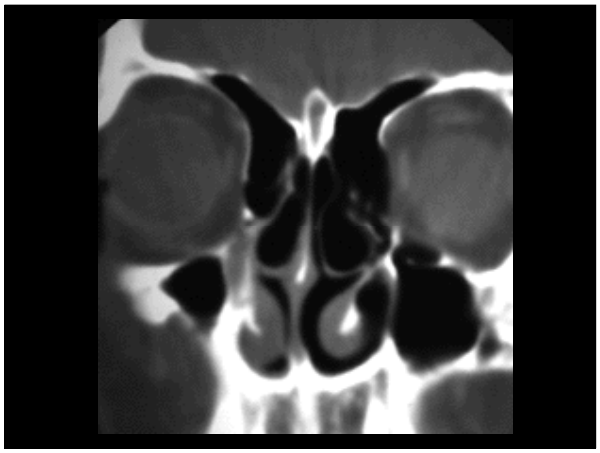
- Antibiotics for 7-10 days
- Topical decongestants
- Oral decongestants
- Mucolytic agents
- Humidification & hydration
- Pain medication
- Avoid drying agents if possible

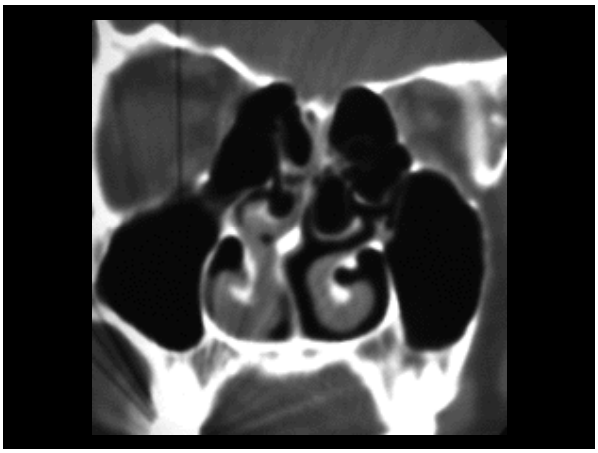
Management Pearls and Principles

- Most episodes of rhinosinusitis can be successfully treated by oral antibiotics
- Beware of cancer, dental infection, and foreign bodies when unilateral sinusitis is encountered
- Recurrent rhinosinusitis in children may indicate the presence of cystic fibrosis
- Immunocompromised, including AIDS, patients: Beware of mucormycosis
- Ophthalmic veins or other veins in the ethmoid area are valveless and afford extension of infection to the cavernous sinus
- CT scans are helpful in resolving diagnostic dilemmas

Treatment of: Recurrent Acute Rhinosinusitis

- Endoscopic nasal exam
- Radiologic evaluation
- Treat underlying precipitating factors
- Drainage procedure w/ cultures
- Targeted antibiotic and surgical therapy





Chronic Rhinosinusitis

- Symptoms
- Physical Examination
- CT Evaluation
- Management
  - Medical
  - Surgical

Factors for Diagnosis of Rhinosinusitis

Major Factors

- Facial pain/pressure
- Facial congestion/ fullness
- Nasal obstruction/blockage
- Nasal discharge/ purulence / discolored postnasal drainage
- Hyposmia/anosmia
- Purulence in nasal cavity on exam

Minor Factors

- Headache
- Fever (nonacute)
- Halitosis
- Fatigue
- Dental pain
- Cough
- Ear pain/pressure/fullness

Chronic Rhinosinusitis: Diagnosis

- Symptoms ≥ 12 weeks duration
- ≥ 2 major factors, or
  1 major factor & 2 minor factors, or
  nasal purulence on examination
- In differential if:
  1 major factor or ≥ 2 minor factors
- Facial pain not enough!
- Previous history of acute sinusitis

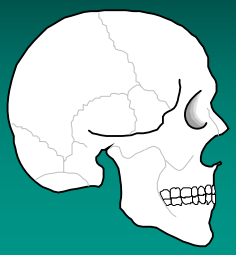
Chronic Rhinosinusitis: Signs and Symptoms

- Postnasal drainage
- Nasal congestion
- Facial discomfort
- Frontal headaches
- Previous history of acute sinusitis
- Sometimes hard to differentiate from chronic rhinitis

Bacteriology of Chronic Rhinosinusitis

- Aerobes
  - *Staph* 51%, *S. aureus* 20%
  - *Streptococcus viridans* 4%
- Anaerobe isolates in >8%
  - *Bacteroides* sp.
  - Anaerobic gram positive cocci
  - *Veillonella*
  - *Fusobacterium*

RADIOLOGY

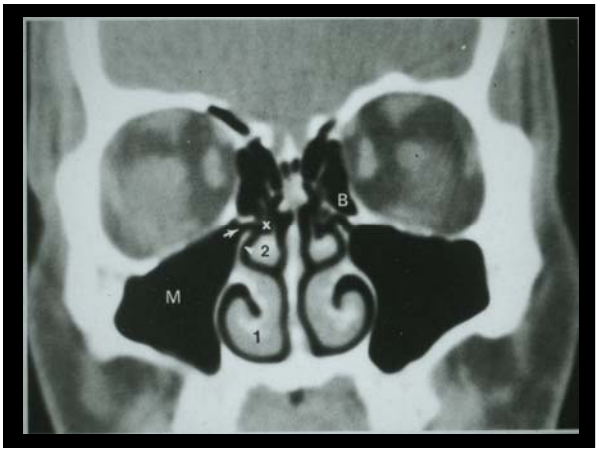


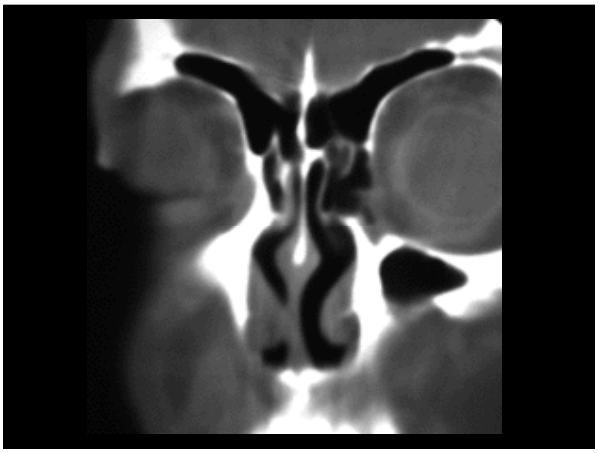
Imaging in Chronic Sinus Disease

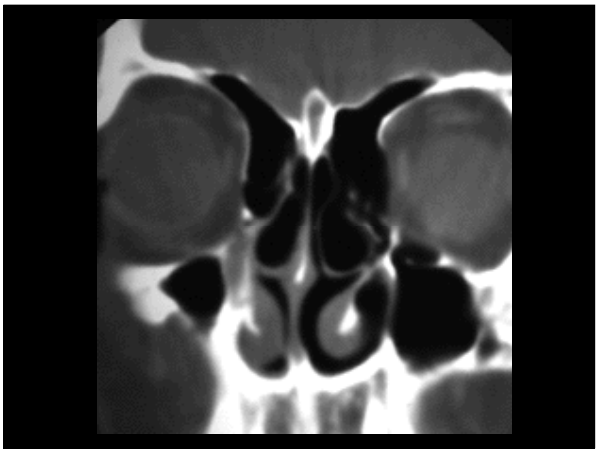
- Plain radiographs poor for visualizing ostiomeatal complex
- MRI has high false positive rate and is expensive
- CT is best tool for confirming diagnosis

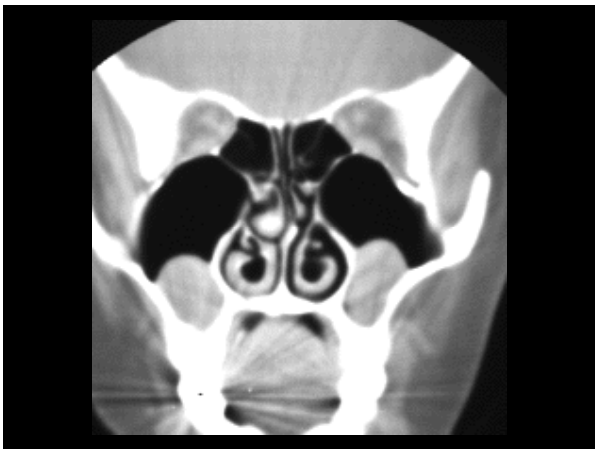
Sinus CT

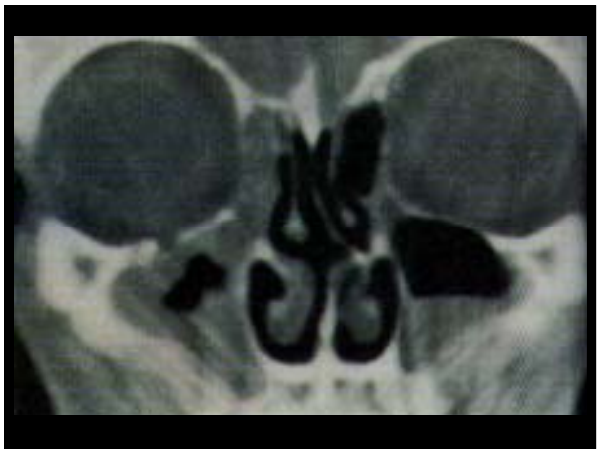
- 2-3 mm cuts
- Coronal projection
- Bone windows, no contrast
- "Cone down" on sinuses
- Mini-sinus CT excellent screening tool
  - 4 axial cuts through sinuses
  - Cost is same as plain radiographs

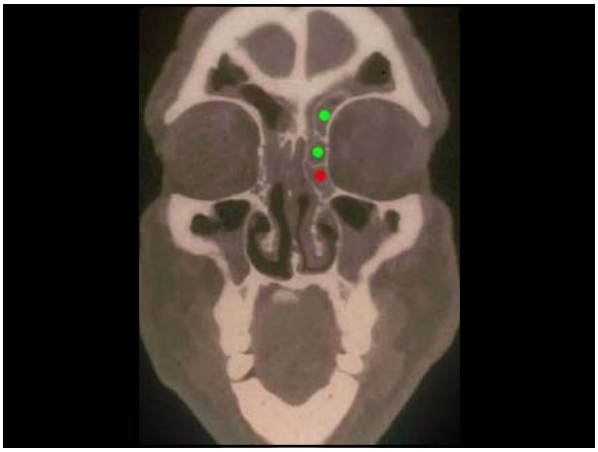










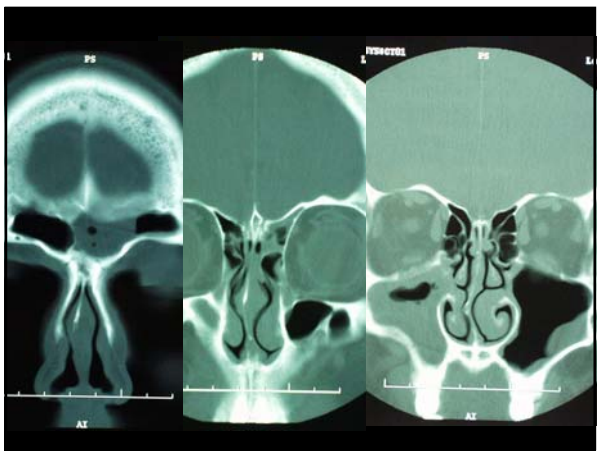


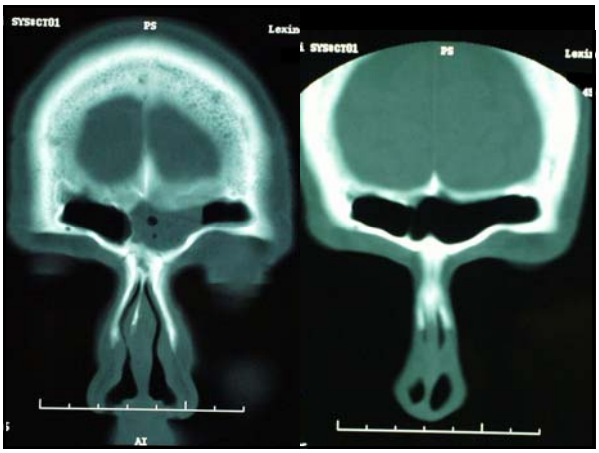
Medical Treatment of Chronic Rhinosinusitis

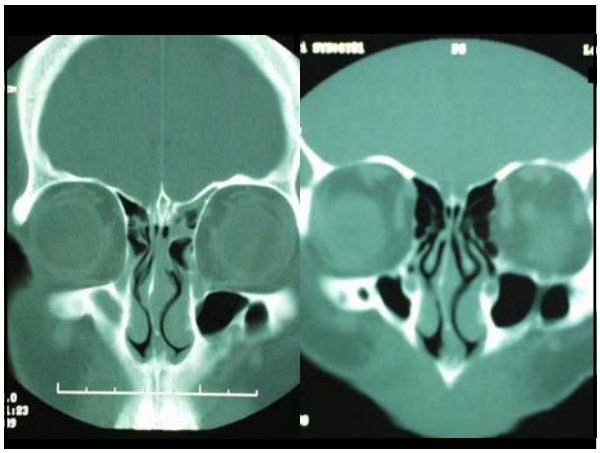
- Antibiotics for 3-6 weeks
  - Geared towards anerobes, *Staph*
  - *(Consider IV home therapy in selected cases)*
- Allergy therapy when appropriate
- Nasal steroid spray
- Oral steroids in chronic hyperplastic sinusitis
- F/U in 6-8 weeks with CT scan

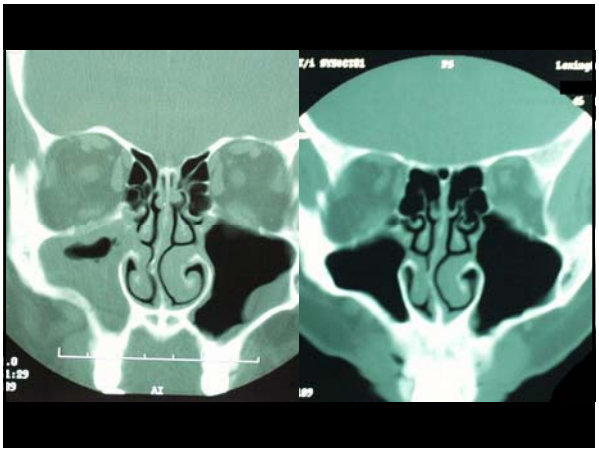
Follow Up Algorithm

- Patient better, CT sinuses normal
- Patient better, CT abnormal
- Patient unimproved, CT normal
- Patient unimproved, CT abnormal









Surgical Treatment of Chronic Rhinosinusitis

- Correct underlying etiology
  - Septal deformity
  - Turbinate hypertrophy
  - Nasal polyps
- Restore drainage and ventilation using functional endoscopic sinus surgery (FESS) when medical therapy fails

Rhinosinusitis: Otolaryngology Referral Guidelines

- All frontal or sphenoidal sinusitis
- All immunocompromised patients
- All patients with complications of sinus disease
- Acute recurrent sinusitis
- Chronic sinusitis unresponsive to medical management