

# Acute Rhinosinusitis (ARS)

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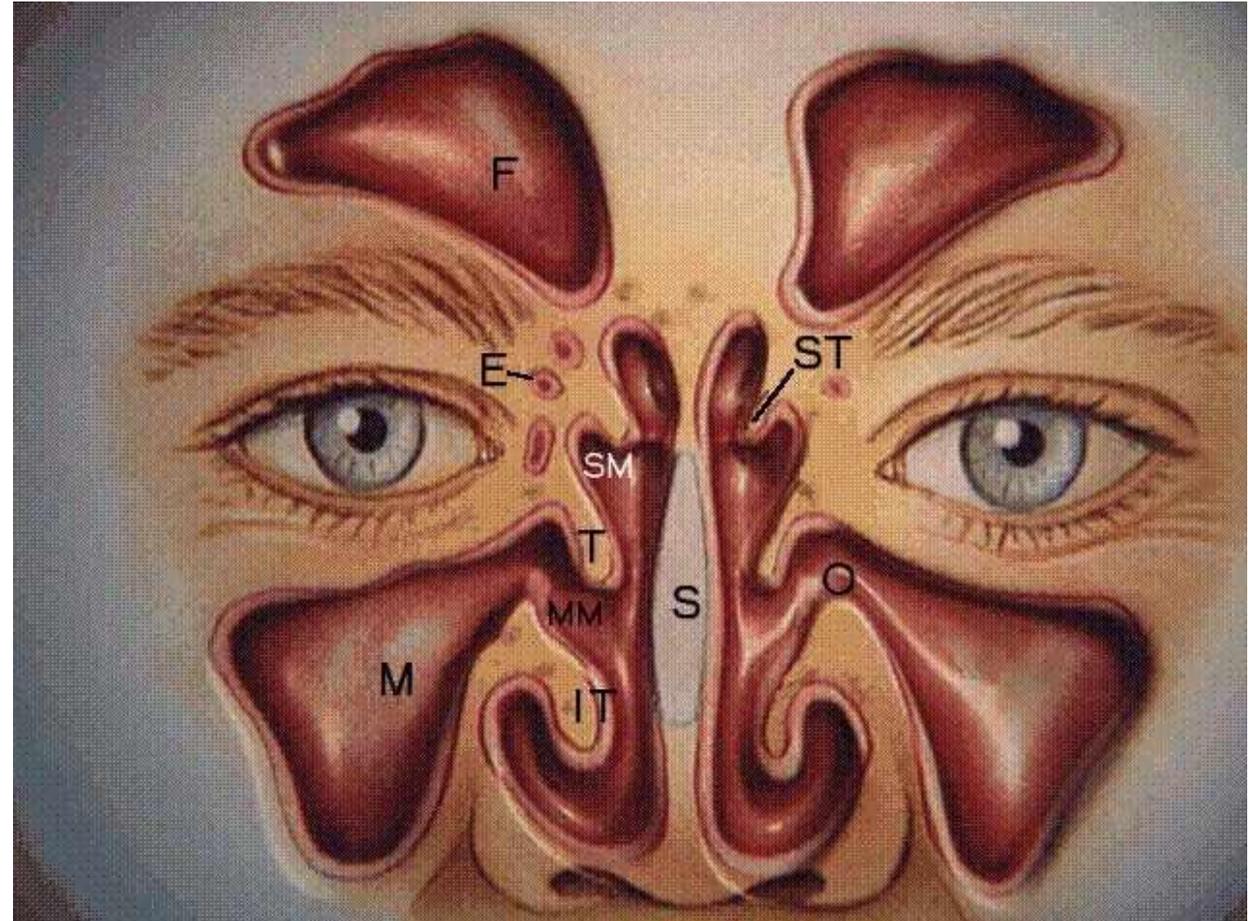


# Terminology and classification

- Inflammation of the lining of the paranasal sinuses.
- **Rhinosinusitis** is now the preferred term for this condition, because the nasal mucosa is simultaneously involved with sinuses mucosa inflammation and because sinusitis rarely occurs without concurrent rhinitis.
- Rhinosinusitis may be further **classified** according to the anatomic site (maxillary, ethmoidal, frontal, sphenoidal), pathogenic organism (viral, bacterial, fungal), presence of complication (orbital, intracranial), and associated factors (nasal polyposis, immunosuppression, anatomic variants)

# Sinus Anatomy

- Maxillary and ethmoid sinuses present at birth, Frontal and sphenoid sinuses develop after birth.
- Paranasal sinuses lined with pseudostratified ciliated columnar epithelium and goblet cells
- Sinuses health depends on:
  1. Mucous secretion of normal viscosity, volume, and composition.
  2. Normal mucociliary flow to prevent mucous stasis and subsequent infection
  3. Open sinus ostia to allow adequate drainage and aeration.



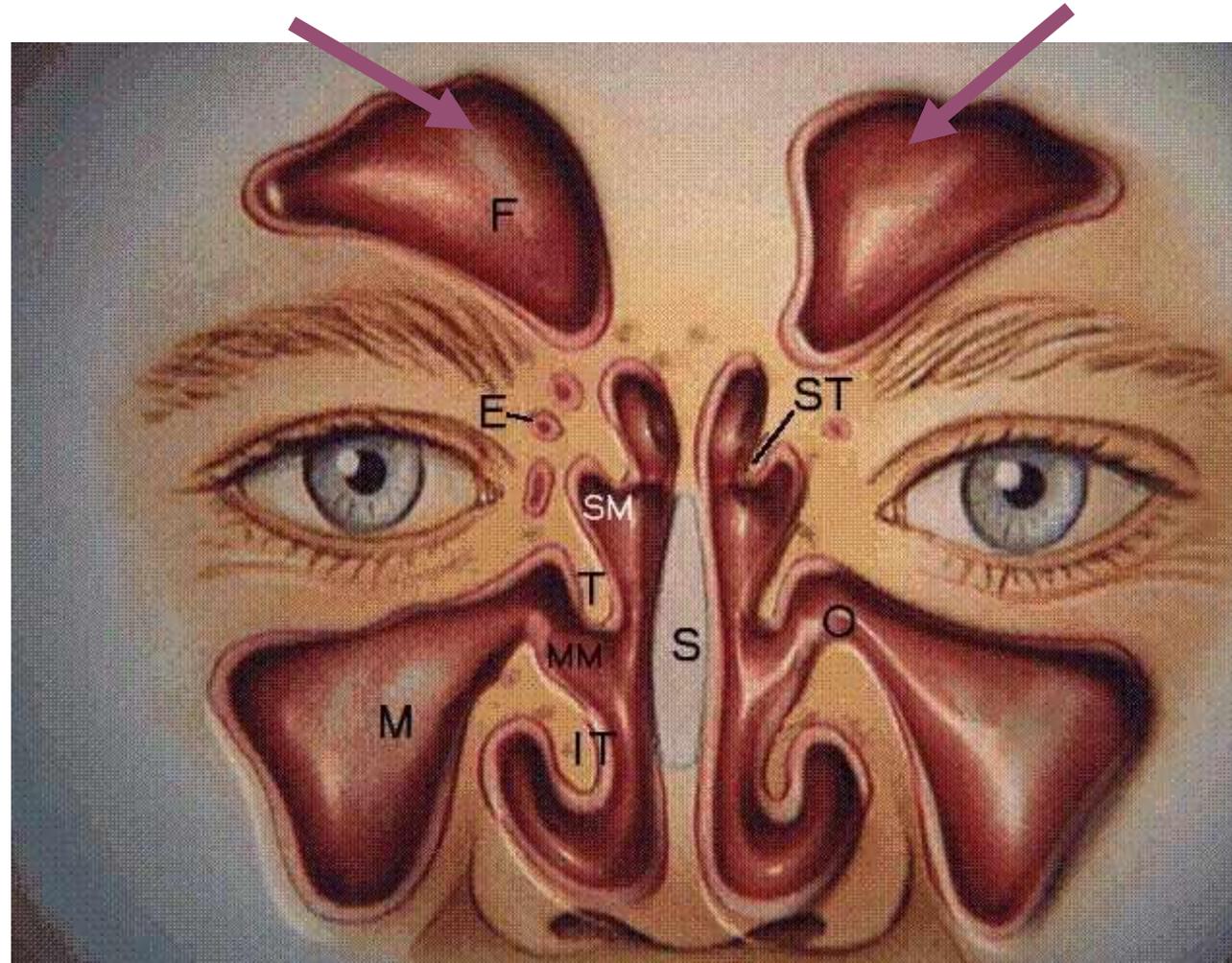
# Sinus Anatomy

- The posterior ethmoid and sphenoid sinuses drain into the superior meatus below the superior turbinate.
- The ostia of the maxillary, anterior ethmoid, and frontal sinuses share a common site of drainage within the middle meatus.
- This region is called the ostiomeatal complex and can be visualized by coronal CT scan.
- The common drainage pathway of the frontal, maxillary, and anterior ethmoid sinuses within the middle meatus allows relatively localized mucosal infection processes to promote infection in all these sinuses.

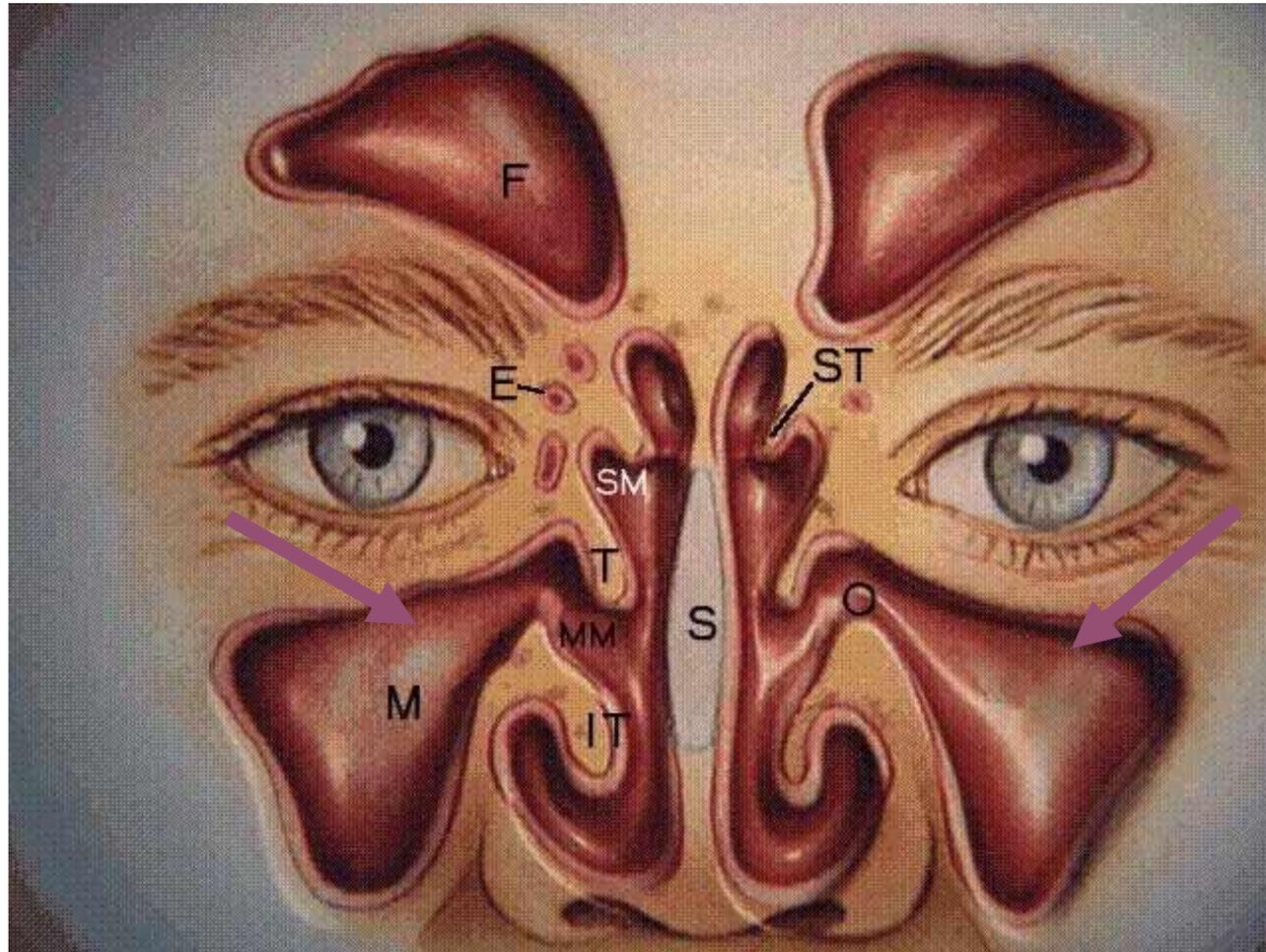
# Sinus normal physiology

- The possible roles of the sinuses may include:
  1. reducing the weight of the skull
  2. dampening pressure; humidifying and warming inspired air
  3. absorbing heat and insulating the brain
  4. aiding in sound resonance
  5. providing mechanical rigidity and increasing the olfactory surface area
- **Ciliary** beat at the rate of 8-15 Hz is continuously moved by the cilia at a speed of 6 mm/min. The ciliary action can be affected due to **local factors**, such as infection and local hypoxia that is associated with complete occlusion of **sinus ostia**. The sinus mucosa has less secretory and vasomotor function than the nasal cavity does. Cilia are concentrated near and beat toward the natural sinus ostia.
- **Blockage of the ostium** results in stasis of mucous flow, which can lead to development of disease.

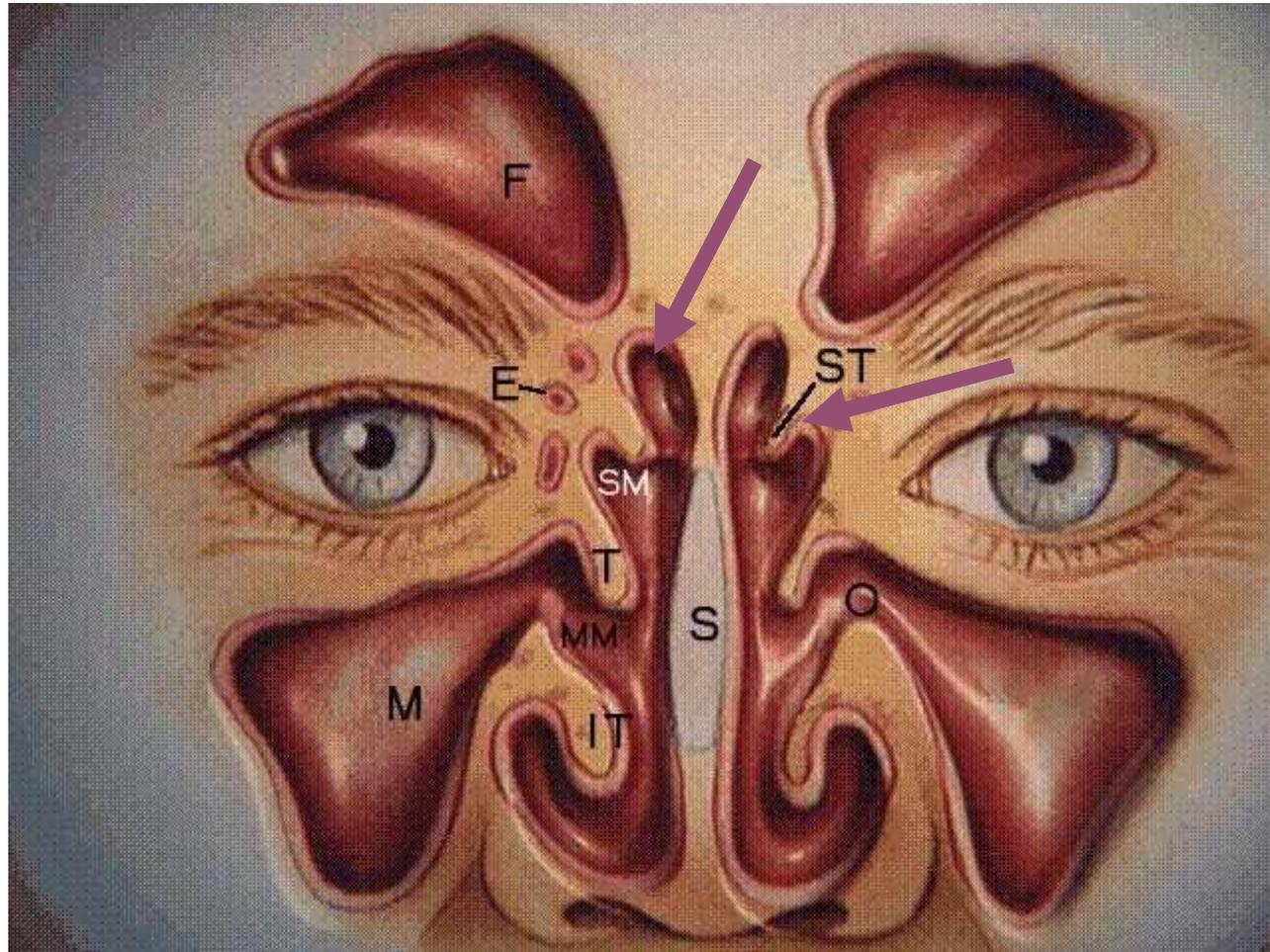
# Frontal Sinuses



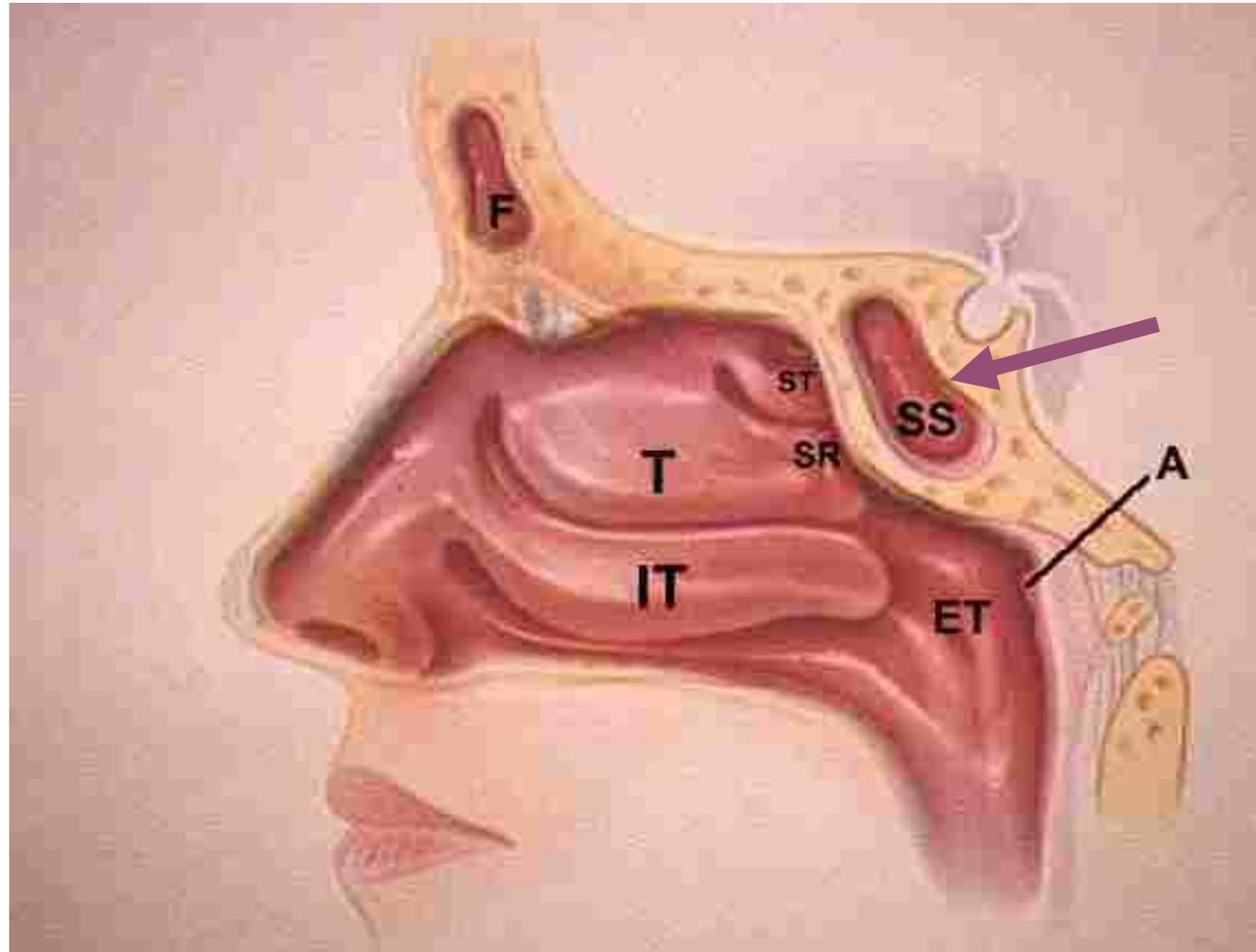
# Maxillary Sinuses



# Ethmoid Sinuses

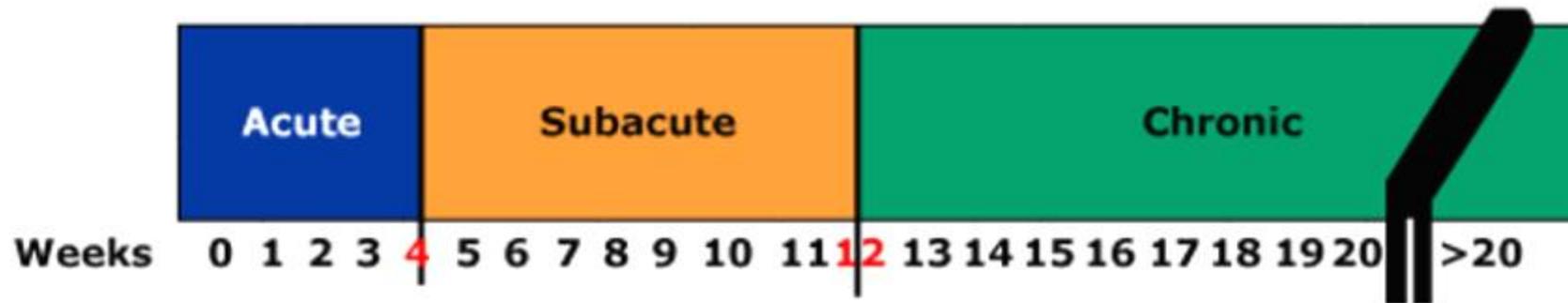


# Sphenoid Sinus



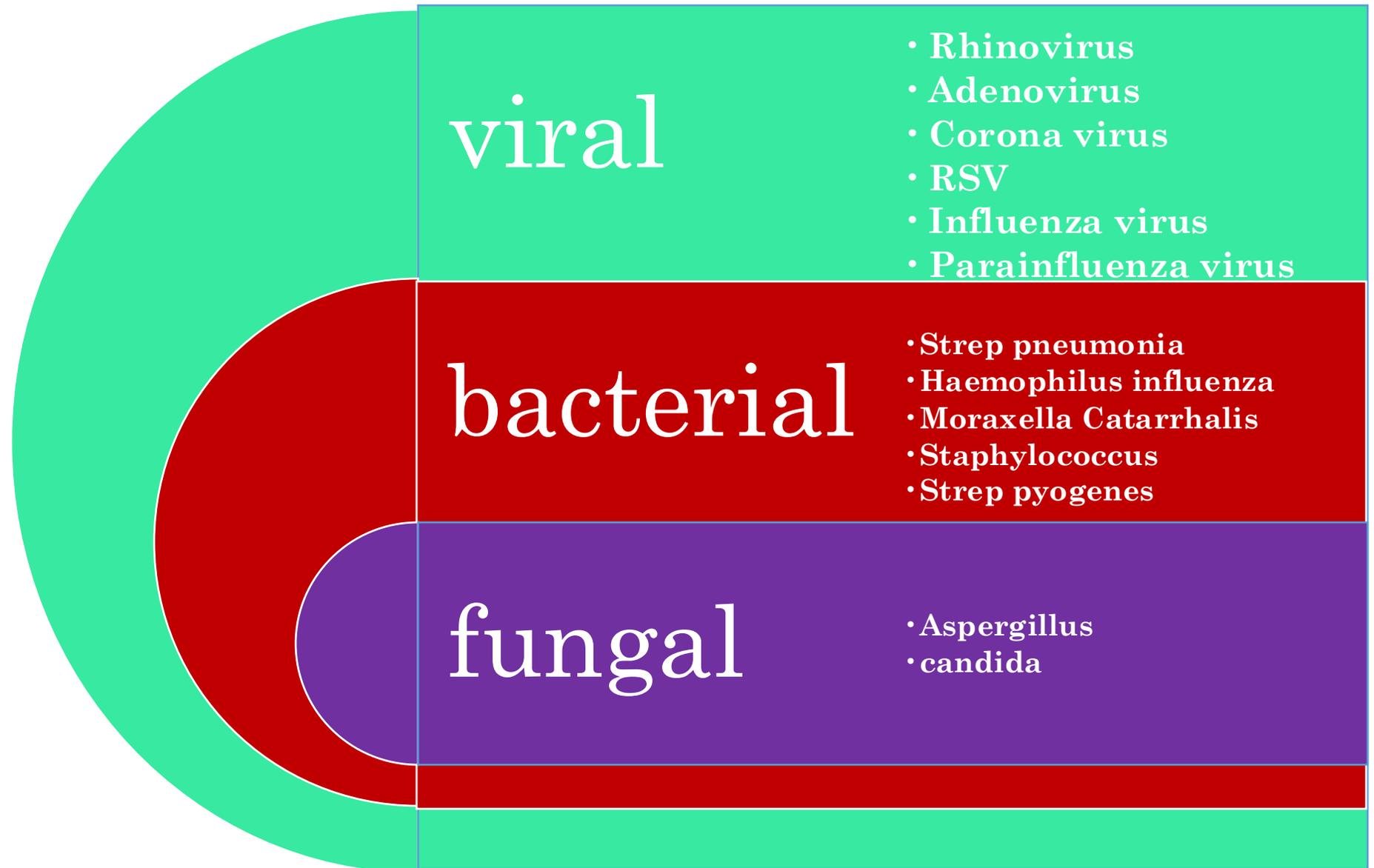
# Classification of Rhinosinusitis

## Classification of rhinosinusitis by duration of disease



- Acute:** less than four weeks duration
- Subacute:** 4 to 12 weeks duration
- Chronic:** greater than 12 weeks duration

# Etiology

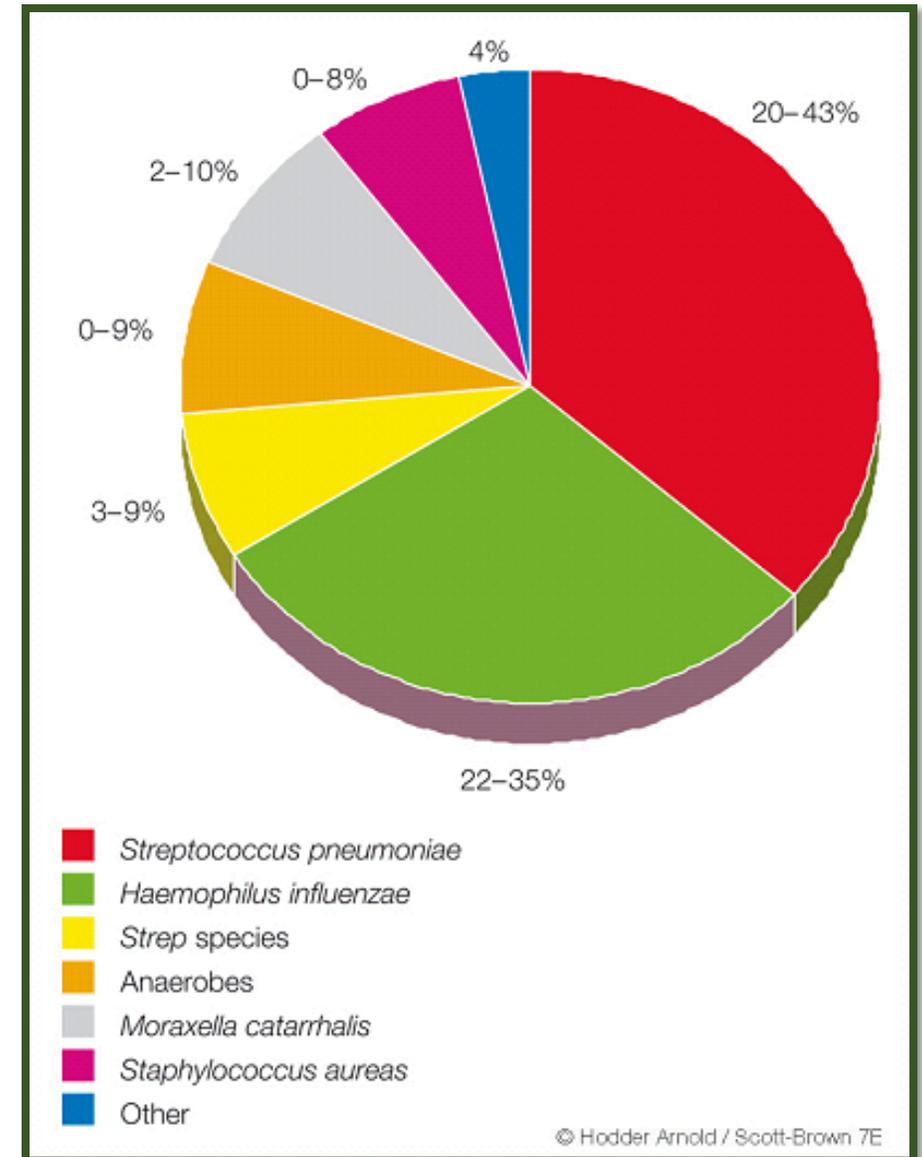


# Acute viral rhinosinusitis ( common cold)

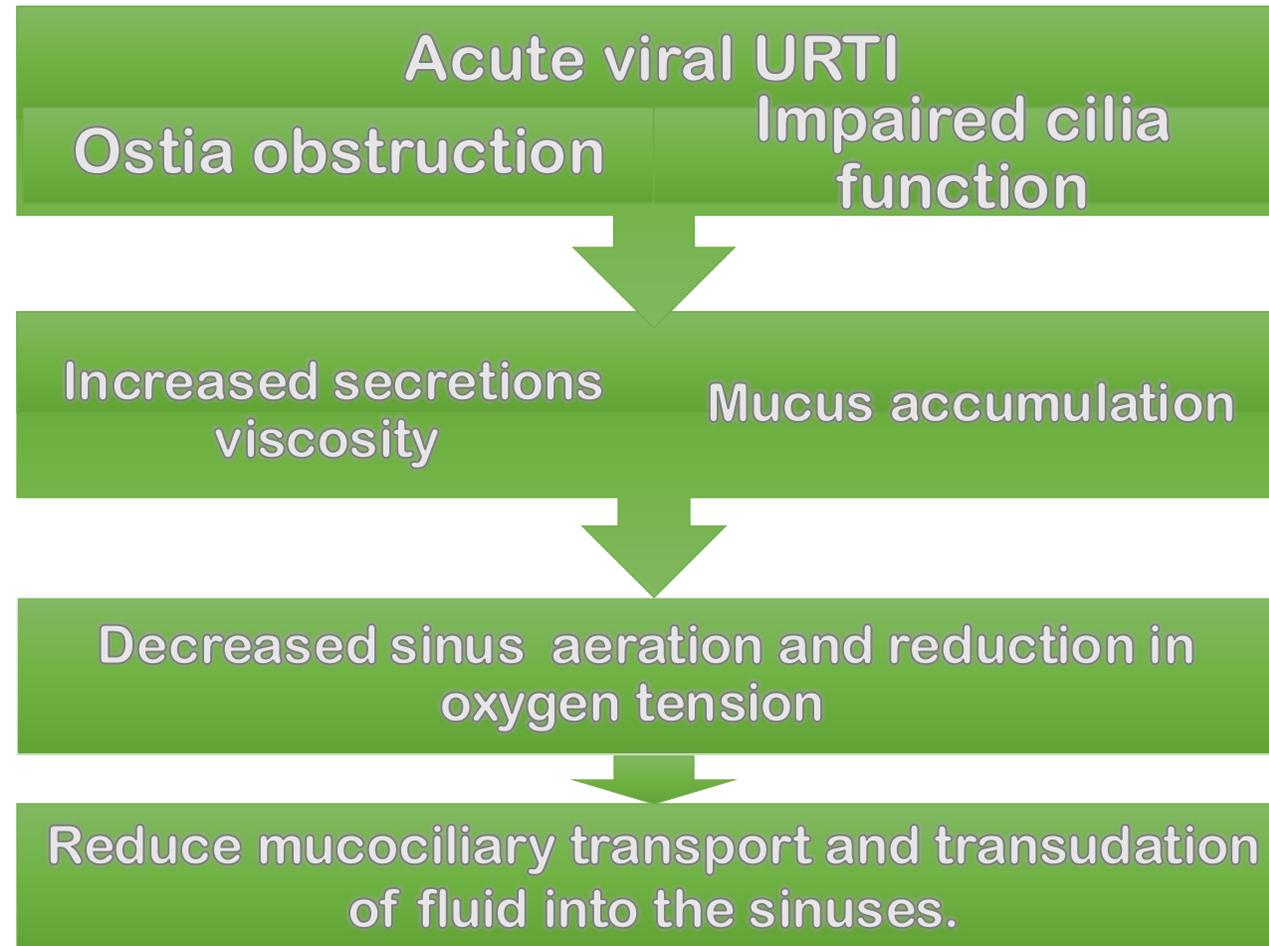
- The vast majority ( up to 70%) of rhinosinusitis episodes are caused by viral infection.
- Most viral upper respiratory tract infections are caused by rhinovirus, but coronavirus, influenza A and B, parainfluenza, respiratory syncytial virus, adenovirus, and enterovirus are also causative agents.
- Rhinovirus, influenza, and parainfluenza viruses are the primary pathogens in 3-15% of patients with acute sinusitis.
- In about 0.5-2% of cases, viral sinusitis can **progress** to acute bacterial sinusitis.
- Approximately **90% of patients** who have viral upper respiratory tract infections have sinus involvement, but **only 5-10%** of these patients have **bacterial superinfection requiring antimicrobial treatment.**

# Acute bacterial rhinosinusitis

- Acute bacterial rhinosinusitis (**ABRS**) is very frequently associated with **viral upper respiratory tract infection**.
- Onset with **persistent** symptoms or signs compatible with acute rhinosinusitis, lasting for **>10 days** without any evidence of clinical improvement;
- **Onset with severe** symptoms or signs of high fever (>39C [102F]) and purulent nasal discharge or facial pain lasting for at least **3–4** consecutive days at the beginning of illness.
- Onset with **worsening** symptoms or signs characterized by the new onset of fever, headache, or increase in nasal discharge following a typical viral upper respiratory infection (URI) that lasted **5–6 days** and were **initially improving** (“double sickening”)



# Road to Bacterial Sinus Infections



**Bacterial growth**

# Epidemiology

- Sinusitis is more common in winter than in summer. Rhino viral infections are prevalent in autumn and spring. Corona viral infection occurs mostly from December to March.
- An average child is likely to have 6-8 colds (i.e., upper respiratory tract infections) per year, and approximately 0.5-2% of upper respiratory tract infections in adults and 6-13% of viral upper respiratory tract infections in children are complicated by the development of acute bacterial sinusitis.
- Women have more episodes of infective sinusitis than men because they tend to have more close contact with young children. The rate in women is 20.3%, compared with 11.5% in men

# Clinical course

## History and physical exam

- Acute sinusitis is a clinical diagnosis; thus, an understanding of its presentation is of paramount importance in differentiating this entity from allergic or vasomotor rhinitis and common upper respiratory infections. **No specific clinical symptom or sign is sensitive or specific for acute sinusitis**, so the overall **clinical impression** should be used to guide management.
- A change in the color or characteristic of the nasal discharge is **not** a specific sign of bacterial rhinosinusitis.

# Clinical presentation

Requires two major factors, or one major and two minor

## Major symptoms

- Facial pain/pressure
- Facial congestion/fullness
- Nasal obstruction/blockage
- Nasal discharge /purulence /discolored
- posterior drainage
- Hyposmia / anosmia
- Purulence on nasal examination
- Fever (acute RS only)

## Minor symptoms

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

## Characteristics of Headache

| Serial No. | Sinus     | Characteristics   |
|------------|-----------|---|
| 1          | Maxillary | Facial, infraorbital pain, > strain and bending forward       |
| 2          | Frontal   | Forehead , supraorbital pain, "Office headache" ,> bending    |
| 3          | Ethmoid   | Between the eyes, may > with eye movement, Spectacle Headache |
| 4          | Sphenoid  | Vertex, occipital or retro-ocular pain                        |

# Differentiating Sinusitis from Rhinitis



## Sinusitis

Nasal congestion

Purulent rhinorrhea

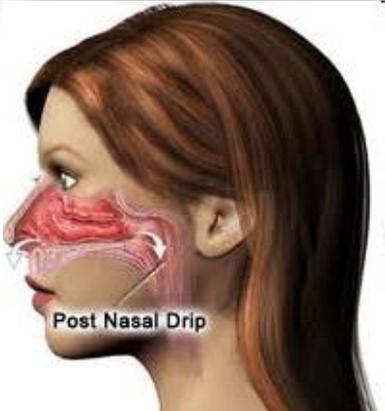
Postnasal drip

Headache

Facial pain

Anosmia

Fever



## Rhinitis

Nasal congestion

rhinorrhea clear

Runny nose

Itching, red eyes

# Physical examination :

- Anterior Rhinoscopy and Endoscopy:
  - Muco-purulent nasal discharge (Highest positive predictive value)
  - Swelling of nasal mucosa
  - Mild erythema

Check for complications

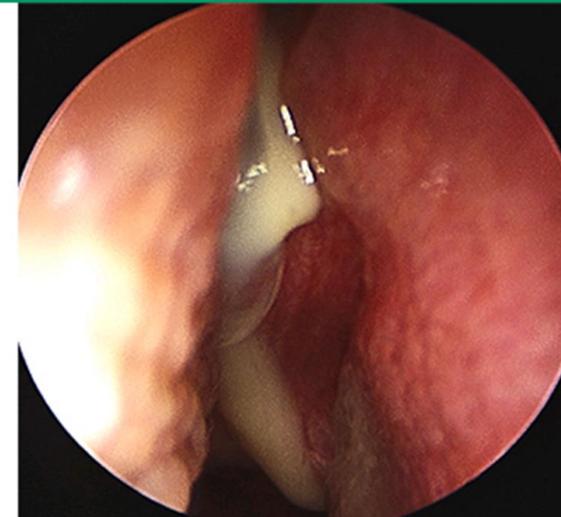


# Endoscopy :

- Mainly in ABRS to take cultures.
- Two critical areas to examine are the ostiomeatal complex lateral to the middle turbinate and the Sphenoethmoidal recess

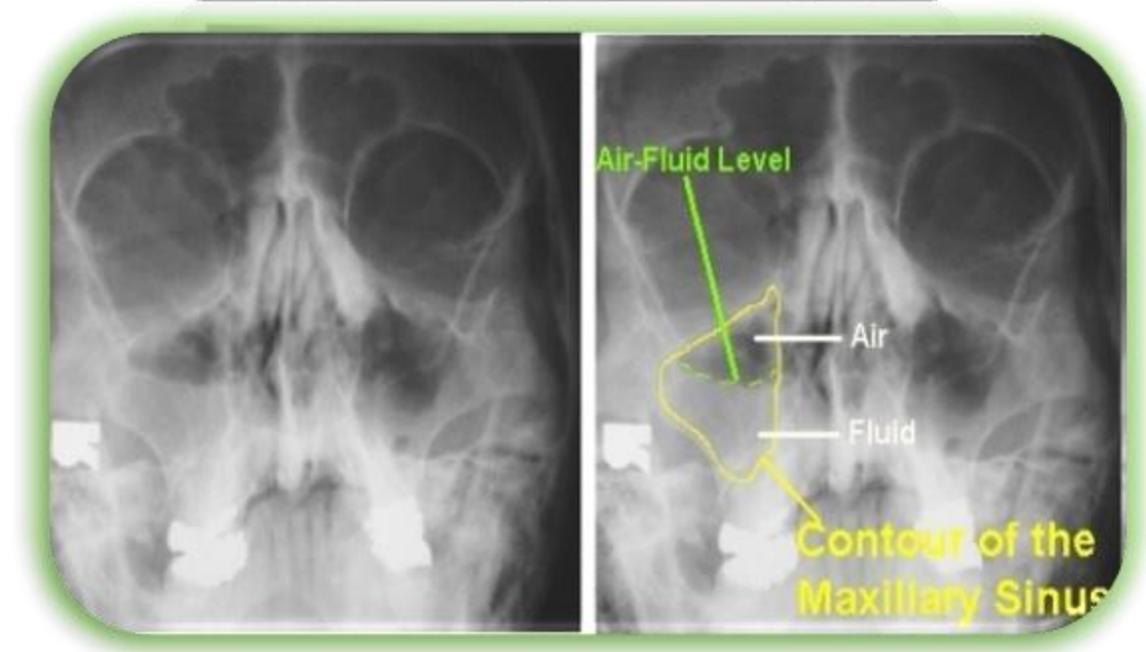
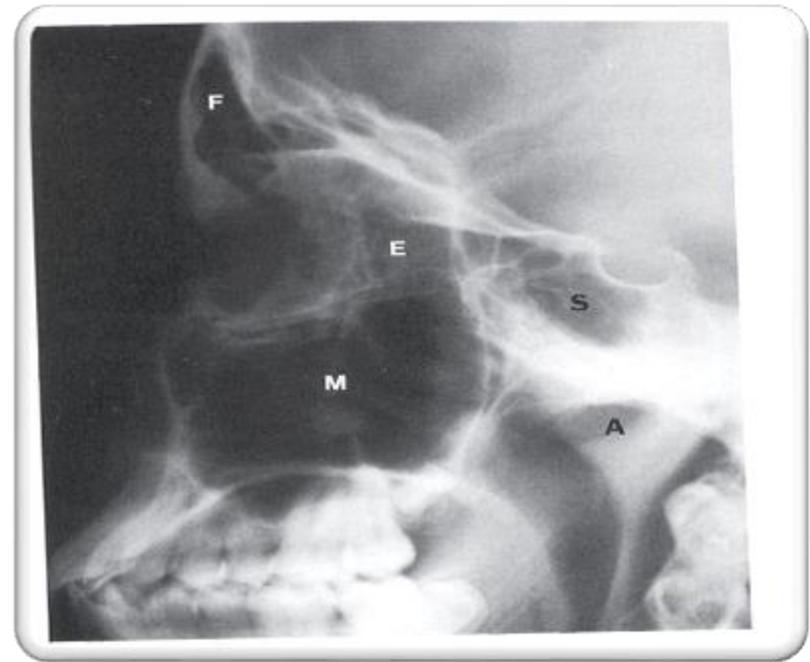


**Endoscopic image of purulent drainage from the middle meatus in a patient with acute bacterial rhinosinusitis**



# Radiology: Plain films

- Plain radiographs are not cost-effective in the diagnosis of RS.
- Poor specificity and sensitivity .
- Have less role in CRS than in acute rhinosinusitis.



# Radiology: CT scan

- Method of choice for sinus imaging
- Providing excellent visualization of mucosal thickening, air fluid levels, and bony structures.
- CT scans are not recommended in the evaluation of ABRS.
- **The role of CT scanning in ABRS** is mostly for evaluation of suspected or impending **complications**, such as orbital or intracranial involvement.

Coronal CT demonstrated air-fluid level and gaseous bubbles within the maxillary sinuses in a patient with acute bacterial rhinosinusitis



# Management

According to recommendations of last update 2015 guidelines by the American Academy of Otolaryngology--Head and Neck Surgery Foundation

- The guidelines state that clinicians may
  - (1) Recommend analgesics, topical intranasal steroids, and/or nasal saline irrigation for symptomatic relief of viral rhinosinusitis
  - (2) Recommend analgesics, topical intranasal steroids, and/or nasal saline irrigation for symptomatic relief of acute sinusitis
  - (3) Obtain testing for allergy and immune function in the evaluation of a patient with chronic or recurrent acute sinusitis

# Management – symptomatic treatment

- Humidification/vaporizer, Warm compresses, Adequate hydration, Smoking cessation, Balanced nutrition  
Nonnarcotic analgesia.
- Antihistamines **are not recommended** and have not been proven beneficial.
- Topical decongestants such as oxymetazoline can be used to decrease mucosal edema. To prevent rebound congestion, they should not be used for more than 3 days.
- A 15- to 21-day course of intranasal corticosteroids may reduce symptom duration when compared to placebo. Mometasone 200, 400, and 800 µg twice daily for 15 days is the usual regimen given, with minimal adverse effects. Systemic steroids have no proven benefit in sinusitis.
- Topical ipratropium bromide 0.06% can be used to decrease rhinorrhea.
- Mucolytic such as guaifenesin can be used to thin secretions, though they have not been definitively shown to be of benefit

# Management

According to recommendations of last update 2015 guidelines by the American Academy of Otolaryngology--Head and Neck Surgery Foundation

- And recommended that clinicians :
  - (1) Either offer watchful waiting (without antibiotics) or prescribe initial antibiotic therapy for adults with uncomplicated acute bacterial rhinosinusitis
  - (2) Prescribe amoxicillin with or without clavulanate as first-line therapy for 5-10 days (if the decision is made to treat acute bacterial rhinosinusitis with an antibiotic).

## Which Antimicrobial Regimens Are Recommended for the Empiric Treatment of ABRS in Adults and Children With a History of Penicillin Allergy?

- Either **doxycycline** (not suitable for children) or a respiratory **fluoroquinolone** (levofloxacin or moxifloxacin) is recommended as an alternative agent for empiric antimicrobial therapy in adults who are allergic to penicillin
- Combination therapy with clindamycin plus a third-generation oral cephalosporin (cefixime or cefpodoxime) is recommended in children with a history of non–type I hypersensitivity to penicillin

# Surgical Treatment :

## Surgical drainage

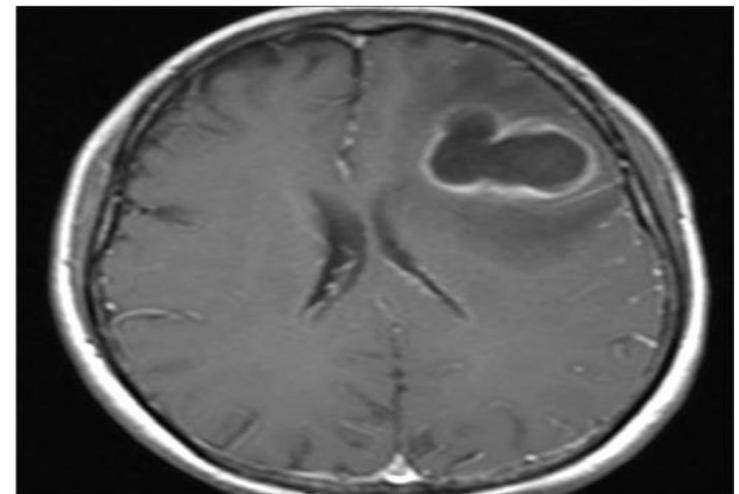
- ▶ If not responding to medical treatment
- ▶ Impending or manifest complications
- ▶ Depends on the sinus involved

# Drainage procedures

- ▶ Acute maxillary: Antral washout/ endoscopic MMA
- ▶ Acute frontal: Frontal trephination/ endoscopic frontal recess clearance
- ▶ Acute ethmoiditis: External ethmoidectomy/ endoscopic ethmoidectomy
- ▶ Acute sphenoiditis: External sphenoidectomy/ endoscopic sphenoidotomy

# Complications of ARS

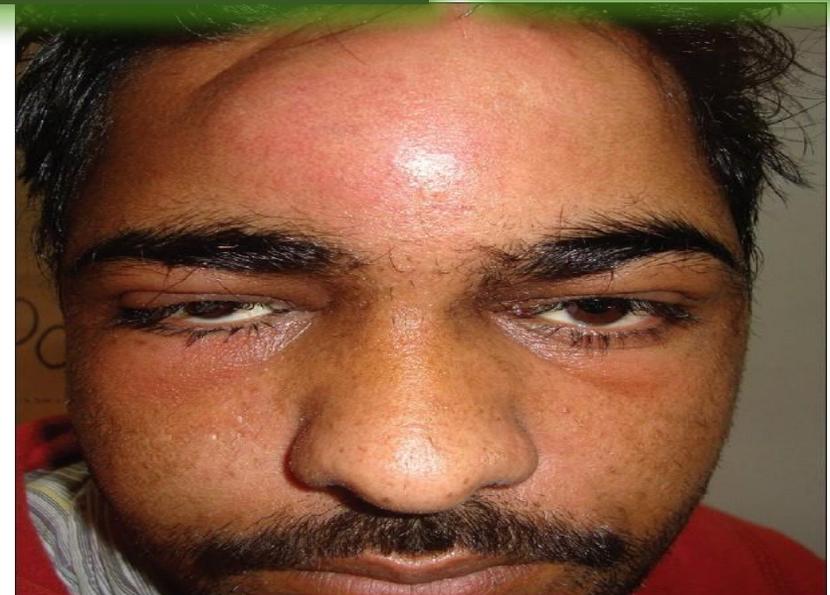
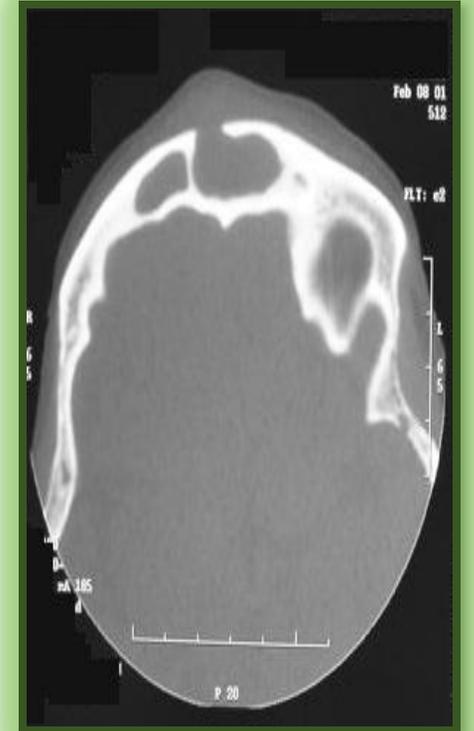
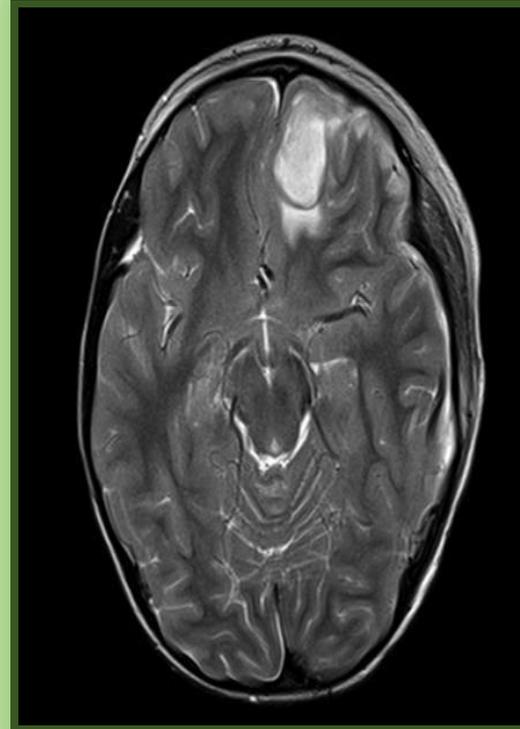
- Complications are rare but can be severe, including intracranial and orbital complications.
- **Ominous Signs suggesting complications:**
  1. Facial swelling / erythema over an involved sinus
  2. Visual changes
  3. Abnormal extraocular movements
  4. Proptosis
  5. Periorbital inflammation/edema
  6. Intracranial or CNS involvement



# ARS complications

## Frontal sinus

1. A sub periosteal abscess Pott's puffy tumor; local progression of the disease is through the outer table of the skull.
2. If the progress is inward, there may be an acute intracranial complication, such as intracranial abscess or meningitis.



# ARS complications

## Ethmoid sinus

**Table 2 – Chandler's classification of orbital infection deriving from sinusitis**

|         |                               |   |
|---------|-------------------------------|---|
| Group 1 | Preseptal cellulitis          | Inflammatory edema primarily limited to eyelid due to restricted venous drainage                  |
| Group 2 | Orbital/postseptal cellulitis | Progressive inflammatory edema involving globe marked by chemosis                                 |
| Group 3 | Subperiosteal abscess         | Collection of purulence between bone and periosteum with development of proptosis                 |
| Group 4 | Orbital abscess               | Collection of pus in orbital contents with onset of ophthalmoplegia                               |
| Group 5 | Cavernous sinus thrombosis    | Progression of inflammation intracranially with onset of fever, headache, and cranial nerve palsy |

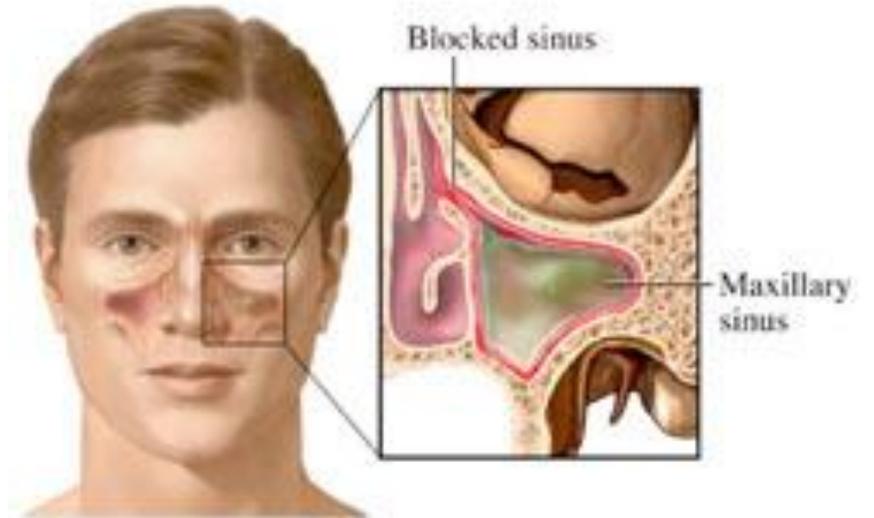
From Chandler JR, et al. *Laryngoscope*. 1970.<sup>13</sup>



# ARS complications

## Maxillary sinus

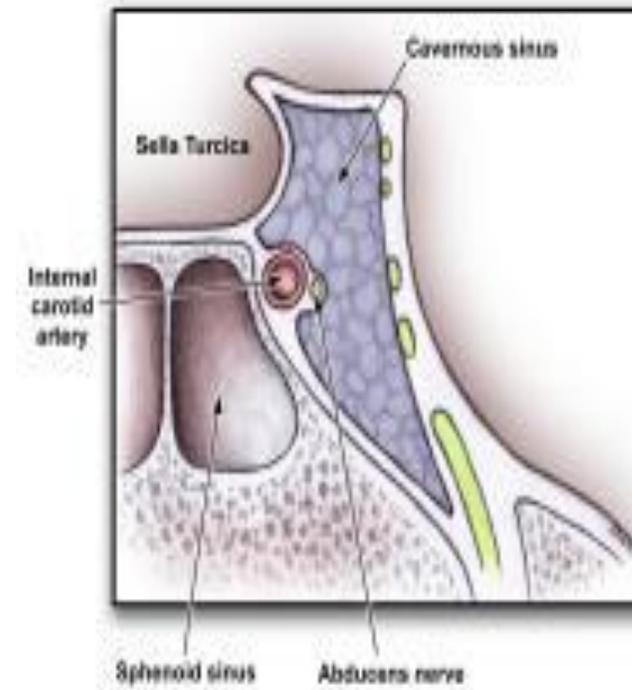
- Isolated maxillary rhinosinusitis rarely gives rise to acute local complications
- Patients present with acute swelling of the cheek



# ARS complications

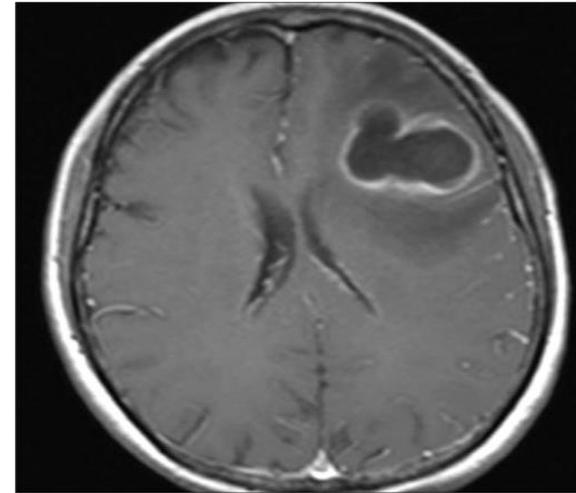
## Sphenoid sinus

- Result in septic cavernous sinus thrombosis by direct spread.



# Distant complications of ARS

- Brain abscess & Meningitis
- Septicemia.
- Toxic shock syndrome.



Thank you

Good luck

# Chronic Rhinosinusitis (CRS) Nasal polyps & Fungal RS

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# Classification

- Rhinosinusitis task force of the American academy :
  - ◆ Acute 7 days – 4 weeks.
  - ◆ Subacute 4weeks – 12 weeks.
  - ◆ Recurrent ARS.  $\geq 4$  Episodes of ARS / Y.
  - ◆ Chronic RS.  $\geq 12$  weeks / Y.
  - ◆ Acute exacerbations of CRS.
- European position paper on RS 2007
  - Acute rhinosinusitis  $\leq 4$  weeks.
  - Chronic rhinosinusitis  $\geq 12$  weeks.

# Other classification of Chronic Rhinosinusitis

- Symptoms for > 12 weeks
- Two main subtypes:
  - CRS without nasal polyps (CRSsNP)
  - CRS with nasal polyps (CRSwNP)
    - Strongly associated with asthma and aspirin tolerance

# Epidemiology

- Chronic sinusitis is one of the more prevalent chronic illnesses in the United States, affecting persons of all age groups.
- The overall prevalence of CRS in the United States is 146 per 1000 population.
- For unknown reasons, the incidence of this disease appears to be increasing yearly. This results in a conservative estimate of 18-22 million physician visits in the United States each year and a direct treatment cost of \$3.4-5 billion annually.
- Chronic sinusitis is the fifth most common disease treated with antibiotics. Up to 64% of patients with AIDS develop chronic sinusitis

# Predisposing factors to CRS

## Host factors

### \* Systemic .

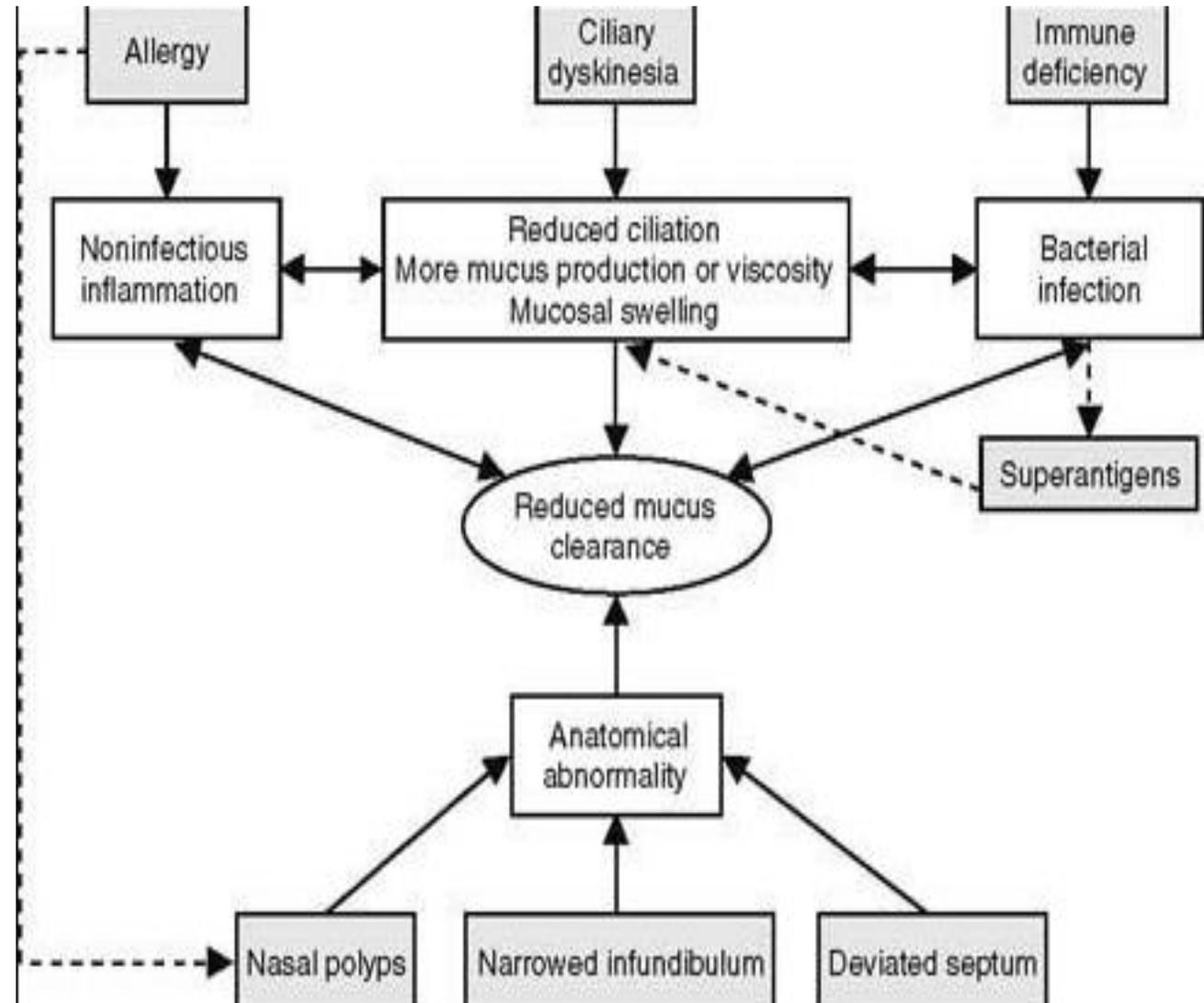
- ▶ AR.
- ▶ Immunodeficiency.
- ▶ Genetic/congenital
  - ♦ Cystic fibrosis.

### \* Local .

- ▶ Anatomic obstruction.
- ▶ GERD/PLR.

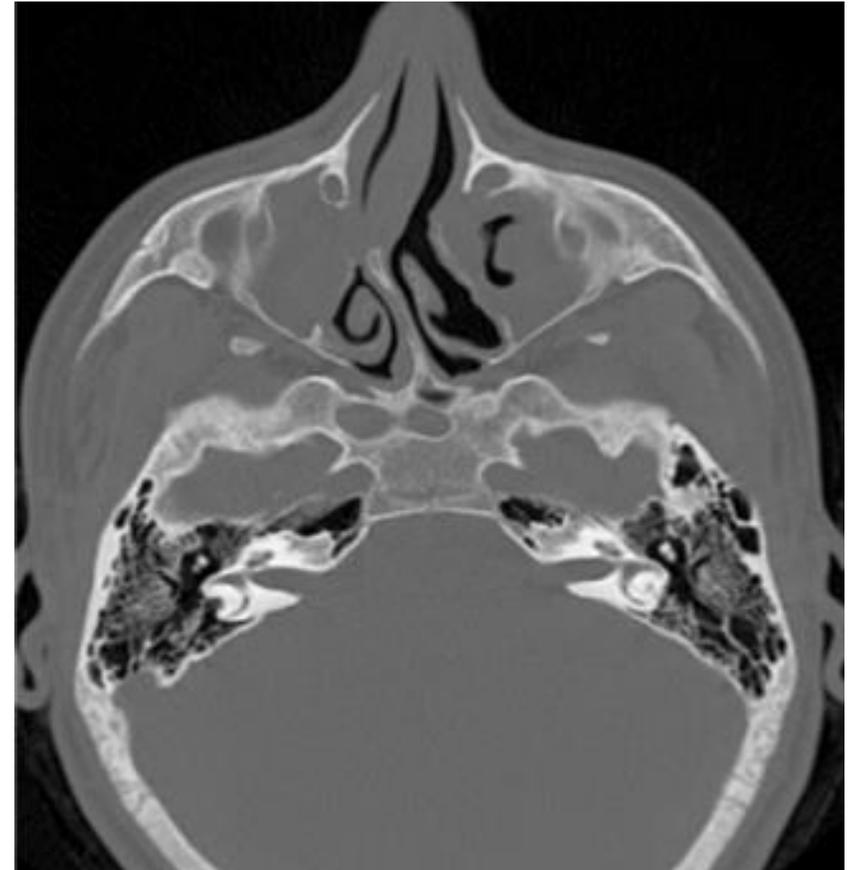
## Environmental factors

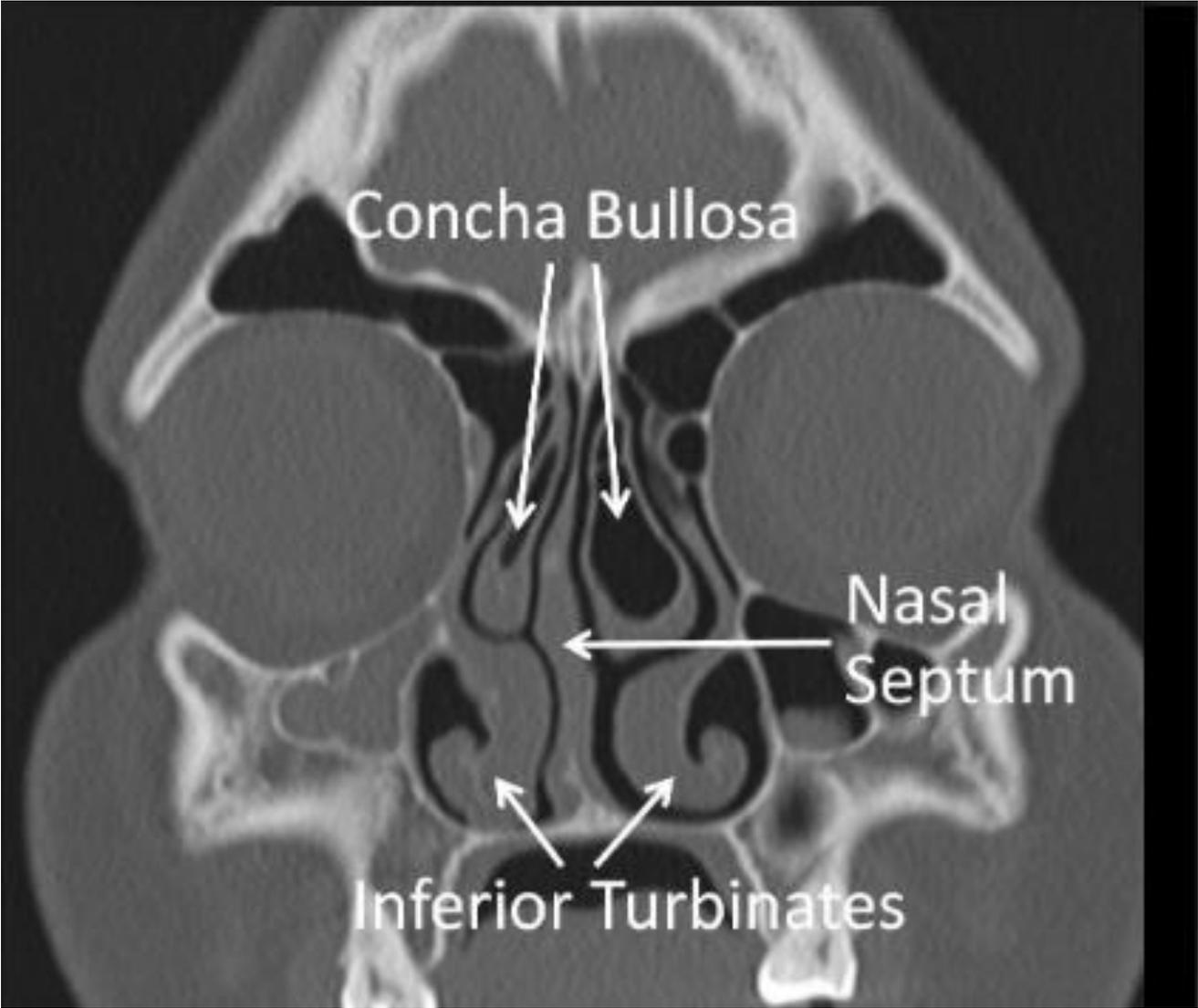
- ☛ Microorganisms
  - ♦ Viral, bacterial and fungal.
- ☛ Pollutants
  - ♦ Cigarette.
- ☛ Medications:



# Predisposing factors to CRS

- **The following conditions and risk factors predispose patients to the development of chronic sinusitis:**
  1. Anatomic abnormalities of the ostiomeatal complex (e.g., septal deviation, concha bullosa, deviation of uncinate process, Haller cells)
  2. Allergic rhinitis
  3. Aspirin sensitivity
  4. Asthma
  5. Nasal polyps
  6. Nonallergic rhinitis (e.g., vasomotor rhinitis, rhinitis Medicamentosa, cocaine abuse)
  7. Defects in mucociliary clearance
  8. Nasotracheal intubation
  9. Nasogastric intubation
  10. Hormonal (e.g., puberty, pregnancy, oral contraception)

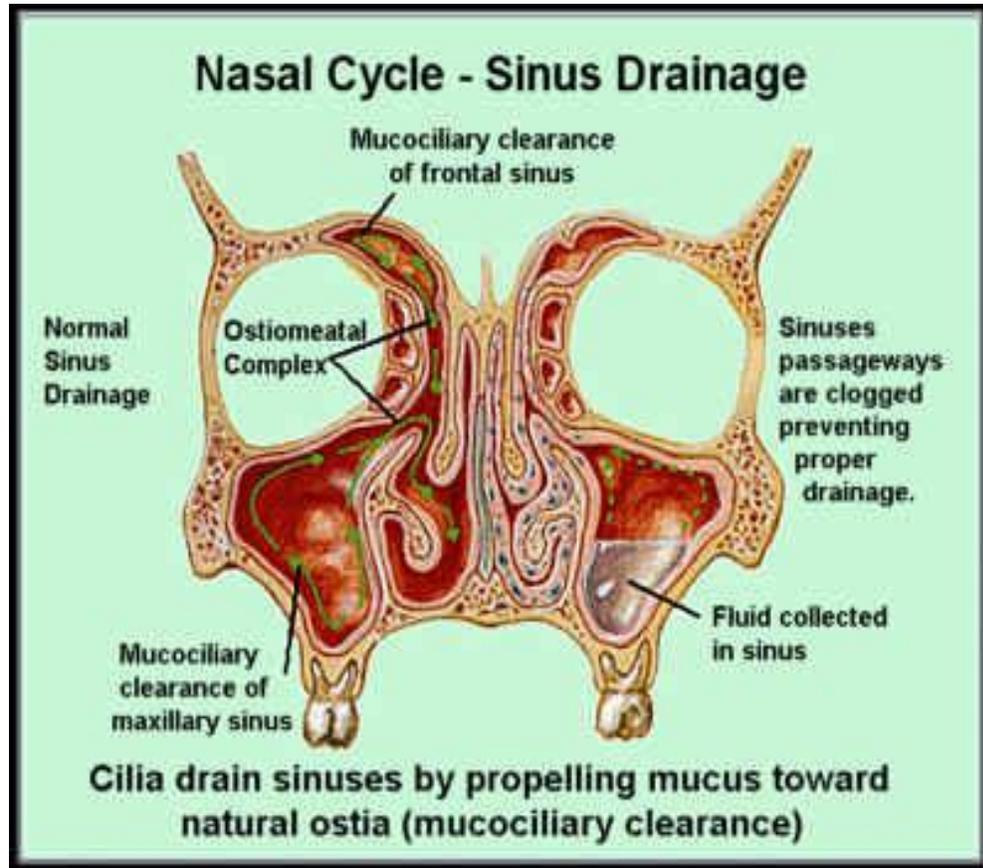




# Predisposing factors to CRS

11. Obstruction by tumor
12. Immunologic disorders (e.g., common variable immunodeficiency, immunoglobulin A [IgA] deficiency, IgG subclass deficiency, AIDS)
13. Cystic fibrosis
14. Primary ciliary dyskinesia, Kartagener syndrome
15. Wegener granulomatosis
16. Repeated viral upper respiratory tract infections
17. Smoking
18. Environmental irritants and pollutants
19. Gastroesophageal reflux disease (GERD). The reflux of gastric contents may play a contributing role in some cases of CRS; this relationship still needs to be better defined
20. Periodontitis/significant dental disease
21. Systemic diseases (ie, granulomatosis with polyangiitis (Wegener granulomatosis), Churg-Strauss vasculitis, sarcoidosis)

# Physiology of the sinuses



- Functions of the sinuses
- Normal cellular component , mucosa
- Cilia ( PH , mechanical , thermal)
- Mucus secreting goblet cells
- Basal cells

# Pathophysiology of CRS

## LOCAL

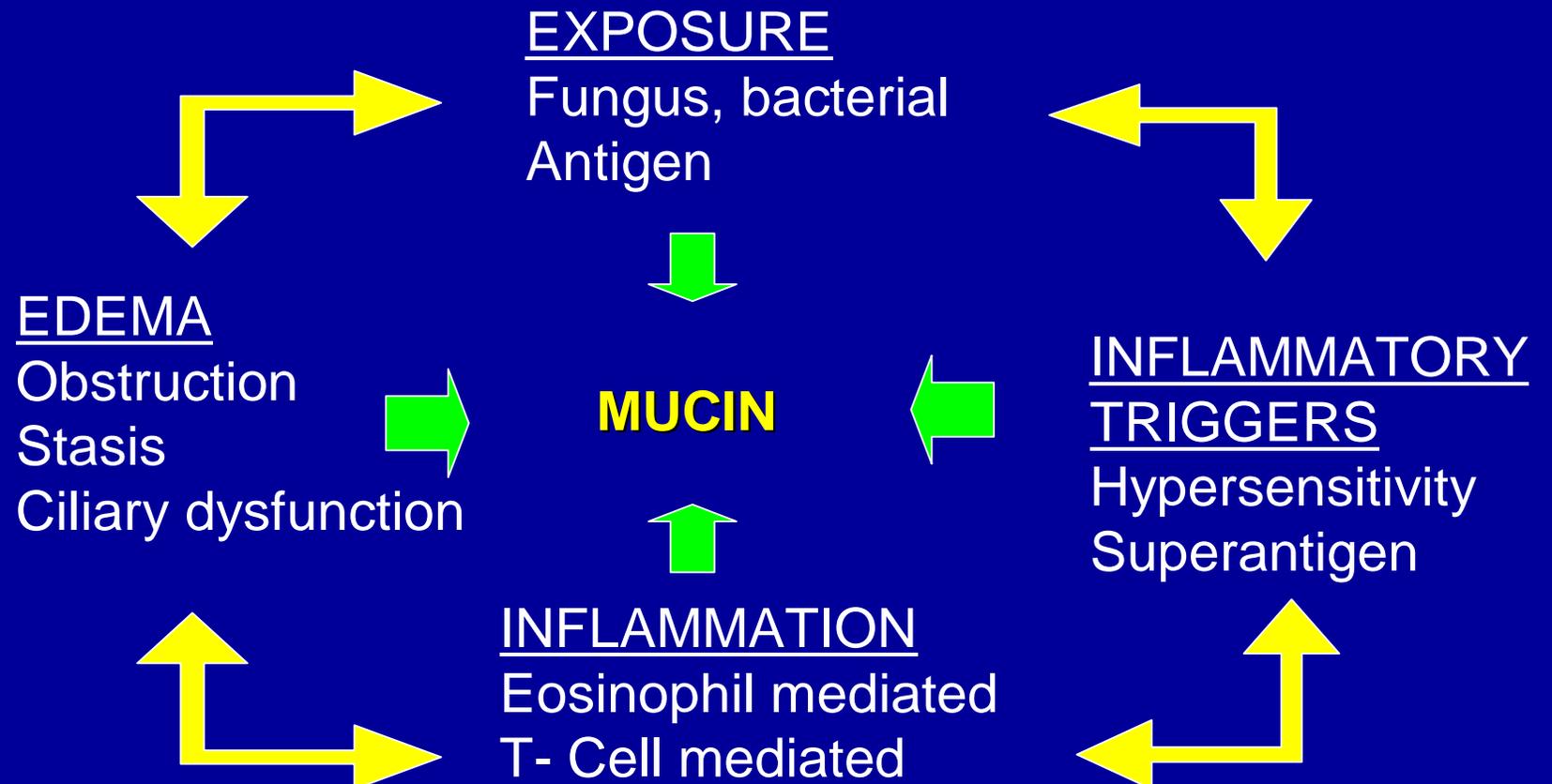
Mucostasis  
Anatomic abnormality

## ENVIRONMENTAL

Fungal, bacterial, allergen  
Geographic

## GENETIC

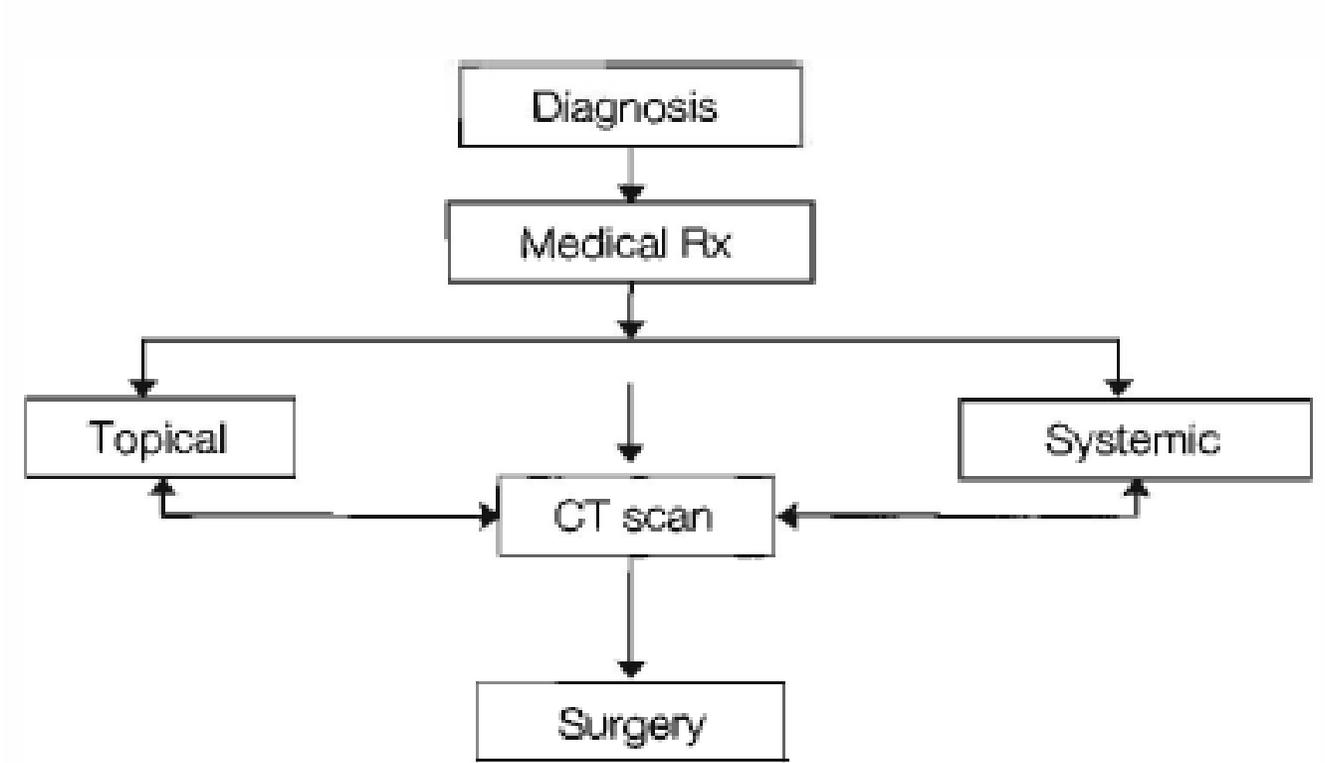
Atopy  
HLA



# Pathophysiology of CRS

- CRS is a proliferative process with remarkable thickening of the mucosa and lamina propria, eosinophils being the predominant infiltrative cell in CRS.
- T-cell ⇒ Cytokines ⇒ Stimulation of various cell type ⇒ 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 + M.C. clearance activity ⇒
  - ☛ Bacteria & fungi colonizing the sinus cavity,
  - ☛ Irritation of sensory nerve endings .

# Approach to CRS



# Clinical picture

## Symptoms Associated with the Diagnosis of Rhinosinusitis

### Major symptoms

- Purulent anterior nasal discharge
- Purulent posterior nasal discharge
- Nasal obstruction
- Facial congestion
- Facial pain/pressure
- Hyposmia/anosmia
- Fever (acute)

### Minor symptoms

- Headache
- Otalgia/aural fullness
- Halitosis
- Dental pain
- Cough
- Fever
- Fatigue

# Diagnosis

- In order to diagnose CRS you need **one of those 2 symptoms** for more than 12 weeks

1. Blockage/congestion.
2. Discharge anterior/posterior (discolored)

**Plus either:**

- **Endoscopic signs of:**
  - Polyps;
  - Mucopurulent discharge from middle meatus;
  - or Edema/mucosal obstruction primarily in middle meatus;

**And/or:**

- **Com. tomography (CT) changes**
  - Mucosal changes within ostiomeatal complex and sinuses.

# Physical examination

- Anterior rhinoscopy.



- Endoscopy.



# Plain Films

- Plain radiographs have less role in CRS than in acute rhinosinusitis.
- Plain films may show mucosal thickenings or sinus opacities.



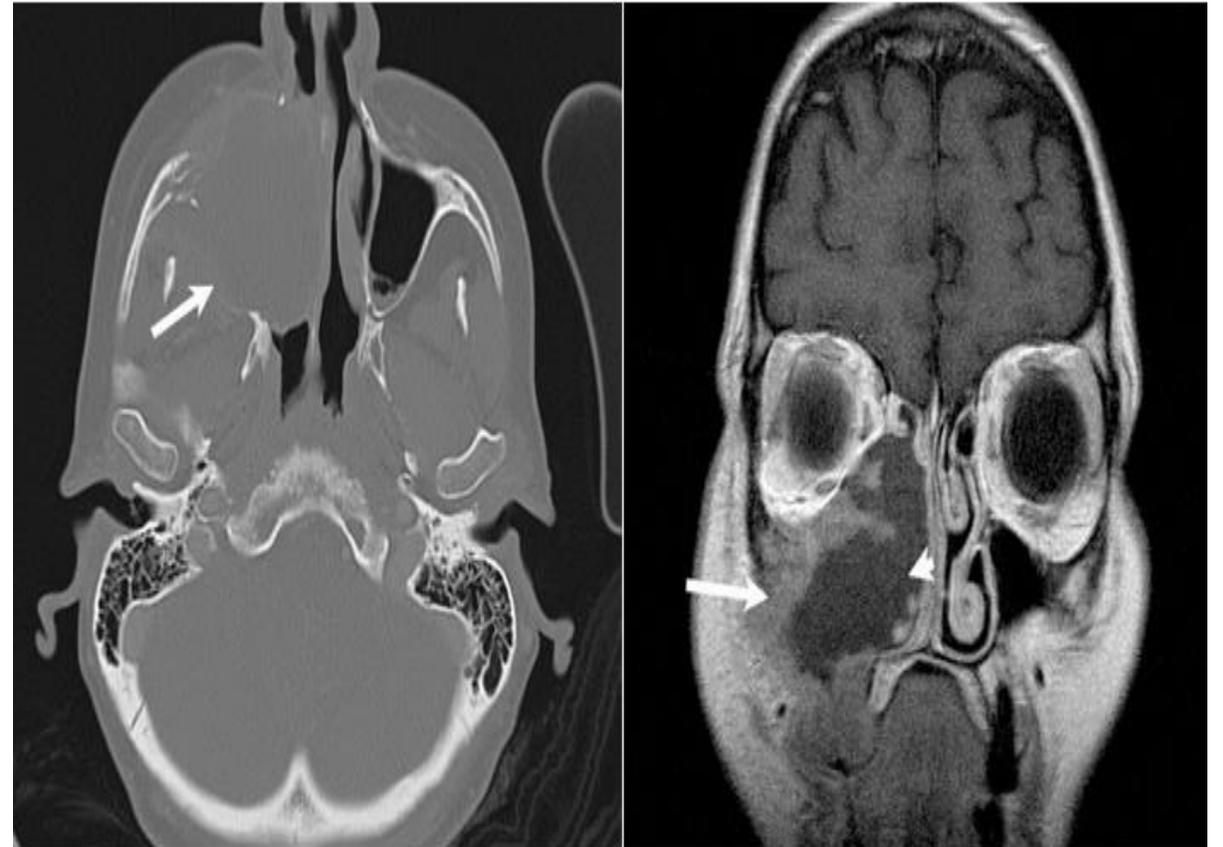
# CT scans

- The imaging study of choice with fine coronal sections at the level of the ostiomeatal complex.
- After failure of maximal medical therapy.
- Before surgical procedures.
- For evaluation of suspected complications.
- When neoplasm is a possibility.



# MRI

- MRI is generally reserved for complex cases, (better evaluation of soft tissue)
1. Paranasal sinus tumors.
  2. Cases with cranial base and orbital involvement.
  3. Fungal sinusitis



# Cultures and biopsies

- Maxillary sinus tap, endoscopically directed middle meatal culture
- Biopsy samples from the maxillary sinus mucosa of patients with chronic sinusitis show basement membrane thickening, atypical gland formation, goblet cell hyperplasia, mononuclear cell infiltration, and sub-epithelial edema. The mononuclear cell infiltrate often predominantly demonstrates neutrophils in acute disease and eosinophils in chronic disease. Rarely, squamous cell metaplasia may be seen.

# Management

- Assess patients with CRS or recurrent acute rhinosinusitis for multiple chronic conditions that would modify management (e.g., asthma, cystic fibrosis, immunodeficiency, ciliary dyskinesia)
- Assess for nasal polyps in patients with CRS
- Recommend **saline nasal irrigation**, **topical intranasal corticosteroids**, or both for symptomatic relief of CRS

**According to recommendations of last update 2015 guidelines by the American Academy of Otolaryngology--  
Head and Neck Surgery Foundation**

# Nasal douching (saline irrigation)

- This
  - > Reduces nasal symptoms.
  - > Improve quality of life.
  - > Improve endoscopic findings.
- Mechanism
  - Prevents crust accumulation.
  - Promotes mucociliary clearance

# Corticosteroids

- Initial oral steroid therapy followed by topical steroid therapy was found to be more effective than topical steroid therapy alone in decreasing polyp size and improving olfaction in patients with CRS with at least moderate nasal polyposis.
- For maintenance therapy topical corticosteroids are the main stay.
- Side effects of systemic steroids:
  1. Osteoporosis.
  2. Growth retardation.
  3. Cataract ,glaucoma
- Ant leukotriene agents can be adjunctive to the effect of the steroids, especially in patients with asthma or an allergy to aspirin

# Antimicrobial therapy

- An adequate antibiotic trial in CRS usually consists of a minimum of 3-4 weeks of treatment, preferably culture directed.
- Empiric therapeutic regimens include the combination of a penicillin (eg, amoxicillin) plus a beta-lactamase inhibitor (eg, clavulanic acid), a combination of metronidazole plus a macrolide or a second- or third-generation cephalosporin, and the newer quinolones (eg, moxifloxacin).
- Antibiotic therapy is often required for up to 6 weeks or longer and should not be discontinued until the patient is asymptomatic. Discontinuation of antimicrobial therapy prior to complete resolution increases the likelihood of relapse.

# Decongestants

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

# Surgical Treatment of Chronic Rhinosinusitis

- Surgical care is used as an adjunct to medical treatment in some cases. Surgical care is usually reserved for cases that are **refractory to medical treatment and for patients with anatomic obstruction**.
- The goal in surgical treatment is to **reestablish sinus ventilation and to correct mucosal opposition in order to restore the mucociliary clearance system**. Surgery strives to restore the functional integrity of the inflamed mucosal lining.
- Recent advances in endoscopic technology and a better understanding of the importance of the ostiomeatal complex in the pathophysiology of sinusitis have led to the establishment of **functional endoscopic sinus surgery (FESS)** as the surgical procedure of choice for the treatment of chronic sinusitis

# Extent of surgery

Extended surgery doesn't yield better results than limited surgery.

{Surgery stops there ,where pathology stops }

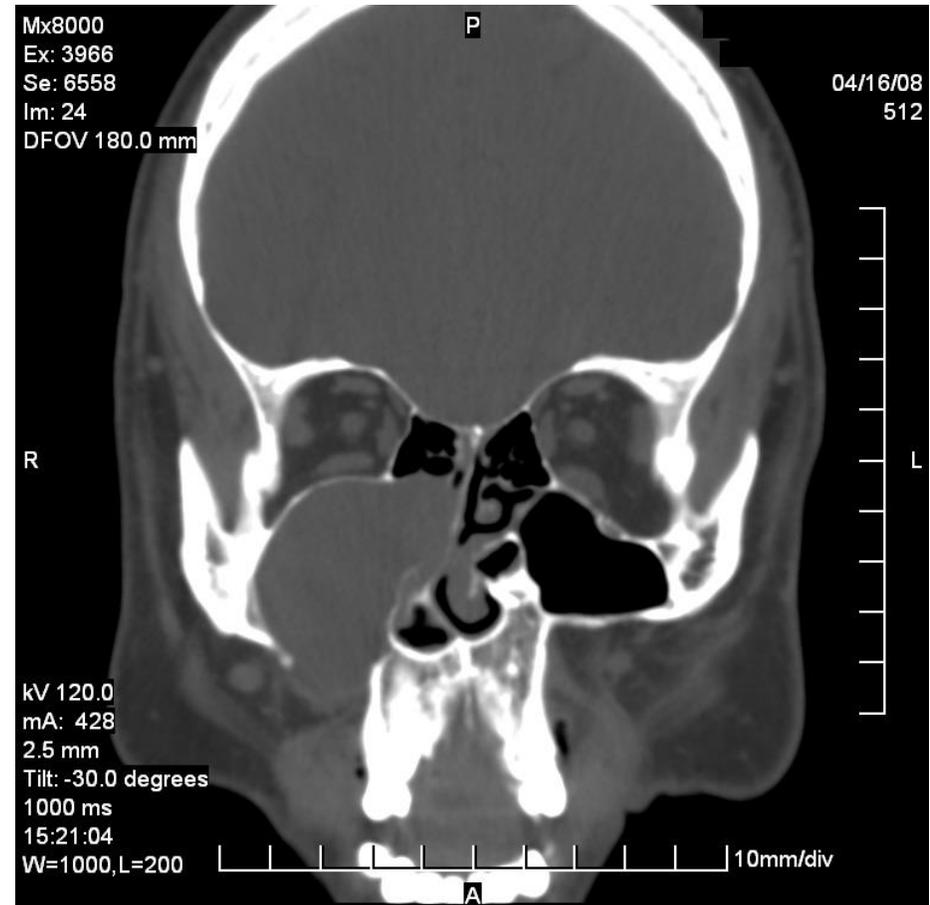


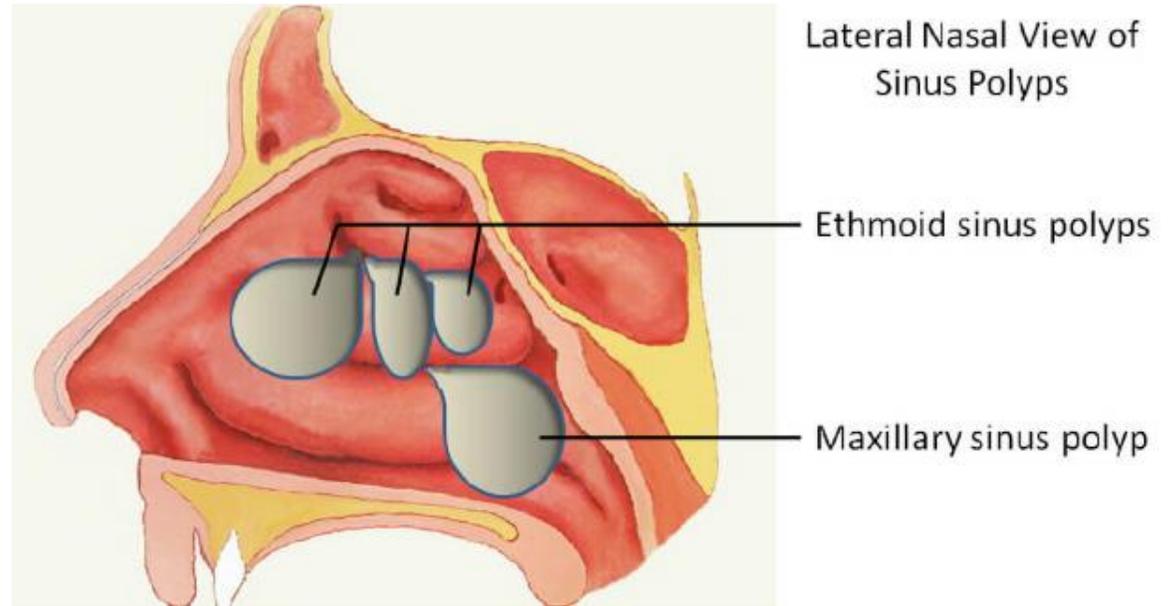
Professor Heinz Stammberger  
(1946–2018)

The Father of Endoscopic Sinus Surgery

# Complications of CRS

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





# Nasal polyps

Edematous pedunculated masses arising from the mucous lining of paranasal sinuses

- **Glistening** and **pale** growth liken to peel grape appearance are characteristic features of nasal polyps.
- It is **painless** and can be quite **mobile** on probing as compared to nasal turbinates.



Grade I



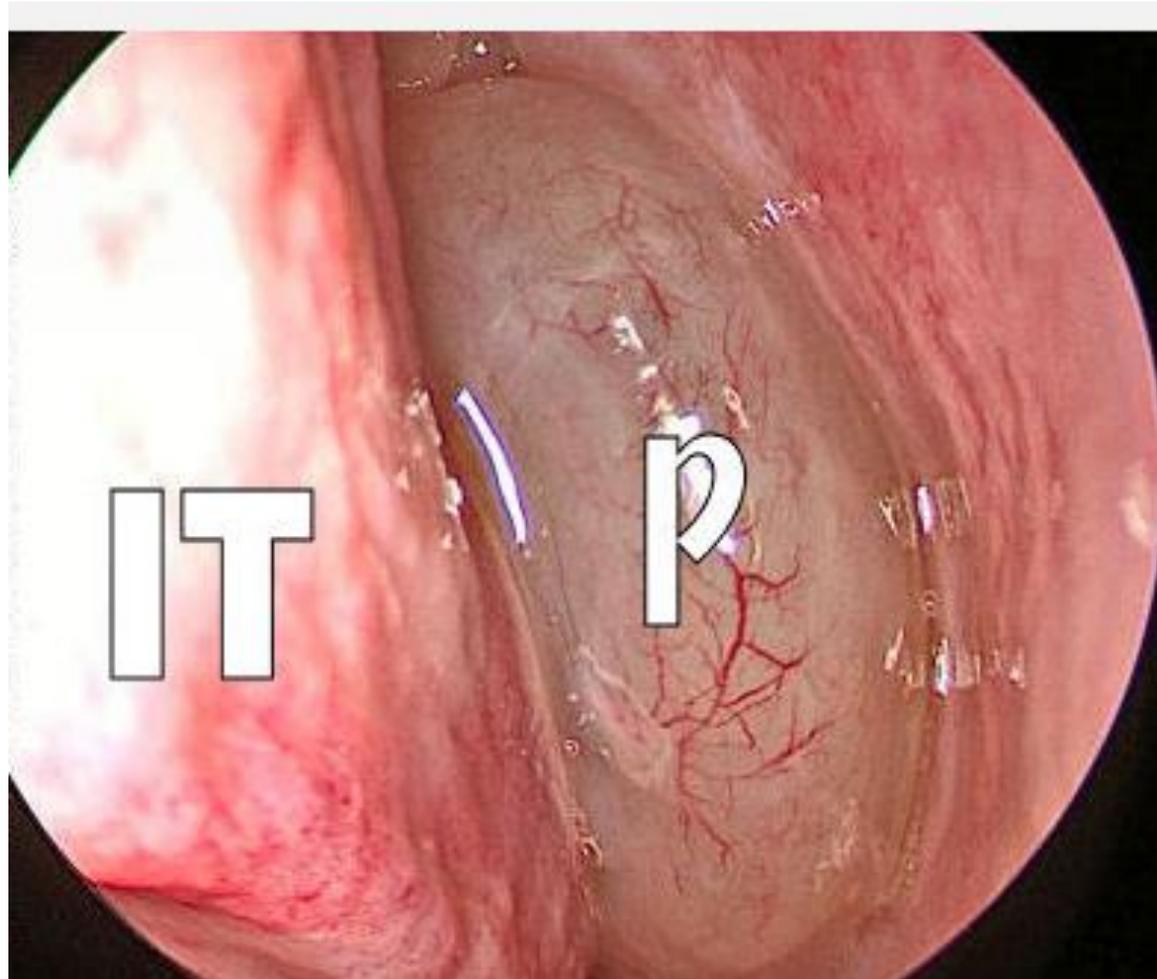
Grade II



Grade III



Grade IV



Close-up view of nasal polyp (P). Compare it with the inferior turbinate appearance (IT)

# Theories of pathogenesis

## 1. Bernstein theory :

Inflammatory changes in lateral nasal wall or sinus mucosa, polyps originate from contact area. Ulceration, reepithelialisation and new gland formation. Inflammatory processes from epithelial cells, endothelium and fibroblasts. Integrity of sodium channels affected

## 2. Vasomotor theory:

increased vascular permeability and impaired vascular regulation cause detoxification of mast-cell products (eg, histamine). The prolonged effects of these products within the polyp stroma result in marked edema (especially in the polyp pedicle) that is worsened by venous drainage obstruction.

## 3. Epithelial rupture theory

suggests that rupture of the epithelium of the nasal mucosa is caused by increased tissue turgor in illness (eg, allergies, infections). This rupture leads to prolapse of the lamina propria mucosa, forming polyps.

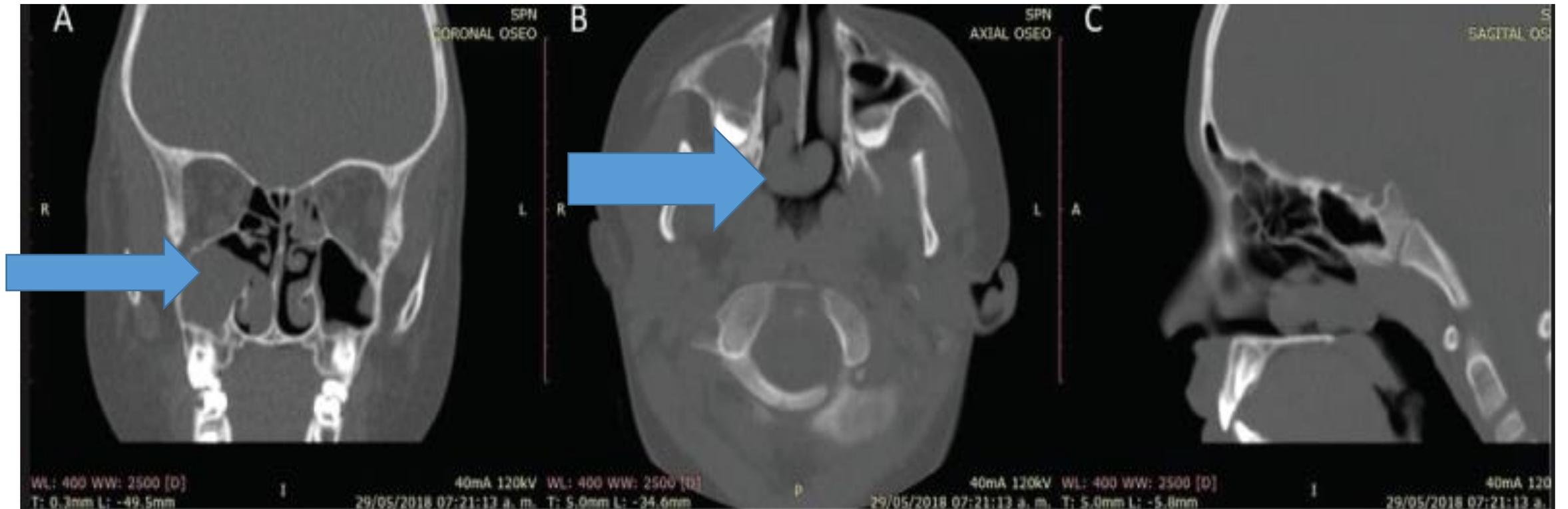
# Classification

Polyps can also be a presenting feature of fungal sinusitis or Sino nasal malignancy

|              | Ethmoidal polyp                                  | Antrochoanal polyp                                    |
|--------------|--|---|
| Age          | Common in adults                                 | Common in children                                    |
| Etiology     | Multifactorial , Asthma is a common association  | Infection   |
| Number       | Multiple   | Solitary  |
| Laterality   | Bilateral  | Unilateral  |
| Origin       | Ethmoidal sinuses                                | Maxillary sinus near ostium                           |
| Growth       | Mostly anteriorly & may present at the nares     | Backwards to choana, may hang down behind soft palate |
| Size & shape | Usually small & grape-like masses                | Trilobed (antral, nasal, choanal part)                |
| Recurrence   | Common   | Uncommon if removed completely                        |
| Treatment    | Polypectomy, endoscopic surgery or ethmoidectomy | Polypectomy, endoscopic removal                       |

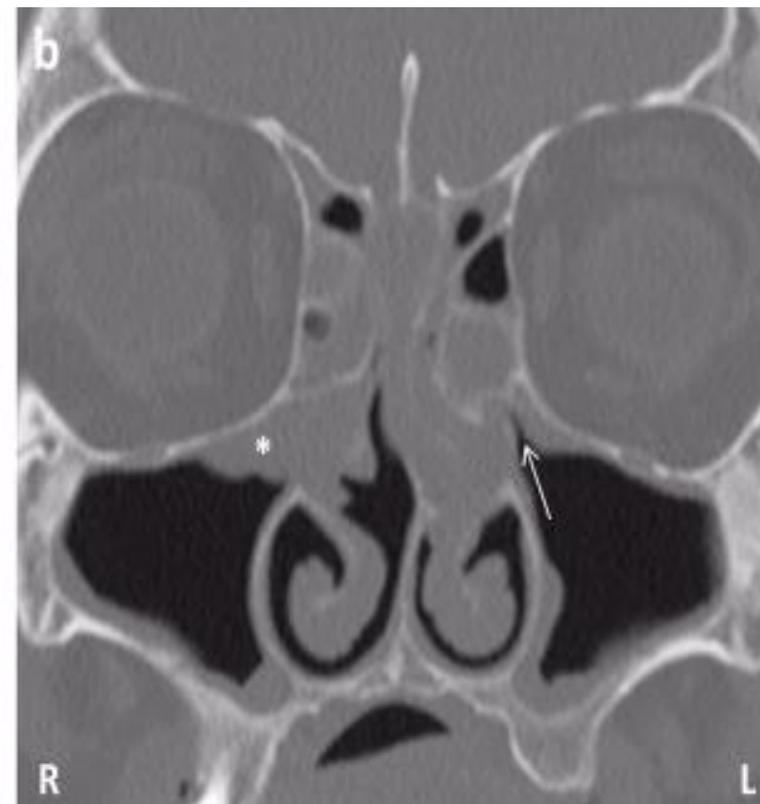
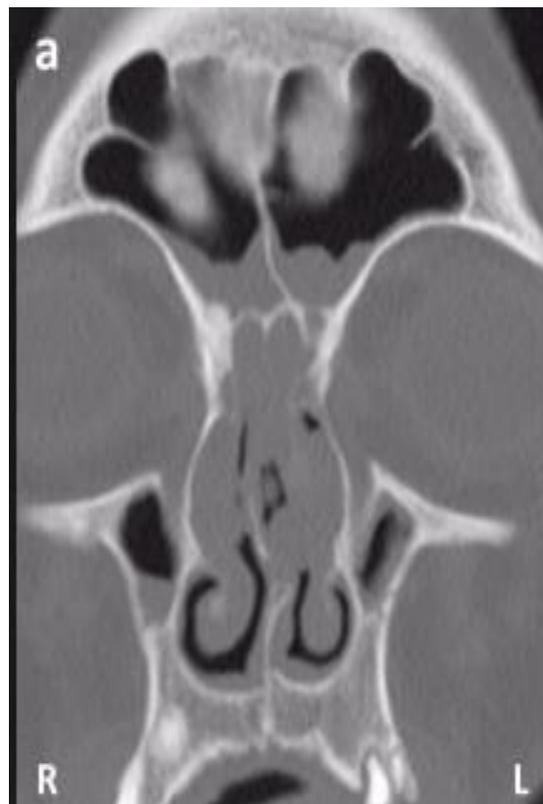
# Antrochoanal polyp

Seen more commonly in adolescents and young children



# Ethmoid polyps

Usually presents in middle aged adults



# Clinical presentation

- Mostly seen in **adults**
- Nasal **stiffness** → leading to total nasal obstruction
- Partial/total **loss of smell**
- **Headache** (associated sinusitis)



# Physical exam

- On **anterior rhinoscopy**, polyps appear as
  - Smooth, glistening
  - Grape-like masses
  - Often pale in color
  - May be sessile or pedunculated
  - Insensitive to probing
  - Do not bleed on touch
  - Often multiple and bilateral
- Broadening of nose
- Increase intercanthal distance } long standing case
- May protrude from the nostril and appear pink and vascular, simulating neoplasm
- Purulent discharge (associated sinusitis)



# Diagnosis

- **Clinical examination**
- **CT scan of paranasal sinuses**
  - exclude neoplasia
  - plan surgery
- **Histological examination**
  - especially in people >40 years

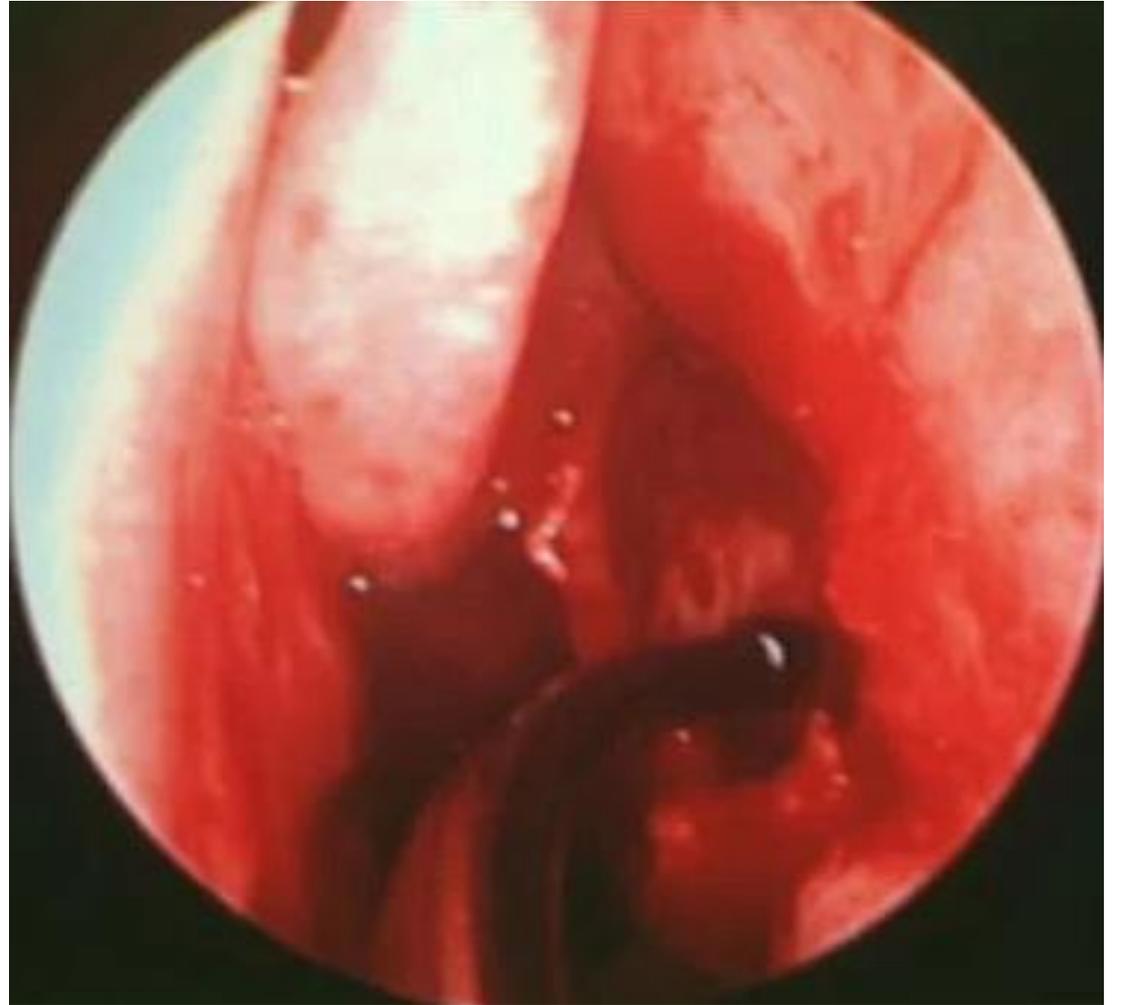
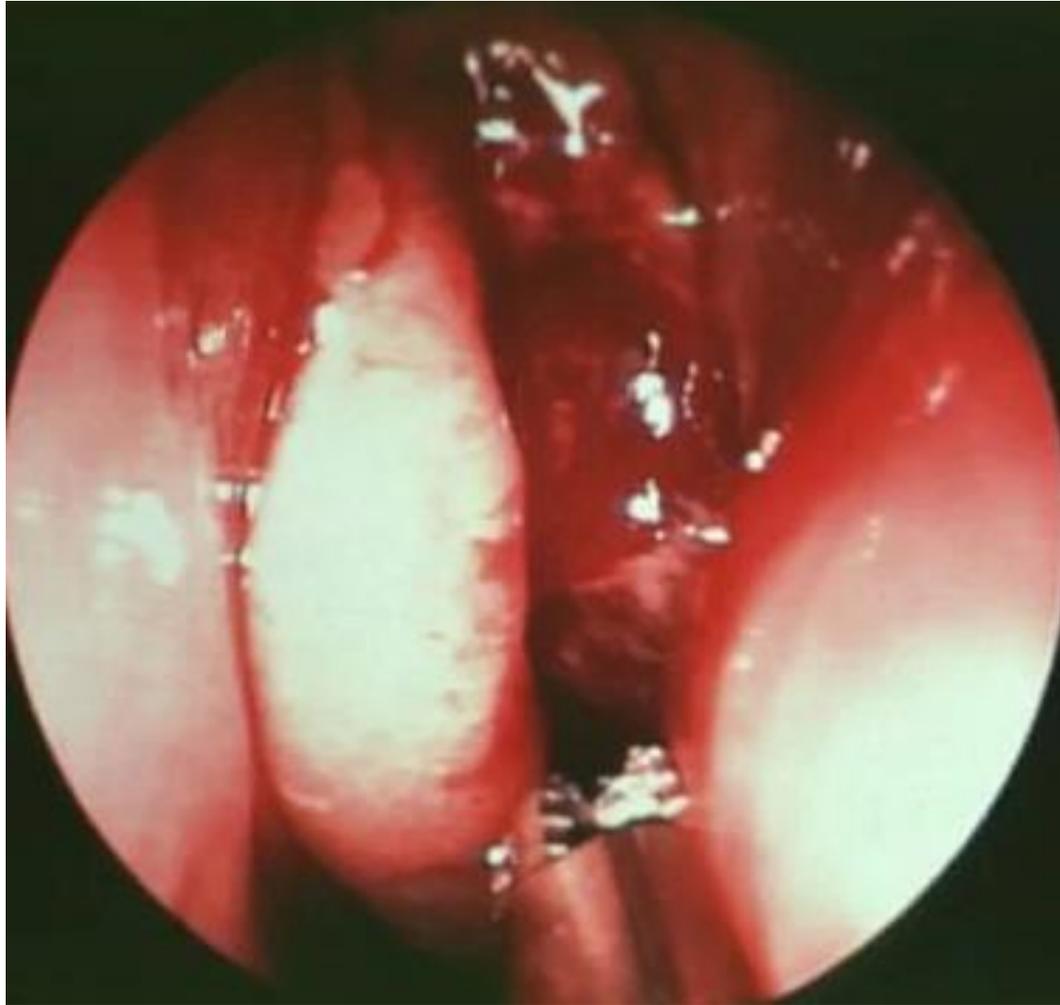
# Management ethmoidal polyps

- Aggressive medical management as mentioned previously in management of CRSwNP ( combination of systemic and topical steroids, antimicrobial therapy, nasal irrigation).
- For refractory symptoms despite aggressive medical therapy FESS + polypectomy.
- Endoscopic sinus surgery appears to improve both olfaction and quality of life in chronic rhinosinusitis patients with nasal polyps.
- Polyposis recurrence is common following treatment with medical or surgical.

# Management Antrochoanal polyps

- Simple polypectomy ( avulsion from the stalk).
- FESS is a better technique that not only removes the polyps but also opens the clefts in the middle meatus, where they most often form, which helps decrease the recurrence rate.





# FUNGAL SINUSITIS

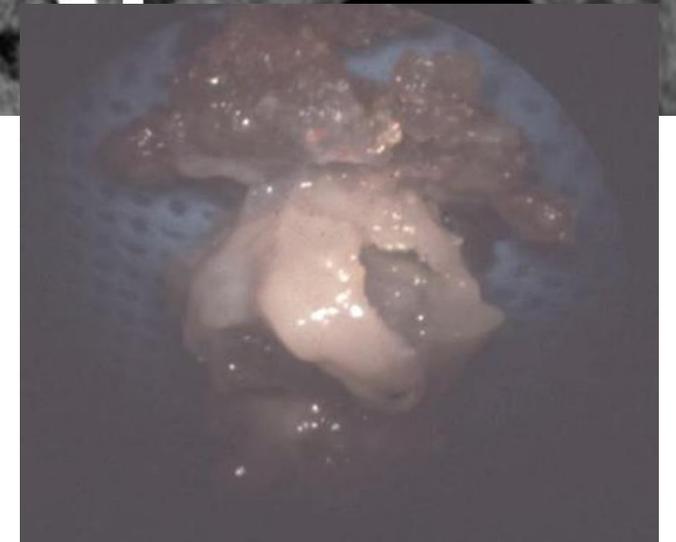
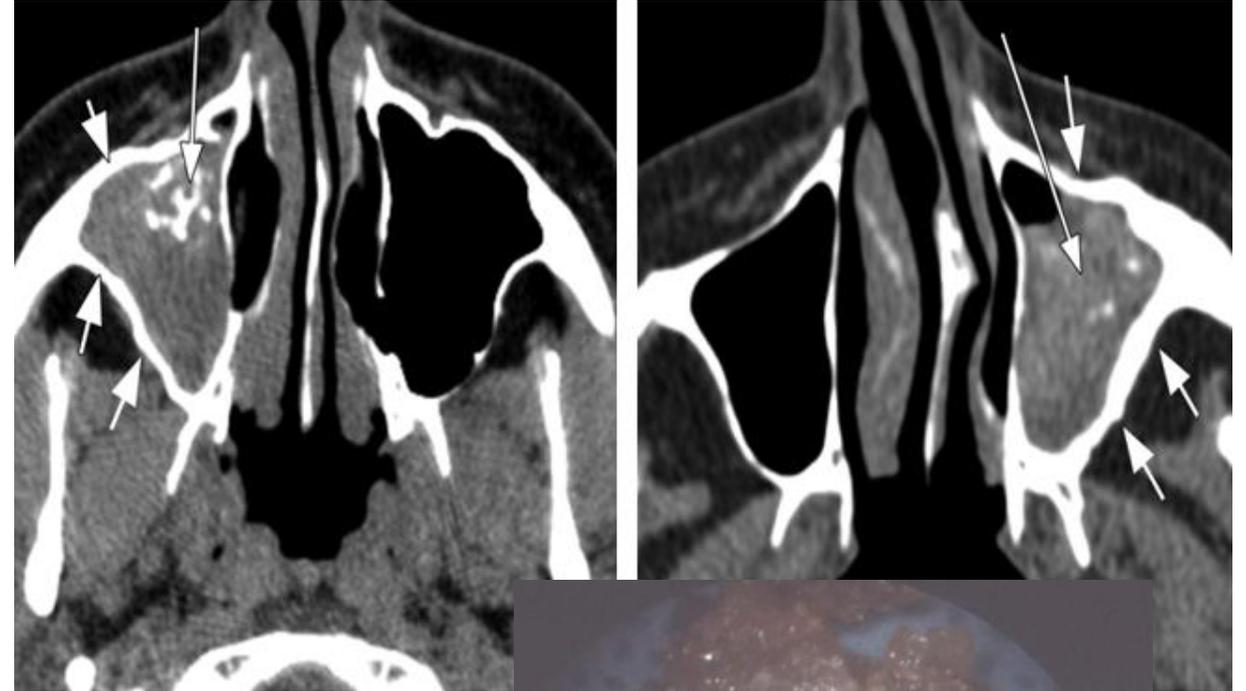
Classification

# CLASSIFICATION OF INFECTION

- **Non-invasive**
  - Sinus fungal ball (Mycetoma)
  - Allergic fungal RS
  
- **Invasive**
  - Acute fulminant invasive fungal sinusitis
  - Chronic invasive fungal sinusitis
  - Granulomatous invasive fungal sinusitis

# SINUS FUNGAL BALL

- Sequestration without invasion
- Aspergillus
- Maxillary sinus (70-80%)
- concomitant in southern India.
- normal immunologic status and in immunocompromised as well
- Treatment : surgical (FESS)
  - ⊙ surgical removal of the fungus ball
  - ⊙ No medical treatment is required
  - ⊙ recurrence or relapse is exceptional.



# ALLERGIC FUNGAL RHINOSINUSITIS (AFRS)

- hyphal elements detected by fungal stains.

- Culture : variety of fungal species.

- vary geographically:

- \*\* In North America : Bipolaris and Alternaria and Curvularia .

- \*\* In northern India : Aspergillus flavus

- Diagnosis : high IgE + no invasion

- Treatment :

1. Surgery (FESS)

2. Post operative topical +/- systemic steroids

3. Immunotherapy

- Development : genetic + strong spore

- millions of spores per day  mucociliary transport disruption, dryness

- Germination  antigenicity  allergic mucin  grow.

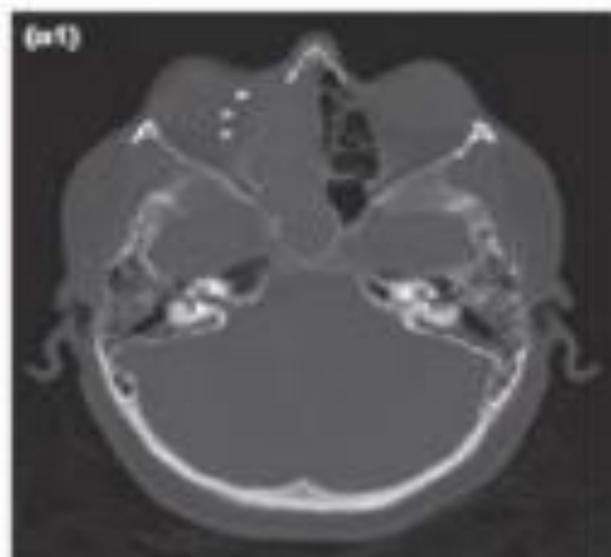
# DIAGNOSTIC CRITERIA OF AFRS



## Diagnosis criteria

- Type I hypersensitivity confirmed by history, skin tests or serology
- Nasal polyposis
- Characteristics CT scan signs
- Positive fungal stain or culture
- Asthma
- Eosinophilic mucus with fungal elements and no tissue invasion
- Unilateral predominance
- Radiographic bone erosion
- Charcot-Leyden crystals
- Peripheral eosinophilia

## Sinus CT



Medial orbital wall thinned and expanded laterally by the ethmoid sinus content

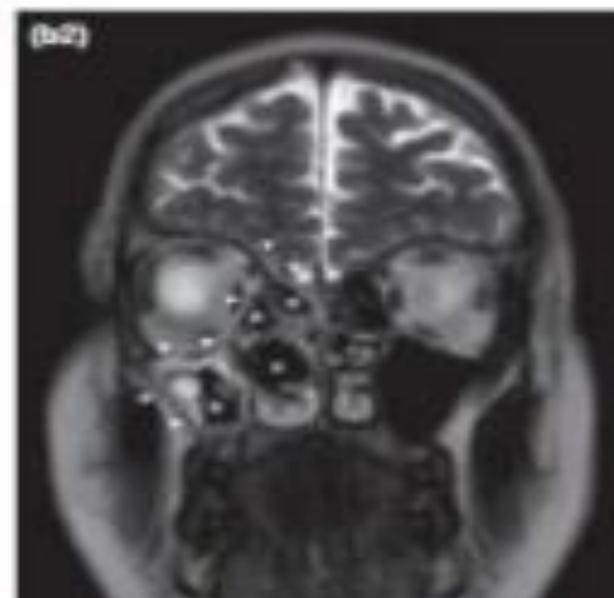
## MRI



T1-weighted image showing central hypointensity (asterisks) and peripheral enhancement of right-side sinuses (arrowheads)



Erosion of the skull base (arrow) and lateral expansion of the thinned medial orbital wall (arrowheads)



T2-weighted image showing central void signal (asterisks) and peripheral enhancement of right-side sinuses (arrowheads)

# ACUTE FULMINANT INVASIVE FUNGAL RHINOSINUSITIS

- Altered host defenses :
  - \*\* transplantation
  - \*\* DKA
  - \*\* leukemia.
- Mainly due to Aspergillus (A. fumigatus or A. flavus.), Mucormycosis
- The time course is rapid, and on histopathologic inspection, the fungus can be seen invading tissue.
- **Invasive FRS may be present** :
  - \*\* Ophthalmoplegia, orbital swelling
  - \*\* proptosis, and visual loss
- **Nasal endoscopy** : necrosis of the nasal mucosa, only edema and pallor
- **Management** :
  1. Urgent Endoscopic debridement.
  2. Combined with systemic antifungal therapy (Amphotericin B)



Thank you

Good luck