Chronic Rhinosinusitis

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LECTURE OUTLINES:

- Definition.
- Classification of rhinosinusitis.
- Epidemiology.
- Pathophysiology.
- Predisposing factors.
- Clinical picture.
- Physical examination.
- Diagnosis.
- Treatment- medical & surgical.
- Complications.

DEFINITION OF CRS

"An inflammatory condition involving the paranasal sinuses and linings of the nasal passages that lasts 12 weeks or longer.

The diagnosis requires objective evidence of mucosal inflammation."

SUBTYPES

- CRS without nasal polyposis (CRSsNP) 60-65%

- CRS with nasal polyposis (CRSwNP)- 20-33%

  Strongly associated with asthma and aspirin tolerance

EPIDEMIOLOGY

- This is the second most common chronic disease in the US.
- 33 million Americans get sinusitis / year.
- 26.7 million office visits / year
- 12.5 million workdays lost.
- 58.7 days of restricted activity.
- Mean age of diagnosis is 39 years
- Women affected more.
- Up to 20% of CRS patients have asthma

RISK FACTORS : HOST FACTORS

- Systemic .
  - AR.
  - Asthma
  - Aspirin-exacerbated respiratory disease
  - Depression
  - Immunodeficiency.
  - Genetic/congenital
    - Cystic fibrosis.
    - Immotile cilia.
  - Vasculitic disorders

- Local .
  - Sinonasal anatomic abnormalities, septal deviation, scarring from previous surgery, neoplasm, or foreign body.
  - GERD/LPR.

RISK FACTORS: ENVIRONMENTAL FACTORS

- Microorganisms
  - Viral, bacterial and fungal.
- Pollutants/Irritants
  - Cigarette
  - Ciliostatic substances
- Medications
  - Rhinitis medicamentosa

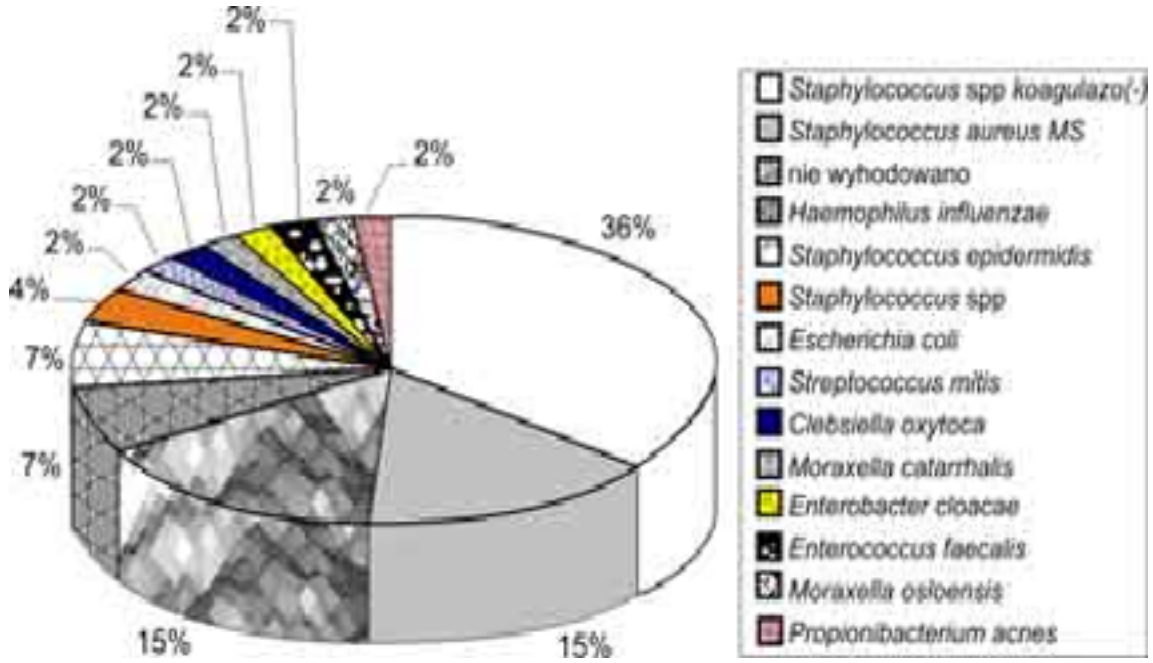
PATHOPHYSIOLOGY

- CRS is a proliferative process with remarkable thickening of the mucosa and lamina propria
- In most cases, the disease process probably starts with obstruction of a sinus ostium leading to acute bacterial rhinosinusitis
- If the obstruction fails to resolve, a chronic inflammatory process begins

PATHOPHYSIOLOGY

- Eosinophils are the predominant infiltrative cell in CRS.
- T-cell ⇨ Cytokines ⇨ Stimulation of different cell types ⇨ Chemokines ⇨ Attract eosinophils.
- ↑ Levels of IL-4 & IL-5 in sinonasal tract ⇨ ↑ Life & proliferation of eosinophils.
- Degranulation of eosinophils ⇨Release of a number of destructive enzymes ⇨ Epithelial damage ⇨ Disruption of the normal barrier + mucocilliary clearance activity.

BACTERIOLOGY



- S. Aureus.
- S. Pneumonia.
- M. Catarhalis.
- H. Influenza.
- P. Aerogenosa.

MICROBIOLOGY

- The uninfected "normal" sinuses contain aerobic and anaerobic bacterial flora similar to those present in acute and chronic sinusitis

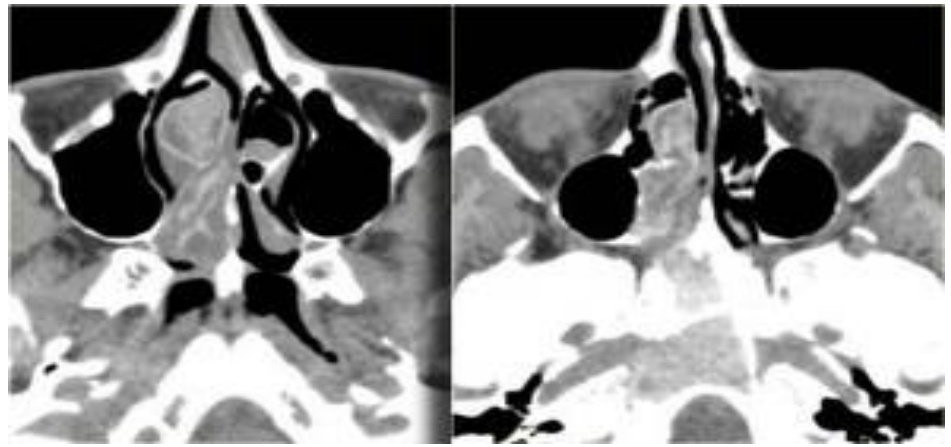
- Polymicrobial infection is common and may be synergistic

ROLE OF BACTERIA

- Failure of an acute infection to resolve
- Acute infection leading to osteitis
- Biofilm formation
- Staph aureus superantigen formation

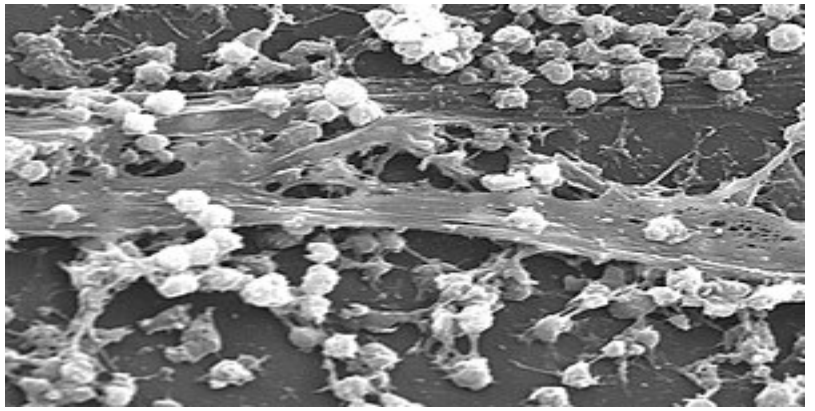
OSTEITIS

- Evidence of osteitis indicated by bony thickening and increased density is frequently seen in areas of chronic inflammation on CT scans.



BIOFILMS

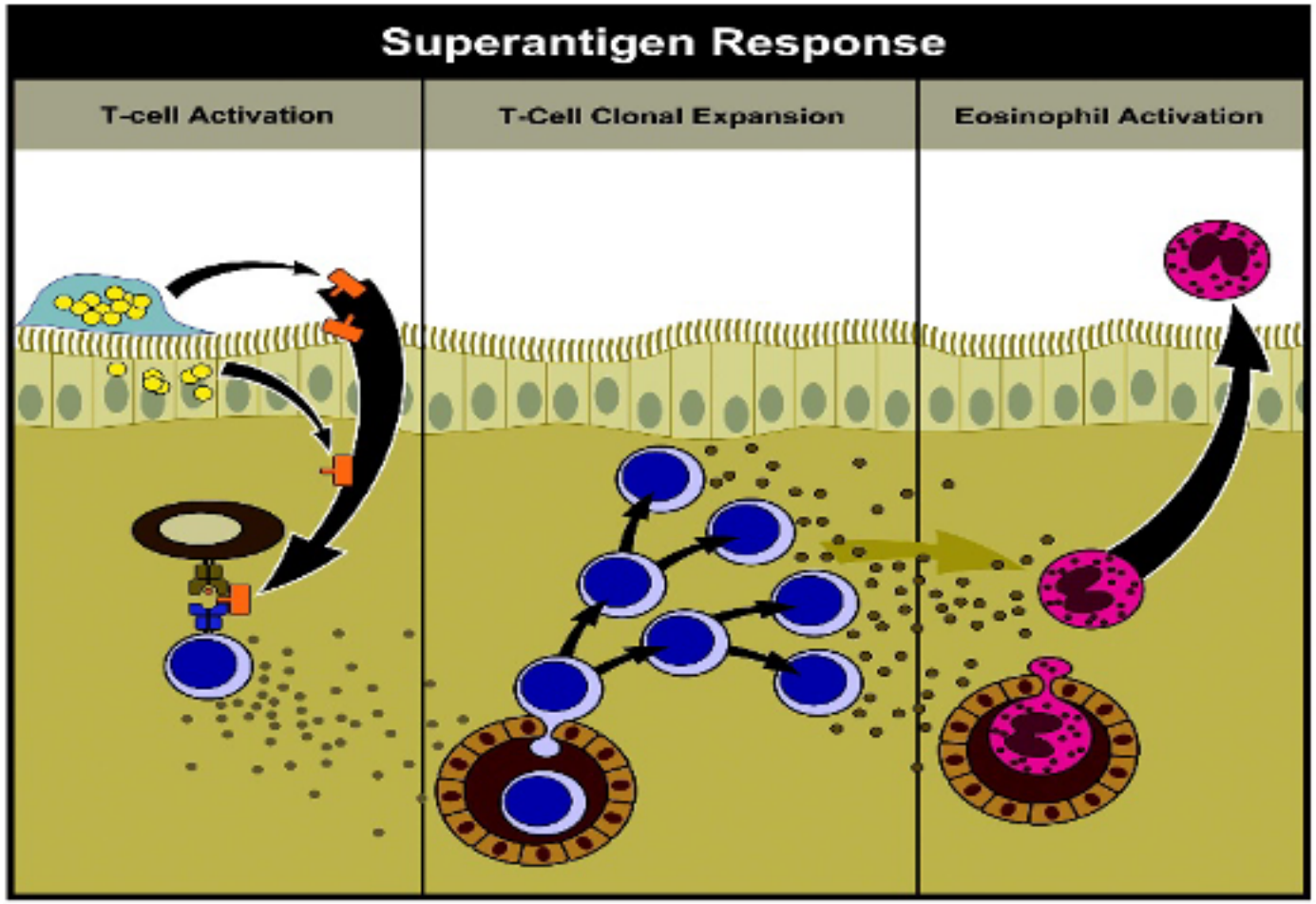
- Bacterial biofilms consist of a complex, organized community of bacteria that anchor to both biotic and abiotic surfaces.
- They are composed of layers of embedded, live bacteria within a protective extracellular matrix.
- Studies have demonstrated the presence of bacterial biofilm in sinus tissue in 45 to 80 percent of cases

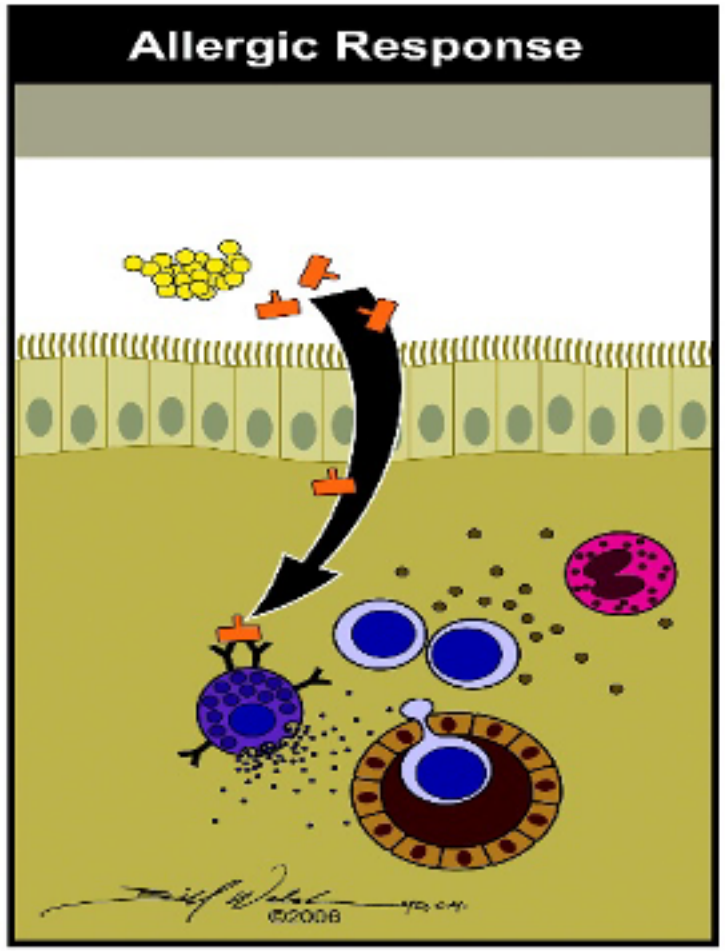


BACTERIAL SUPERANTIGENS

- The theory states that exotoxins produced by certain bacteria and fungi are capable of activating a large population of T cells compared with traditional antigens that activate a specific and small subset of T cells.

- A superantigen produced by S. aureus has been postulated to play a role in some cases of nasal polyposis (CRS with nasal polyposis).


Superantigen Response
T-cell Activation
T-Cell Clonal Expansion
Eosinophil Activation


Allergic Response

CHRONIC RHINOSINUSITIS (CRS)

WITH POLYPS (CRSwNPs)

- • Eosinophilic mucin RS (EMRS)
- • Aspirin intolerance
- • Allergic fungal RS (AFRS)
- • Cystic fibrosis
- • Primary ciliary dyskinesia

WITHOUT POLYPS (CRSsNPs)

- • Anatomical defect/ variation
- • Trauma, foreign body
- • Environmental triggers
- • Allergy
- • Immunodeficiency
- • GERD

CHRONIC RHINOSINUSITIS (CRSo

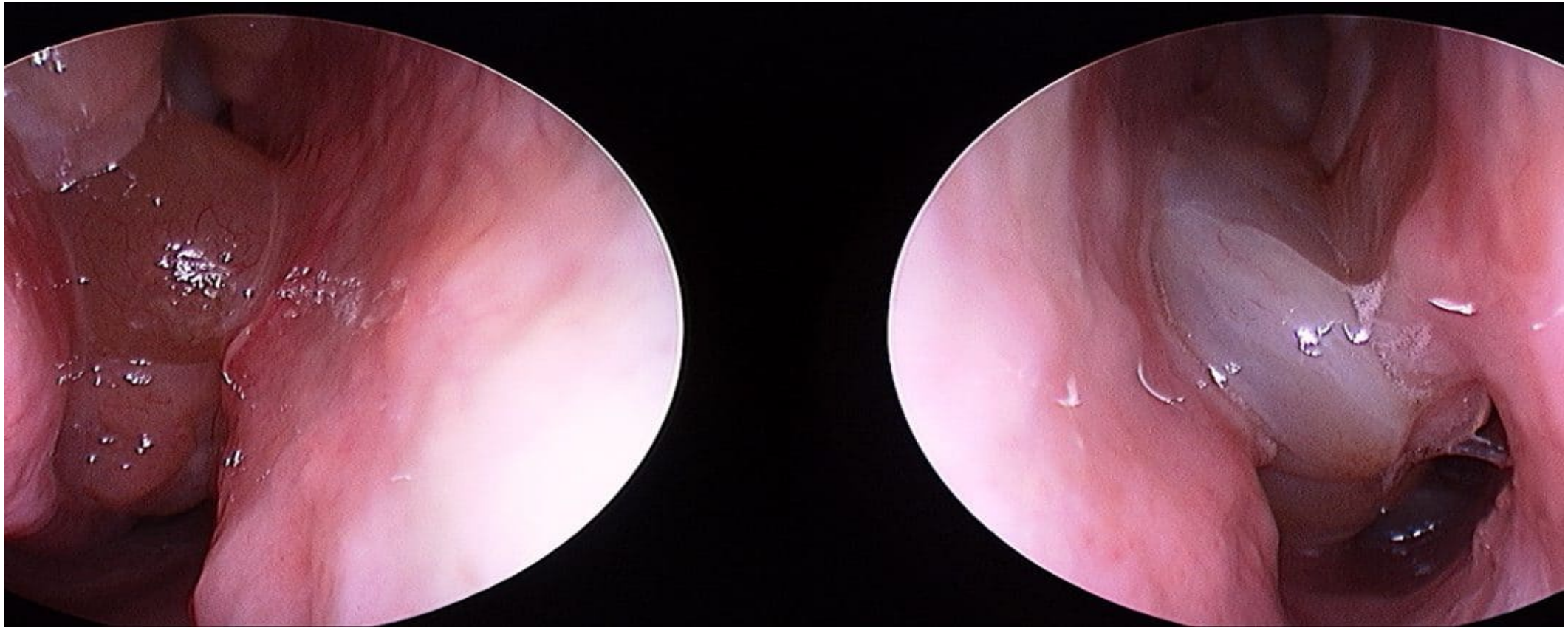
WITH POLYPS (CRSwNPs)

- The prevalence =2.7%
- More frequent in men (2.2 to 1)
- Elderly (5% at > or =60 years of age)
- More frequent in asthmatics

WITHOUT POLYPS (CRSsNPs)

- The prevalence =10.9%
- less frequently in men

(CRSWNPS)

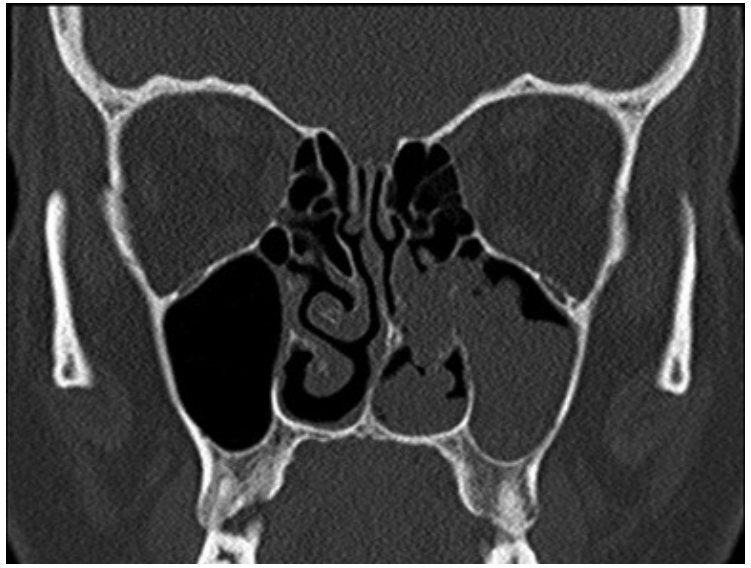


BOX 43-3 CLASSIFICATION OF NASAL POLYPS

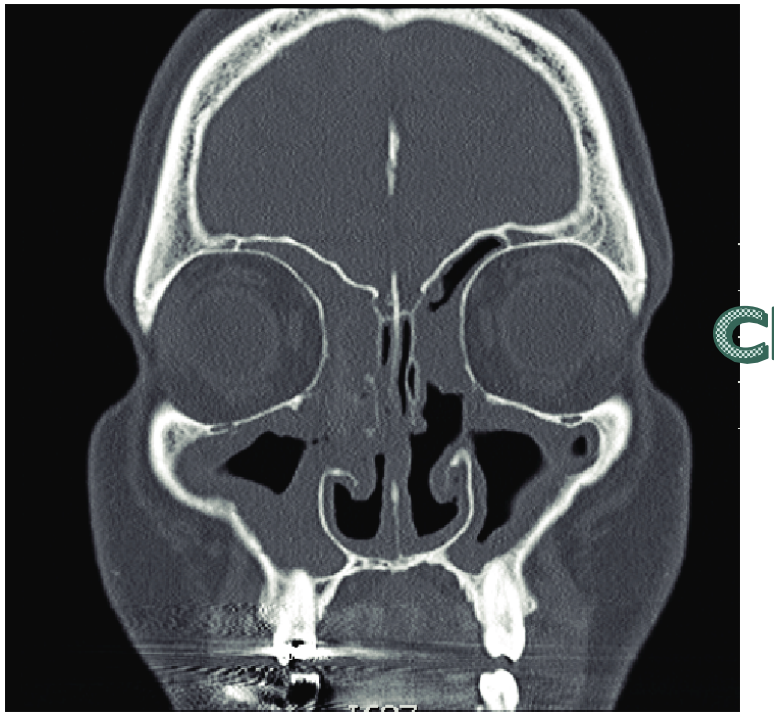
1. The antrochoanal polyp, mostly arising from the maxillary sinus and prolapsing into the choana; a commonly large, isolated, unilateral cystlike noneosinophilic formation
2. Idiopathic unilateral or bilateral; mostly eosinophilic polyps without involvement of the lower airways
3. Bilateral eosinophilic polyposis with concomitant asthma and/or aspirin sensitivity
4. Polyposis with underlying systemic disease such as cystic fibrosis, primary ciliary dyskinesia, Churg-Strauss syndrome, or Kartagener syndrome

(CRSWNPS)

LOCALIZED



DIFFUSE



SYSTEMIC

Cystic Fibrosis

Churg-strauss syndrome

(CRSWNPS)

LOCALIZED

- It may represent a benign entity such as an antro-choanal polyp or be part of a tumour such as an inverted papilloma or sinonasal malignancy.

DIFFUSE

- bacterial (super-antigen response), fungal sensitization, and atopy.
- These may be associated with biofilm formation or frank eosinophilia, both exacerbating and propagating the inflammatory process.

DIAGNOSIS

- History detailed.
- Physical examination:
  - Anterior rhinoscopy.
  - Nasal endoscopy.
- Radiology
  - X- Ray.
  - C.T.
  - MRI.

DIAGNOSIS OF RHINOSINUSITIS: HISTORY

Table 2. Conventional Criteria for the Diagnosis of Sinusitis Based on the Presence of at Least 2 Major or 1 Major and ≥2 Minor Symptoms

Major Symptoms	Minor Symptoms
• Purulent anterior nasal discharge	• Headache
• Purulent or discolored posterior nasal discharge	• Ear pain, pressure, or fullness
• Nasal congestion or obstruction	• Halitosis
• Facial congestion or fullness	• Dental pain
• Facial pain or pressure	• Cough
• Hyposmia or anosmia	• Fever (for subacute or chronic sinusitis)
• Fever (for acute sinusitis only)	• Fatigue

Modified from Meltzer et al [7].

DIAGNOSIS

The diagnosis of CRS requires the presence 2 or more of the cardinal symptoms of CRS

(Nasal obstruction, PND/nasal discharge, ***Facial pain and hyposmia/cough in children***)

AND

Documentation of mucosal inflammation

Or

Mucopurulent nasal discharge in middle meatus

Or

Nasal polyps

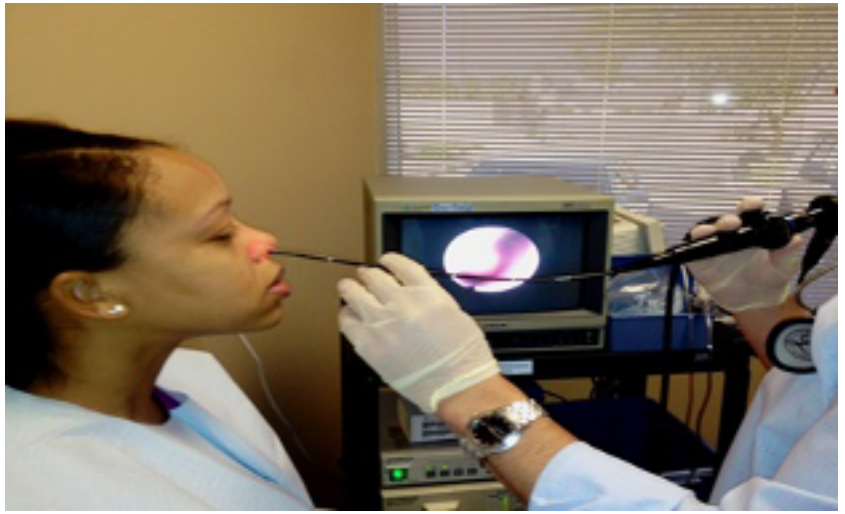
AND/or

With or without Sinus CT scan findings suggestive of CRS

-Mucosal changes within ostiomeatal complex and sinuses.

PHYSICAL EXAMINATION

- Anterior rhinoscopy.



- Endoscopy.

IMAGING

- CRS is primarily a clinical diagnosis,, there is a limited role for radiologic studies in the initial assessment of suspected sinusitis.

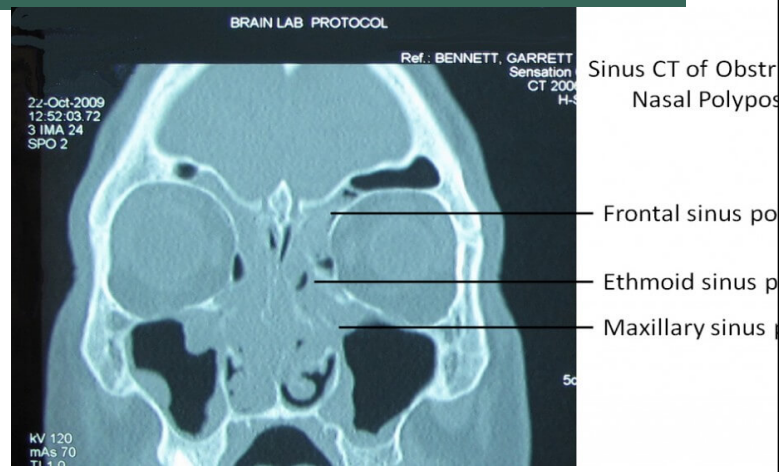
PLAIN FILMS

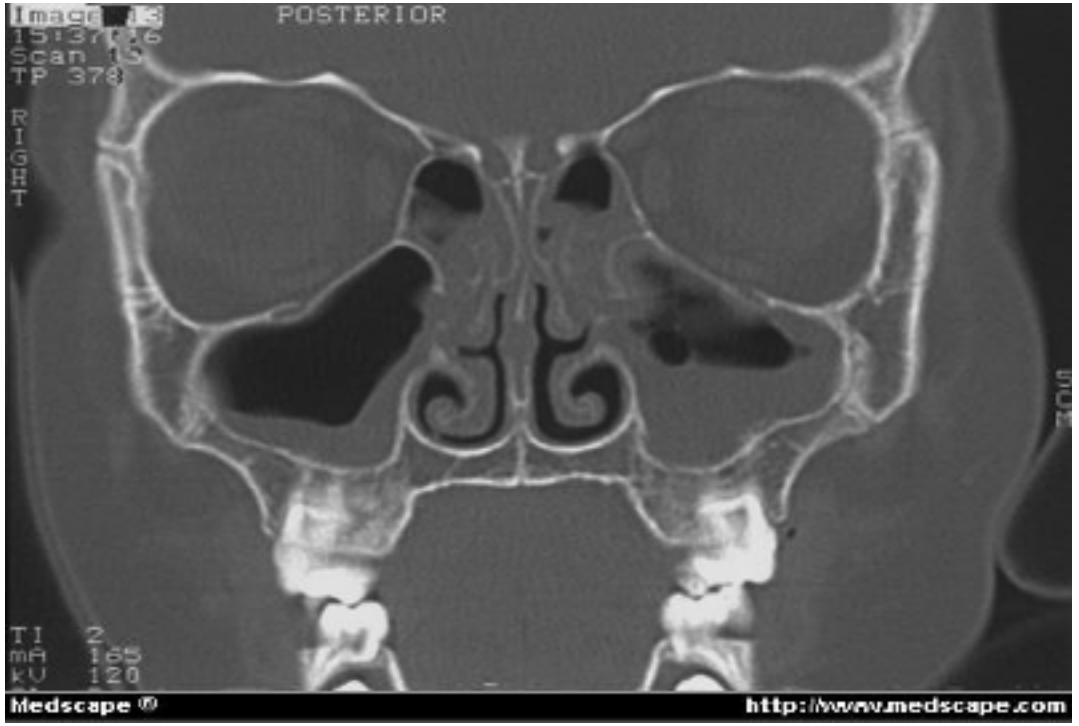
- Plain radiographs have less role in CRS than in acute rhinosinusitis.

- Plain films may show mucosal thickenings or sinus opacities.

SINUS CT SCAN

- The investigation of choice
- Indications:
  - After failure of maximum medical therapy
  - Before surgical procedures
  - Suspected complications
  - Suspected neoplasms




POSTERIOR
RIGHT
TI 2
mA 165
kV 120
Medscape ®
http://www.medscape.com


Se: 606/6
Im: 35/65
Sag: L4.7 (COI)
Acc: 2466177
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Acq Tm: 14:00:21.308729
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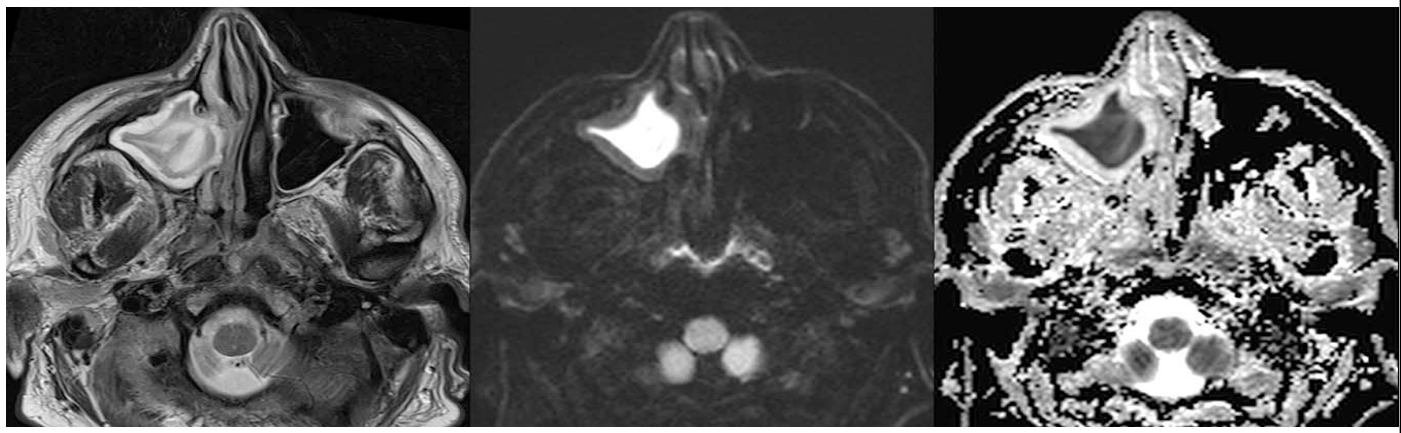
SINUS MRI

- MRI is generally reserved for complex cases of :
- Paranasal sinus tumors
- Cases with skull base and orbital involvement
- Fungal sinusitis



- Nasal swab and culture.
- RAST or skin testing for allergens.
- Sweat cholride test.

MANAGEMENT

Aim Of Treatment

- Reduce symptoms and signs
- Improve patients quality of life
- Prevent disease progression and/or recurrence

 Medical

✂ Surgical

MEDICAL TREATMENT OF CHRONIC RHINOSINUSITIS

“ Medical treatment of CRS is as effective as endoscopic sinus surgery, combined with topical nasal steroids, both in polypoid & nonpolypoidal CRS ”

MEDICAL TREATMENT

- allergen and/or irritant avoidance;
- douching;
- corticosteroids;
- decongestants;
- antibiotics;
- antifungals;
- antileukotrienes;
- aspirin;
- immunotherapy;
- other therapies.

ALLERGEN AVOIDANCE

- It is usually employed in patients with allergic history together with relevant positive skin prick tests.

IRRITANT AVOIDANCE

- Irritants can increase nasal symptoms, therefore avoidance of smoke, pollution and occupational irritants is usually advised.

SALINE IRRIGATIONS

- Reduces postnasal drainage
- Removes secretions
- Rinses away allergens and irritants
- Can be used immediately prior to intranasal medications
- less effective as monotherapy than intranasal glucocorticoids

NB.. Hypertonic saline is preferred, but has not been shown to have any effect on the nasal airway.

PROPER USE OF INS

Common errors to avoid

- Forgetting to prime the spray device
- Skipping doses
- Wrong head position (should be tilted forward, not back)
- Pushing nozzle too hard or far into the nose
- Blowing nose hard after spraying (the medicine is lost)
- Sniffing hard after spraying (the medicine is deposited in the throat instead of the nose)
- Using saline sprays or irrigations *after* using corticosteroid spray instead of before

DECONGESTANTS

- Vasoconstriction of dilated blood vessels.
- Symptomatic relief nasal congestion.
- No therapeutic efficacy for the treatment of sinusitis or polyps.

CORTICOSTEROIDS

- ***Indications for corticosteroids in rhinosinusitis***:
  - Acute rhinosinusitis;
  - Prophylactic treatment of acute recurrent rhinosinusitis;
  - Chronic rhinosinusitis without NP;
  - Chronic rhinosinusitis with NP;
  - Postoperative treatment of chronic rhinosinusitis with or without NP.

CORTICOSTEROIDS: SYSTEMIC

- Systemic
  - Stabilize mast cells,
  - Block formation of inflamm. mediators,
  - Inhibit chemotaxis of inflammatory cells,
  - Highly effective in reducing polyp size,
  - Postoperatively prevent polyp recurrence.

- Contraindications
  - DM.
  - PUD.
  - Glaucoma.
  - Severe HTN.
  - Advanced osteoparosis.

- Side effects
  - ★ Osteoparosis.
  - ★ Growth retardation.
  - ★ Cataract ,glaucoma.
  - ★ Suppresses H.P.A. axis.

CORTICOSTEROIDS : LOCAL

- Topical
  - Improve patency of OMC.
  - Reduce nasal blockage, secretions & sneezing.
  - Reduce polyp size & recurrence.
  - Inhibit immediate & late phase reaction to Ag stimulation.
  - 90% of A.R. patients will improve.

- Adverse effects
  - Nasal irritation ,bleeding,& crusting.
  - Effect on growth, bone, H-P-A axis.
  - Nasal septal perforation.

ANTIBIOTICS

- Since the majority of exacerbations of chronic rhinosinusitus are probably viral/inflammatory, rather than bacterial, routine use of AB especially in children, is not recommended.

- Antibiotics are needed for acute severe bacterial sinusitis; their place in the chronic form is controversial.

Duration of antibiotic

- **Broad-spectrum antibiotic for up to 3 weeks.**
  - Improvement in symptoms within 3 to 5 days.
  - Resolution of symptoms within 7 to 10 days after first improvement.
  - Another week- to diminish mucosal edema and improve mucociliary function
- **Rapid recurrence after previous treatment**
  - Add 3- to 6-week course of once-daily prophylactic antibiotic therapy

MACROLIDES (CLARITHROMYCIN)

Mechanism of activity
Anti-agent
↓ Adhesion (pseudomonas/moraxella)
↓ Virulence
Inhibit toxin/dye production
Destruction of biofilm
On host
Modulation of defence mechanisms
↑ Monocyte → macrophage
Inhibit cytokine production
Inhibit neutrophil function
Decrease mucus production
Inhibit chloride channels
Decrease glycoconjugate secretion
Increase ciliary beat frequency
Increase steroid receptors

- macrolides were effective in improving sinus symptoms.
- Long & short term.

ANTIHISTAMINES

- Little evidence of efficacy of AH in chronic rhinosinusitis (with & without NP).

- A.R. Especially 60—80% of patients with CRS have +ve skin test.

ANTILEUKOTRIENES

- Approximately 50 - 72 % of CRS with & without NP respond to some degree to ALTs.

Surgical Treatment of Chronic Rhinosinusitis

- Extent of surgery

  Extended surgery doesn´t yield better results than limited surgery.

  {Surgery stops there ,where pathology stops }

  (Stammberger)

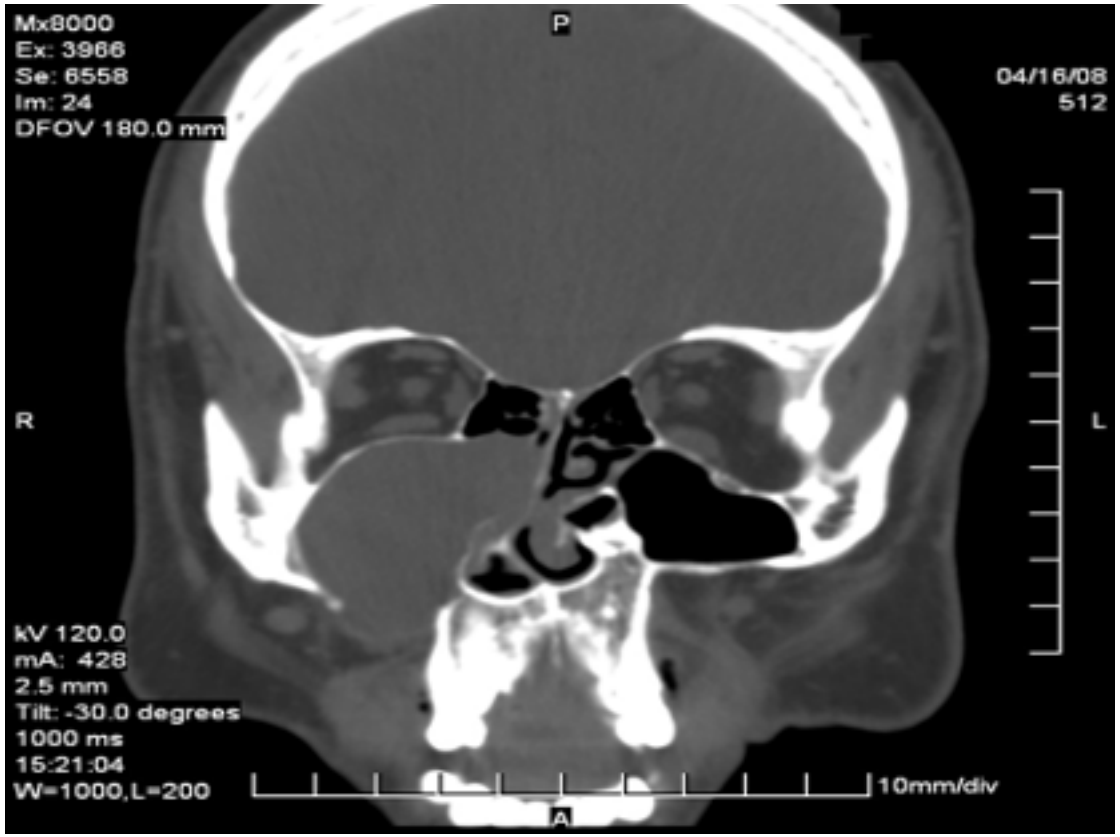
- Conservative

 Functional Endoscopic sinus surgery

Complications of CRS

CHRONIC COMPLICATIONS

- Mucocoeles are chronic, slowly expanding lesions in any of the sinuses that may result in bony erosion and subsequent extension beyond the sinus. If the mucocoele becomes secondarily infected and the contents purulent, it is described as a pyocoele.




Thank
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