Acute Rhinosinusitis (ARS)

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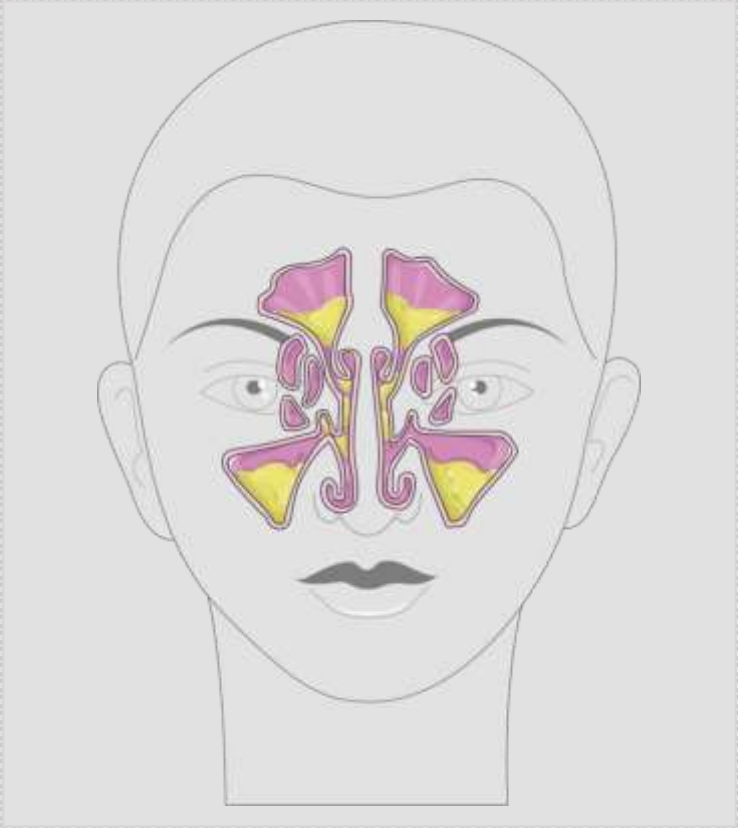
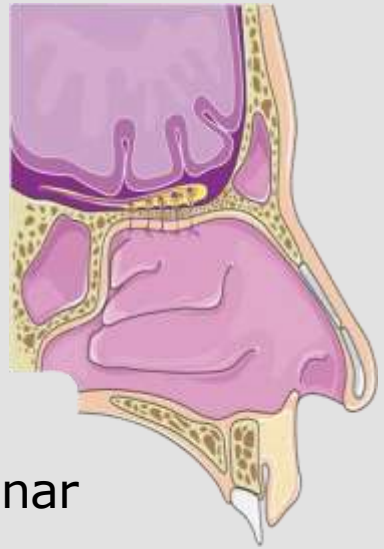


Sinus Anatomy



-Paranasal sinuses lined with pseudostratified ciliated columnar epithelium and goblet cells.

- Sinuses health depends on:

- Mucous secretion of normal viscosity, volume, and composition.
- Normal mucociliary flow to prevent mucous stasis and subsequent infection
- Open sinus ostia to allow adequate drainage and aeration.

Sinus Anatomy

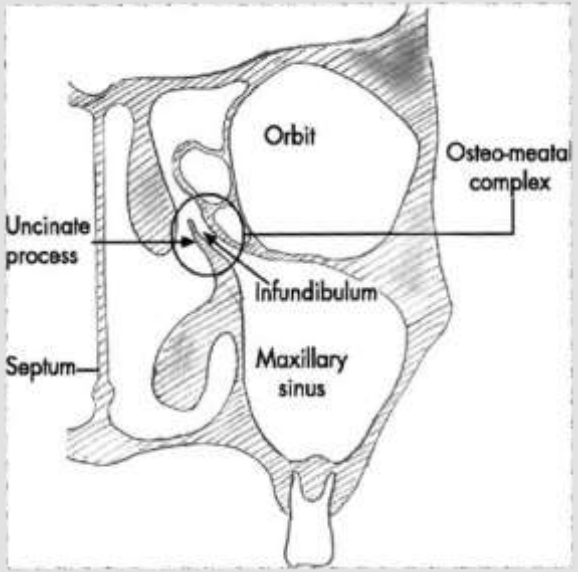
-Maxillary and ethmoid sinuses present at birth, Frontal and sphenoid sinuses develop after birth.

-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

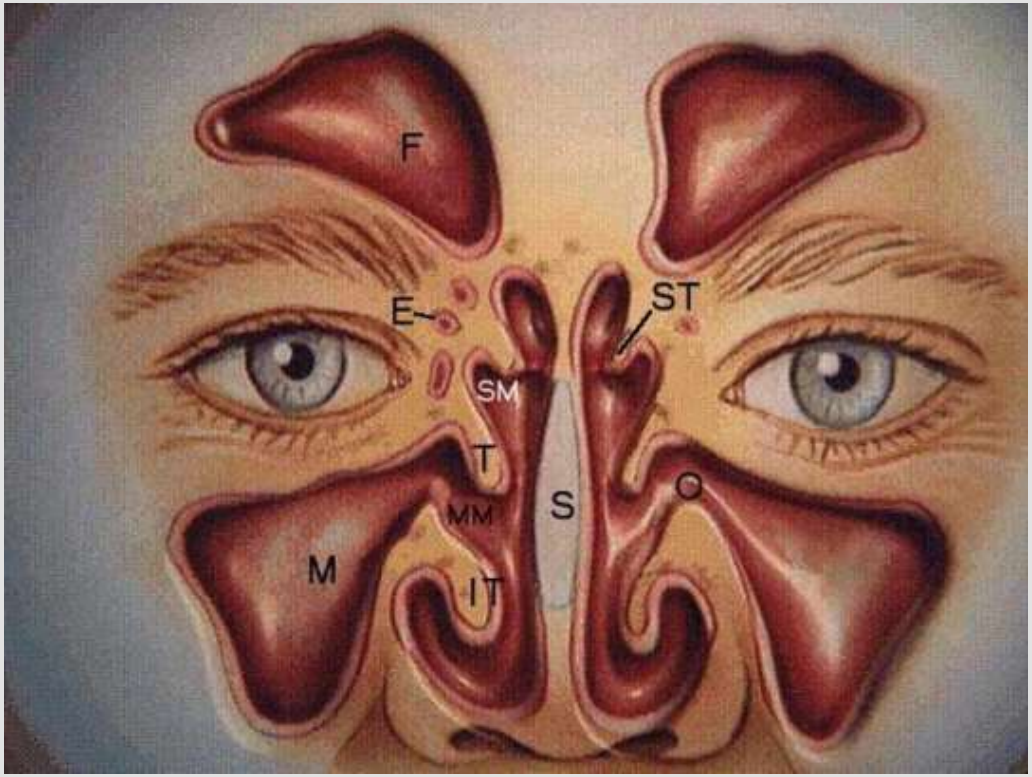
- The possible roles of the sinuses may include:

- reducing the weight of the skull
-dampening pressure; humidifying and warming inspired air
- absorbing heat and insulating the brain
- aiding in sound resonance
-providing mechanical rigidity and increasing the olfactory surface area

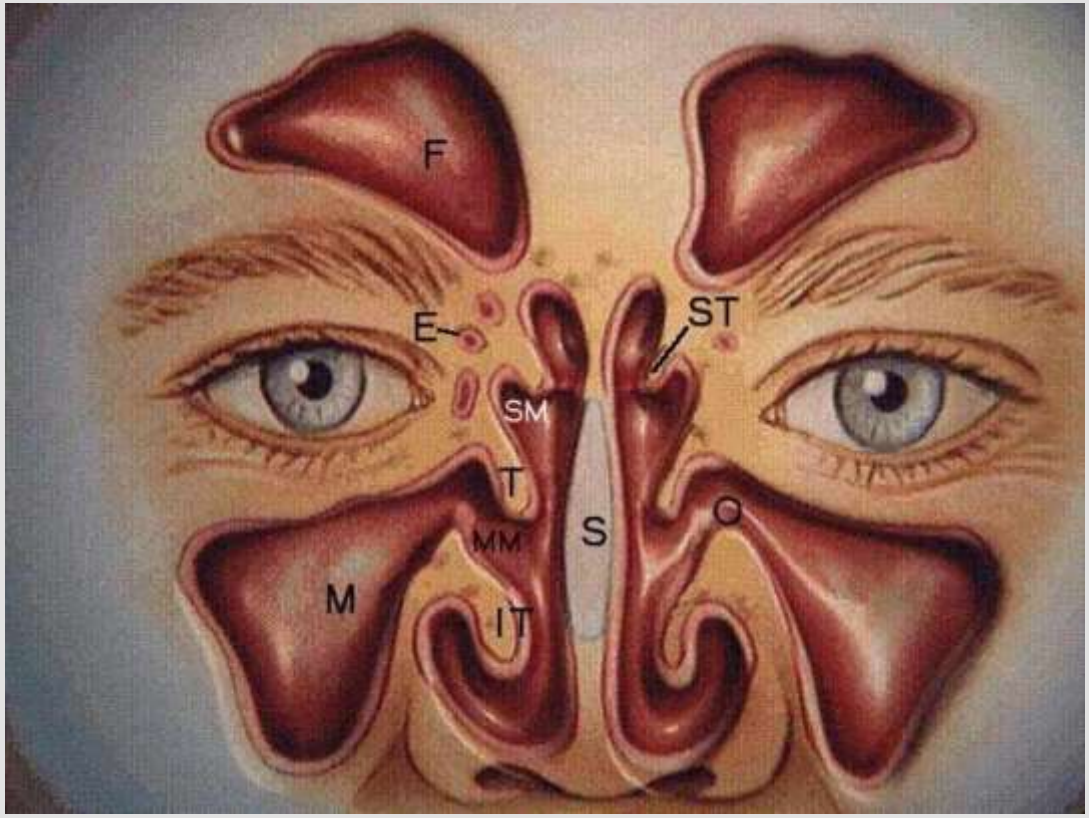
- Ciliary beat at the rate of 8-15 Hz is continuously moved by the cilia at a speed of 6 mm/min. The ciliary action can be affected due to local factors, such as infection and local hypoxia that is associated with complete occlusion of sinus ostia. The sinus mucosa has less secretory and vasomotor function 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.

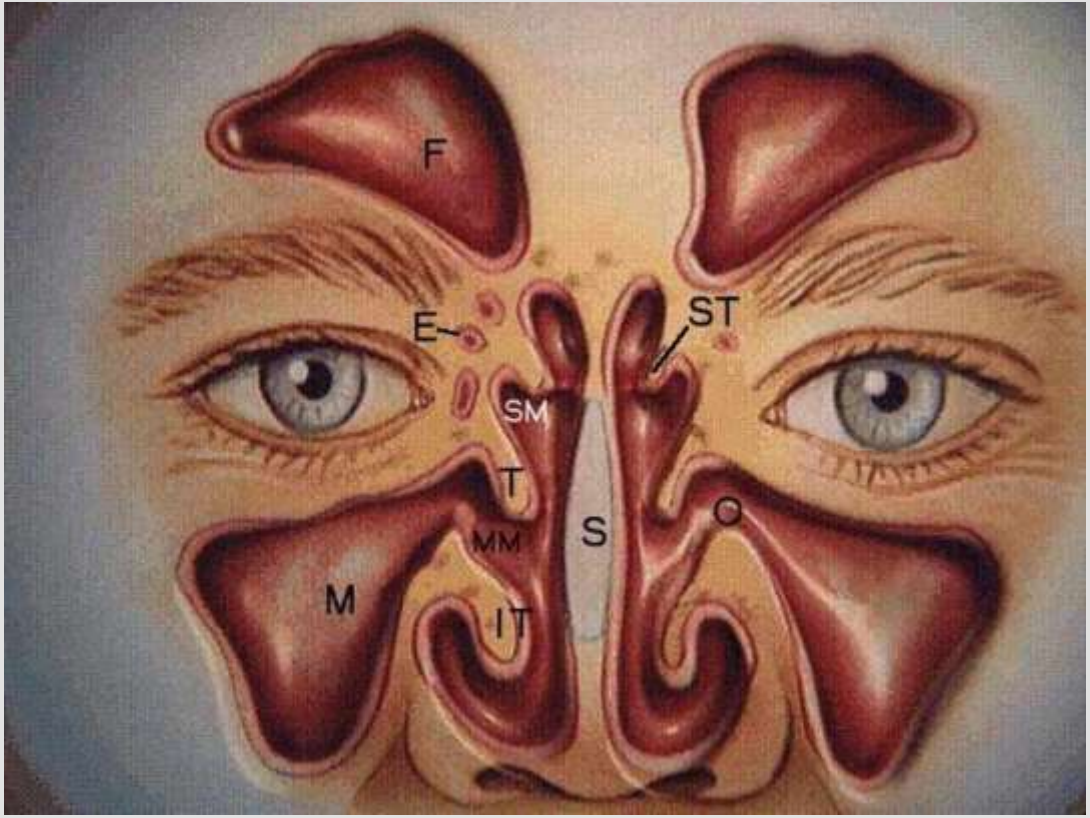
Frontal Sinuses



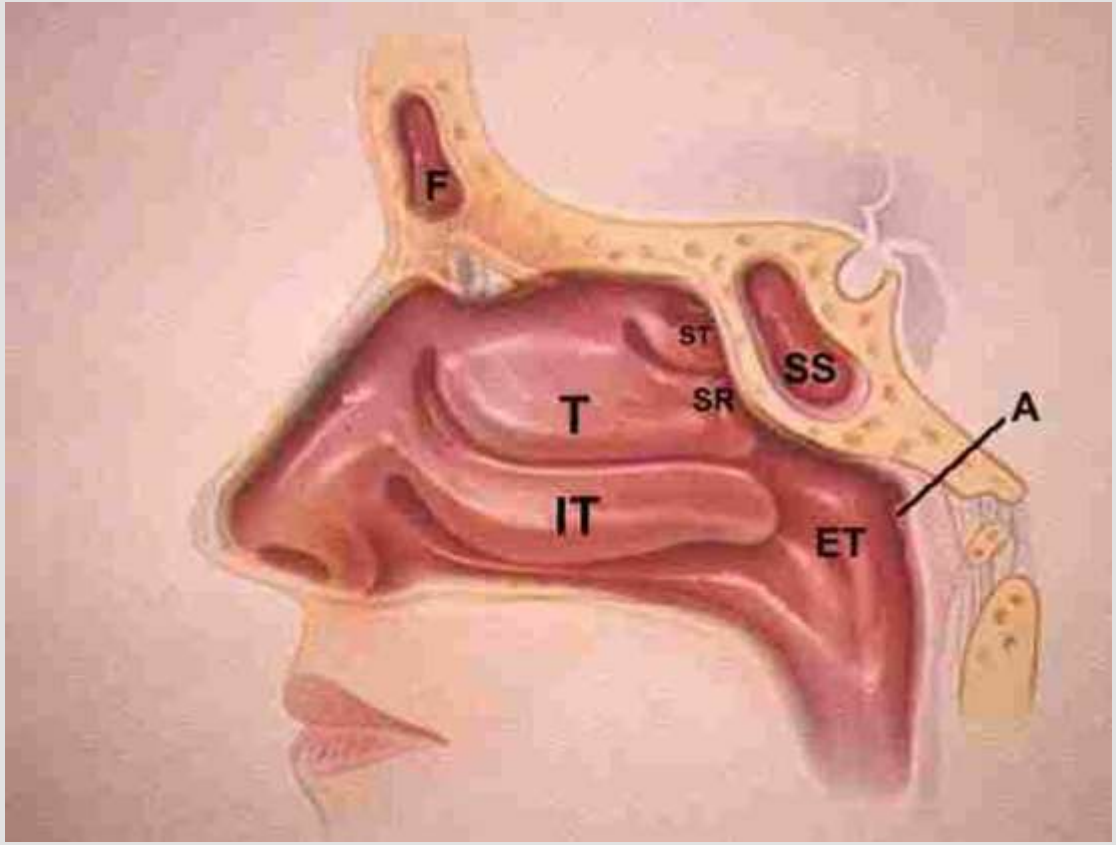
Maxillary Sinuses



Ethmoid Sinuses



Sphenoid Sinus



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.

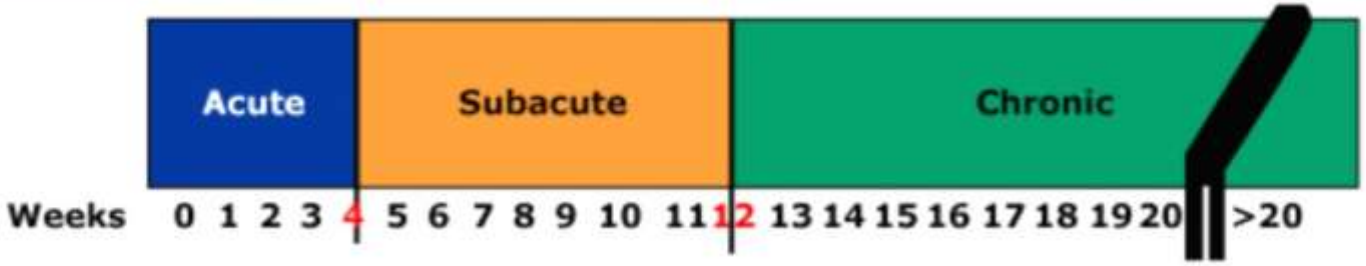
Rhinosinusitis may be further classified according to the anatomic site (maxillary, ethmoidal, frontal, sphenoidal), pathogenic organism (viral, bacterial, fungal), presence of complication (orbital, intracranial), and associated factors (nasal polyposis, immunosuppression, anatomic variants)

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

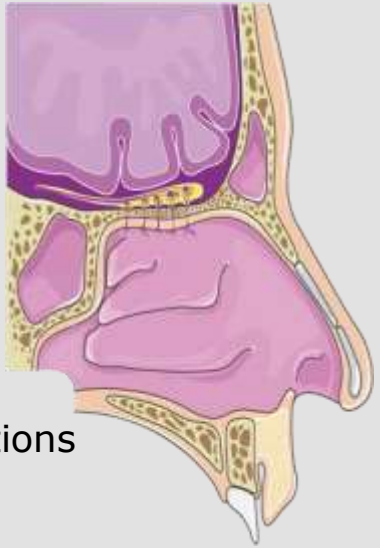
Classification of Rhinosinusitis

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

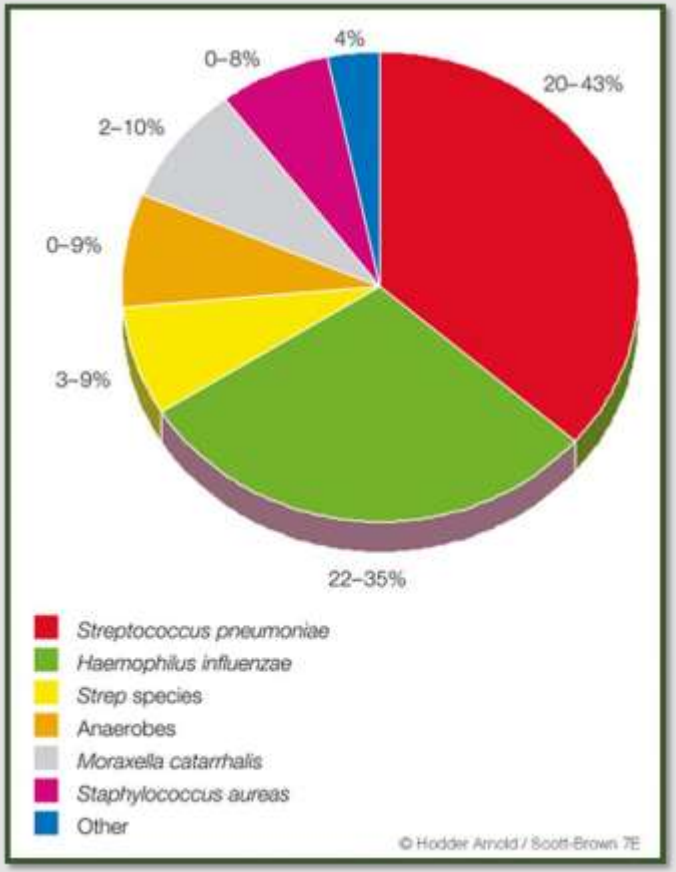
Acute viral rhinosinusitis (common cold)



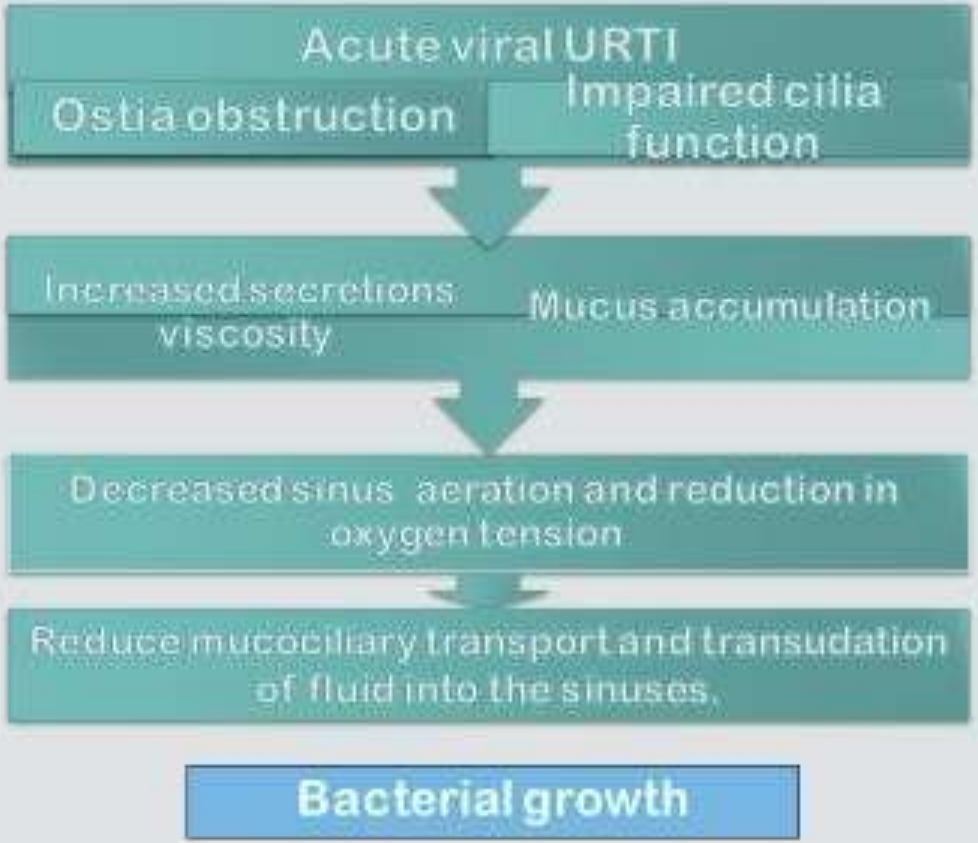
- The vast majority (up to 70%) of rhinosinusitis episodes are caused by viral infection.
- Approximately 90% of patients who have viral upper respiratory tract infections have sinus involvement, but only 5-10% of these patients have bacterial superinfection requiring antimicrobial treatment.
- Most 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.

Acute bacterial rhinosinusitis:

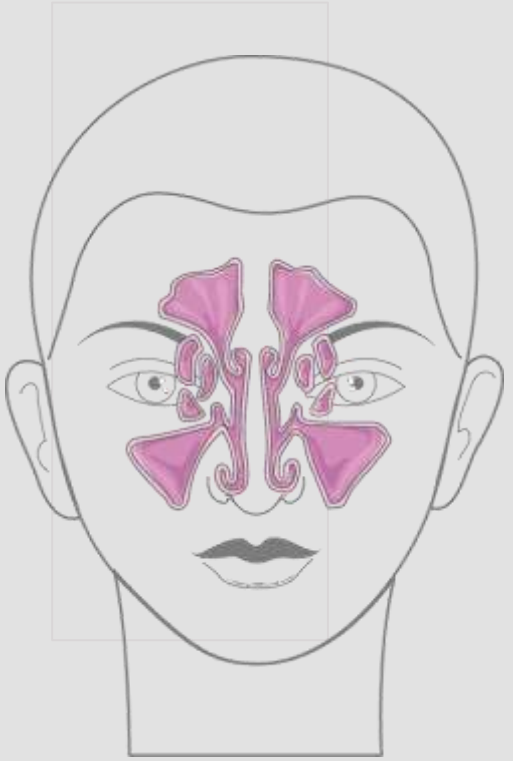
- Acute bacterial rhinosinusitis (ABRS) is very frequently associated with viral upper respiratory tract infection.
- Onset with persistent symptoms or signs compatible with acute rhinosinusitis, lasting for >10 days without any evidence of clinical improvement;
- Onset with severe symptoms or signs 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



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

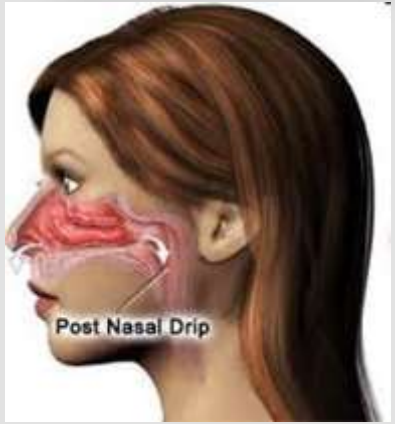
Characteristics of Headache

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 :

Speculum exam:

- **Muco-purulent nasal discharge (Highest positive predictive value)**
- **Swelling of nasal mucosa**
- **Mild erythema**
- **Check for complications**

Endoscopy :

Mainly in ABRS to take cultures.

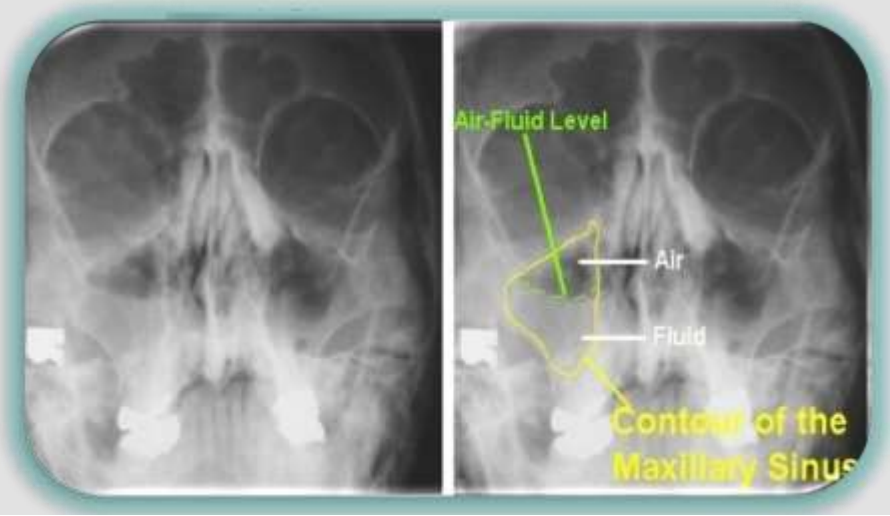
Two critical areas to examine are the ostiomeatal complex lateral to the middle turbinate and the Sphenoethmoidal recess

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



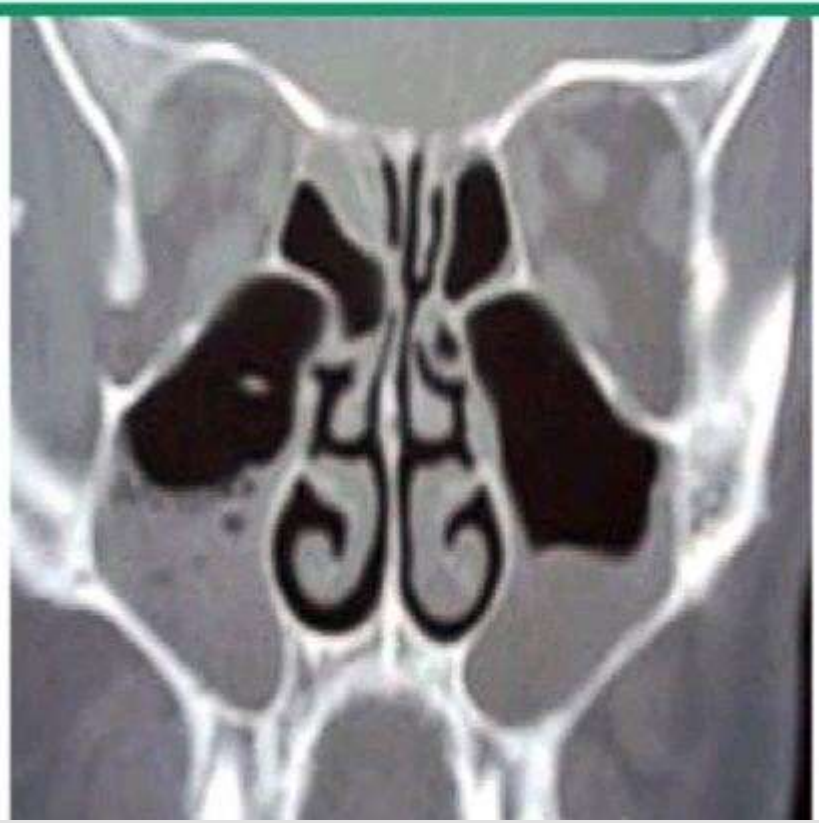
Radiology: CT scan

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 update2015 guidelines by the American Academy of Otolaryngology- - Head and Neck Surgery Foundation

(1)The guidelines state that clinicians may
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 update2015 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

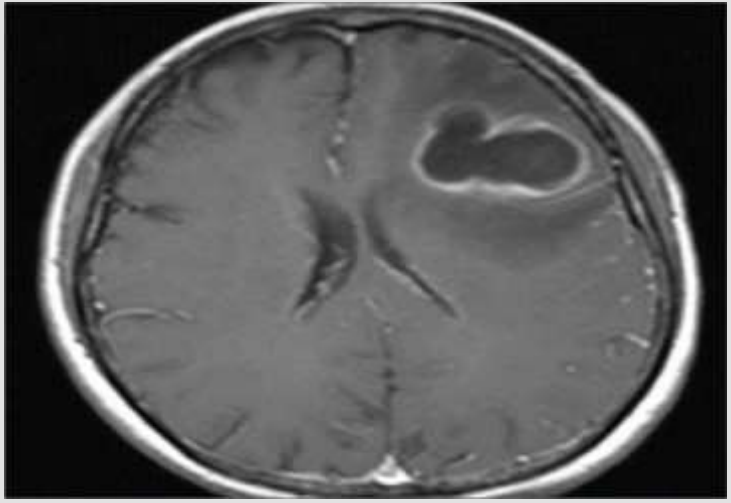
- Acute maxillary: Antral washout/ endoscopic MMA
- Acute frontal: Frontal trefination/ endoscopic frontal recess clearance
- Acute ethmoiditis: External ethmoidectomy/ endoscopic ethmoidectomy
- Acute sphenoiditis: External sphenoethmoidectomy/ endoscopic sphenoidotomy

Complications of ARS

Complications are rare but can be severe, including intracranial and orbital complications.

- **Ominous Signs suggesting complications:**

-Facial swelling / erythema over an involved sinus
- Visual changes
- Abnormal extraocular movements
-Proptosis
- Periorbital inflammation/edema
- Intracranial or CNS involvement

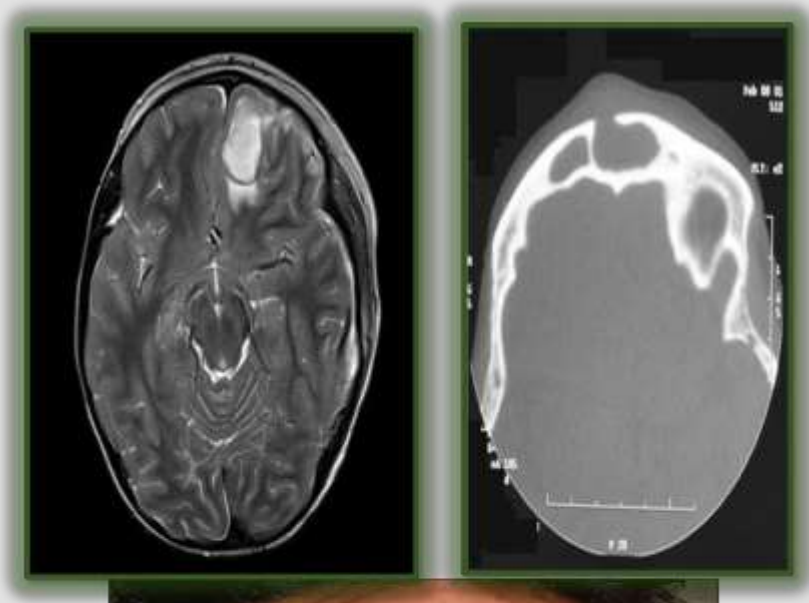


Complications of ARS

- **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.**



Complications of ARS

- **Ethmoid sinus**

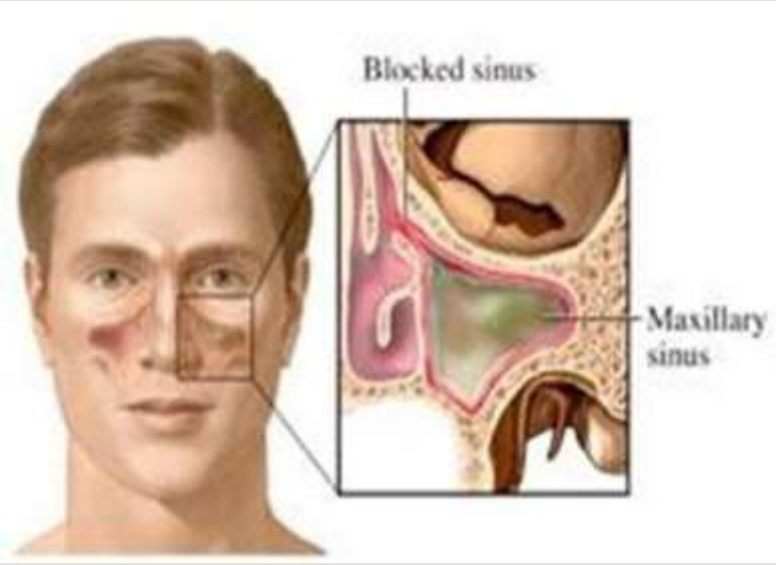
Table 2 – Chandler's classification of orbital infection deriving from sinusitis		
Group 1	Preseptal cellulitis	Inflammatory edema primarily limited to eyelid due to restricted venous drainage
Group 2	Orbital/postseptal cellulitis	Progressive inflammatory edema involving globe marked by chemosis
Group 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.[13]		

Complications of ARS

- **Maxillary sinus**

•Isolated maxillary rhinosinusitis rarely gives rise to acute local complications

- **Patients present with acute swelling of the cheek**



Complications of ARS

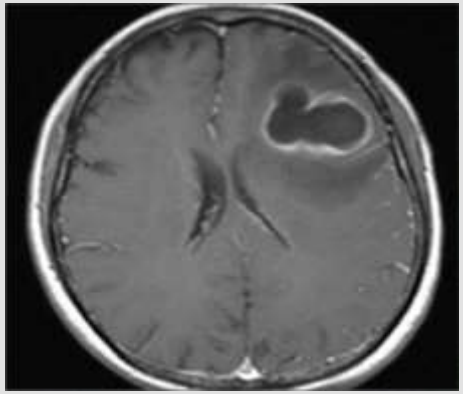
- **Sphenoid sinus**
- **Result in septic cavernous sinus thrombosis by direct spread**

Distant complications of ARS

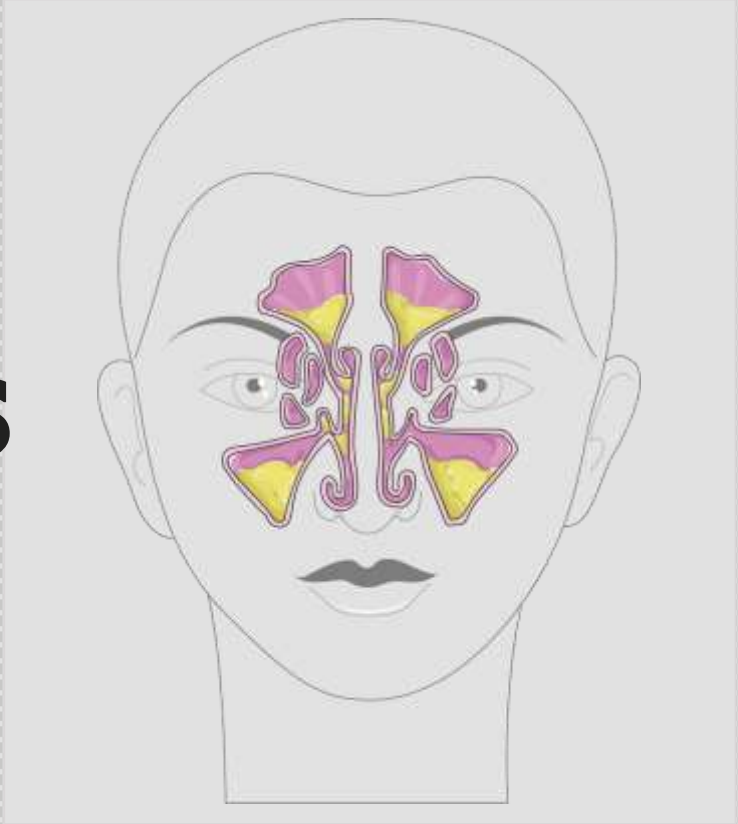
- Brain abscess & Meningitis

-Septicemia.

- Toxic shock syndrome

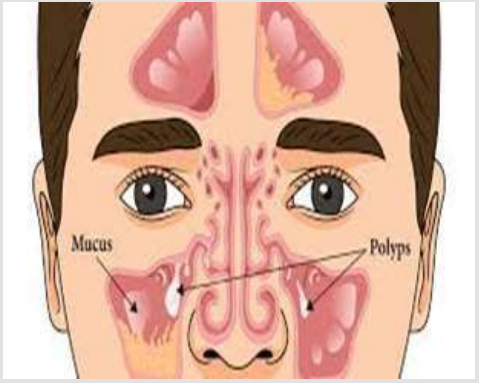


Chronic Rhinosinusitis



Classification :

- **Acute** 7 days – 4 weeks.
- **Subacute** 4weeks – 12 weeks.
- **Recurrent ARS.** ≥ 4 Episodes of ARS / Y.
- **Chronic RS.** ≥ 12 weeks
- **Acute exacerbations of CRS**



Other classification of CRS :

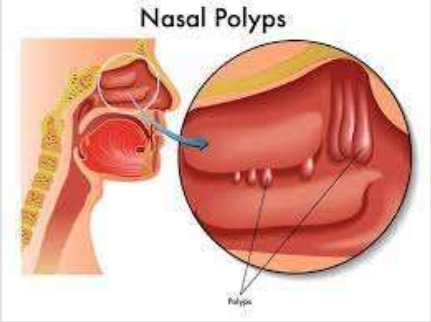
- Symptoms for >12 weeks

Two main subtypes:

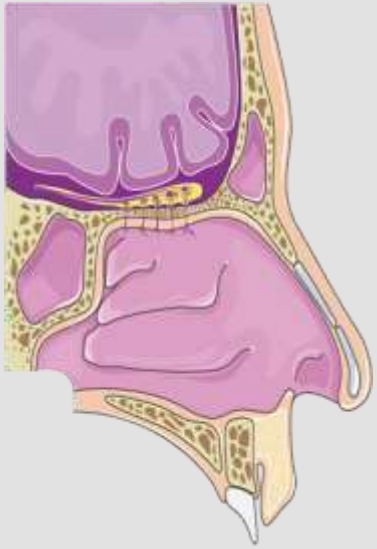
- CRS without nasal polyps (CRSsNP)

- CRS with nasal polyps (CRSwNP)

- Strongly associated with asthma and aspirin tolerance

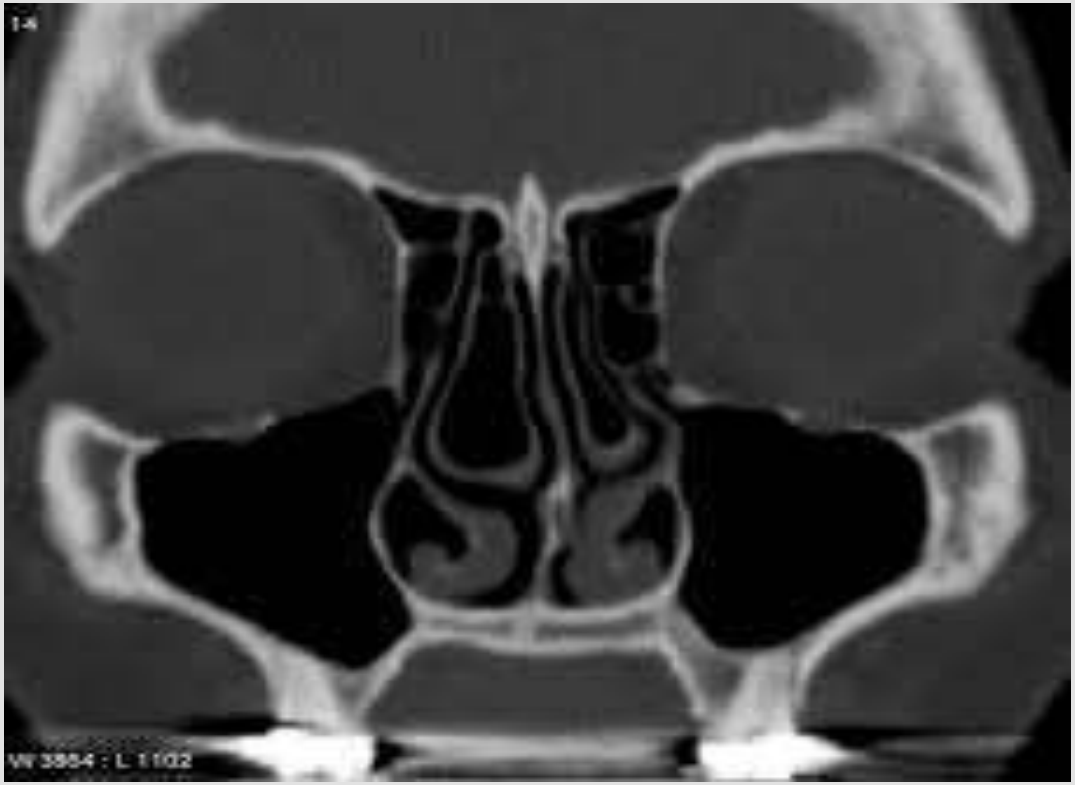


Predisposing factors to CRS :



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)

concha bullosa



11. Obstruction by tumor

12. Immunologic disorders (e.g., common variable immunodeficiency, immunoglobulin A [IgA] deficiency, IgG subclass deficiency, AIDS)

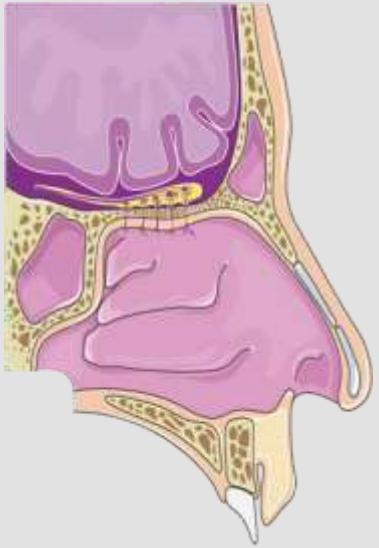
13. Cystic fibrosis

14. Primary ciliary dyskinesia, Kartagener syndrome

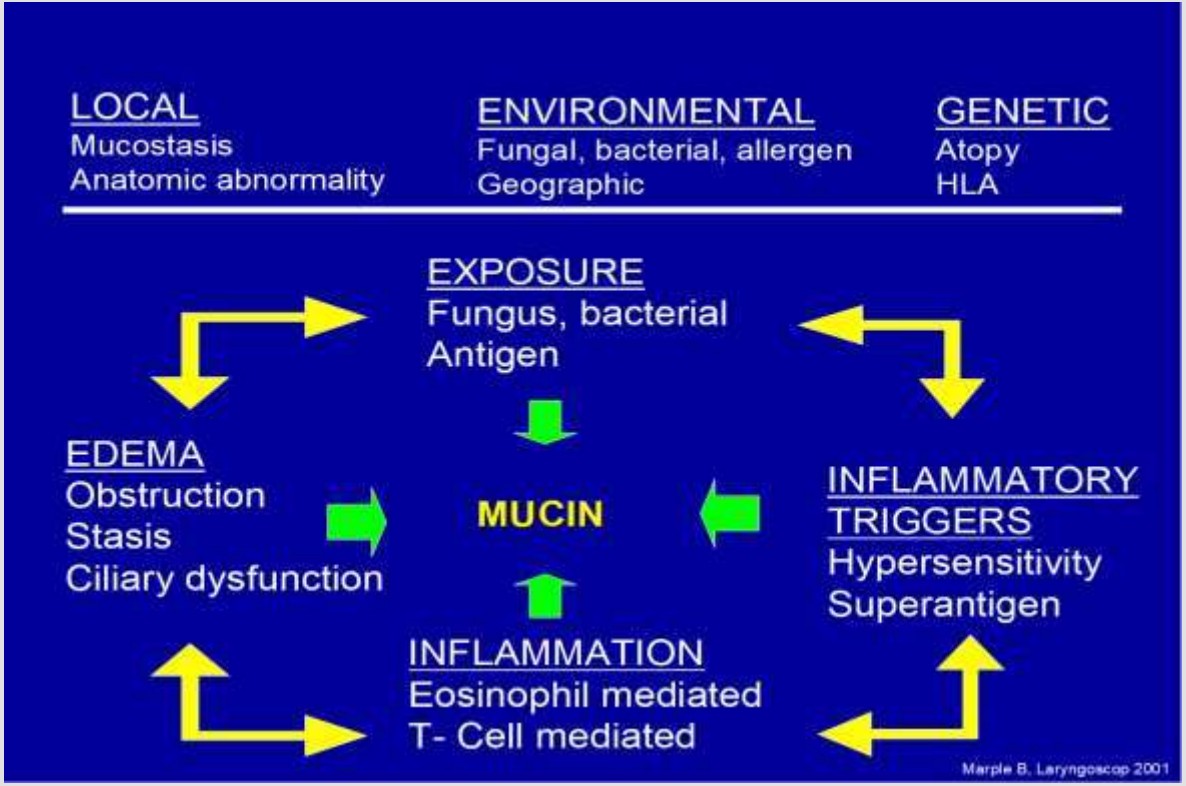
15. Wegener granulomatosis

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



Pathophysiology of CRS:



Pathophysiology of CRS :

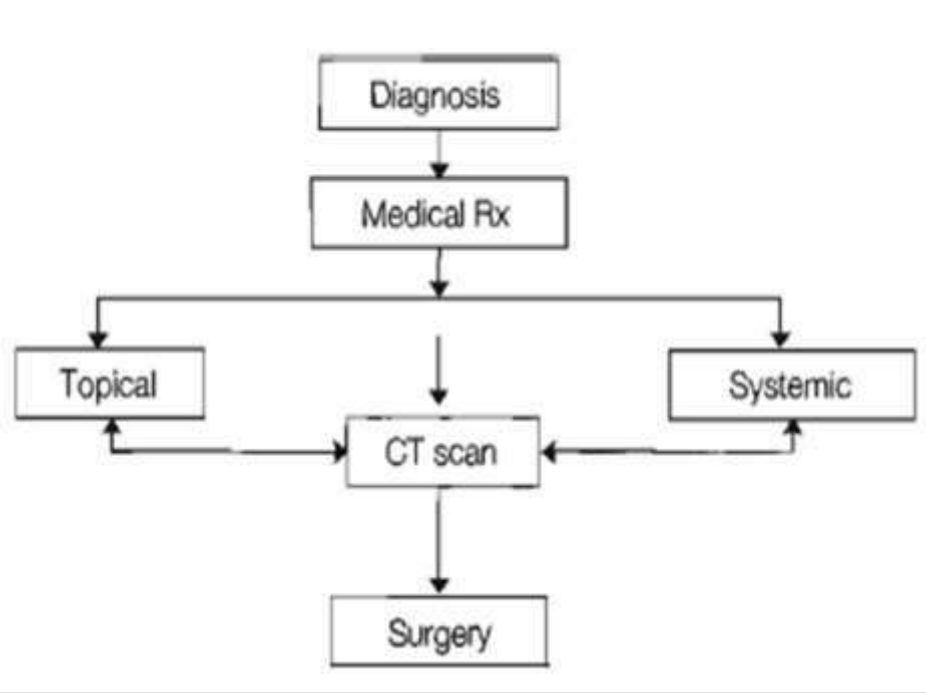
- CRS is a proliferative process with remarkable thickening of the mucosa and lamina propria, eosinophils being the predominant infiltrative cell in CRS.

- 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 :

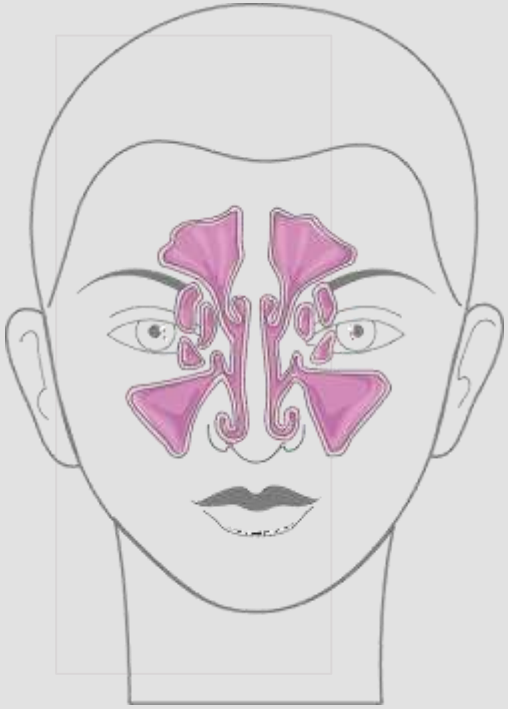


Clinical picture :

- 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.

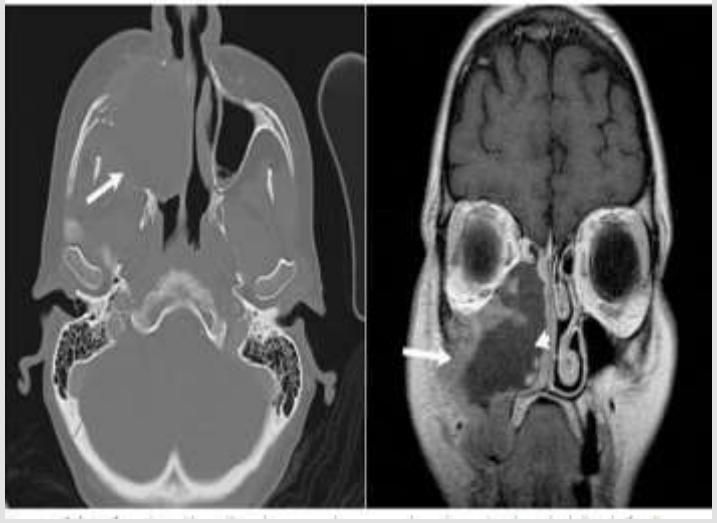
For evaluation of suspected complications.

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

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.

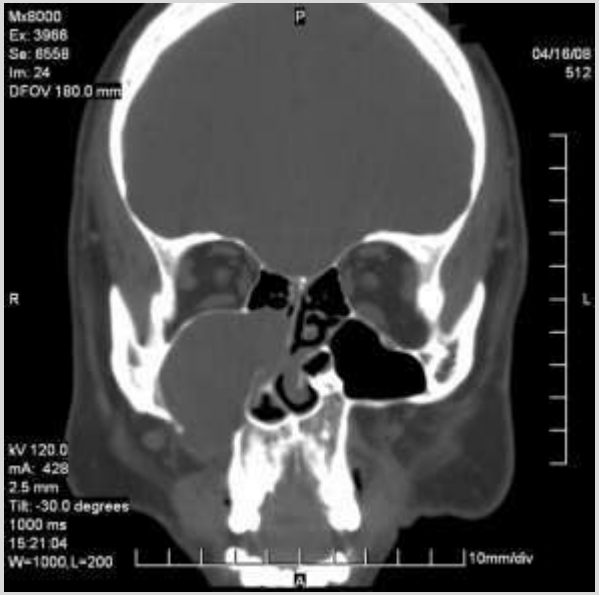
Surgical Treatment of Chronic Rhinosinusitis

- 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

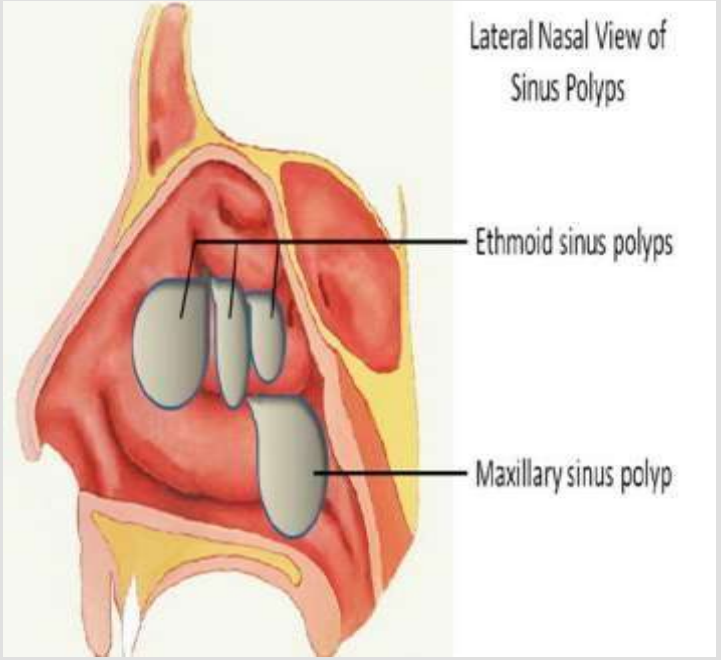
Complications of CRS :

- **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**



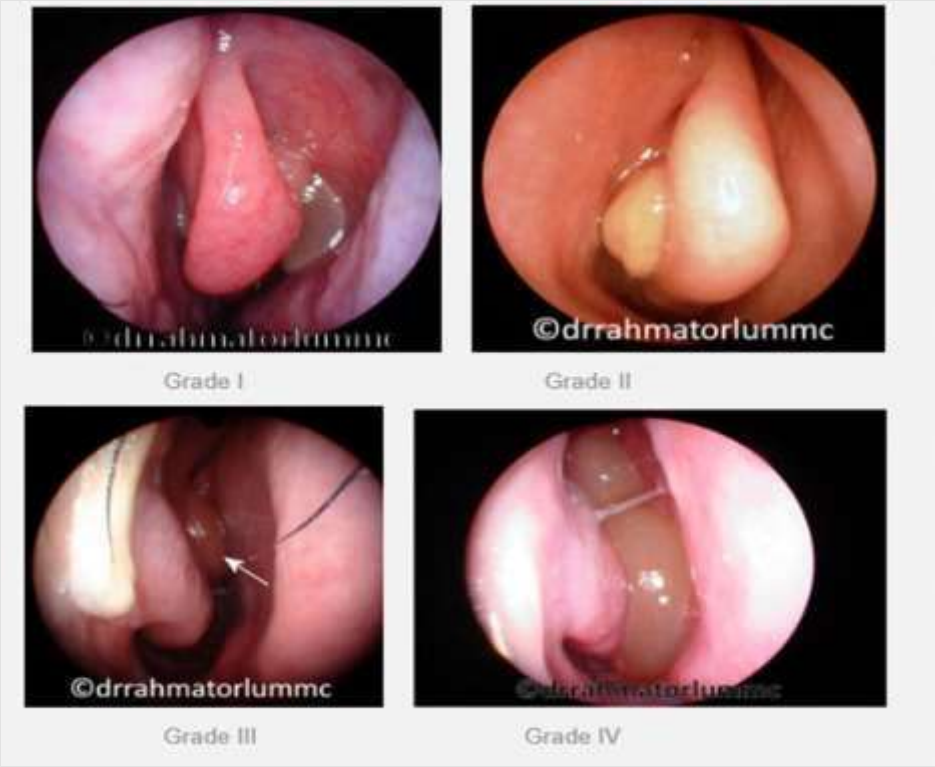
Nasal polyps

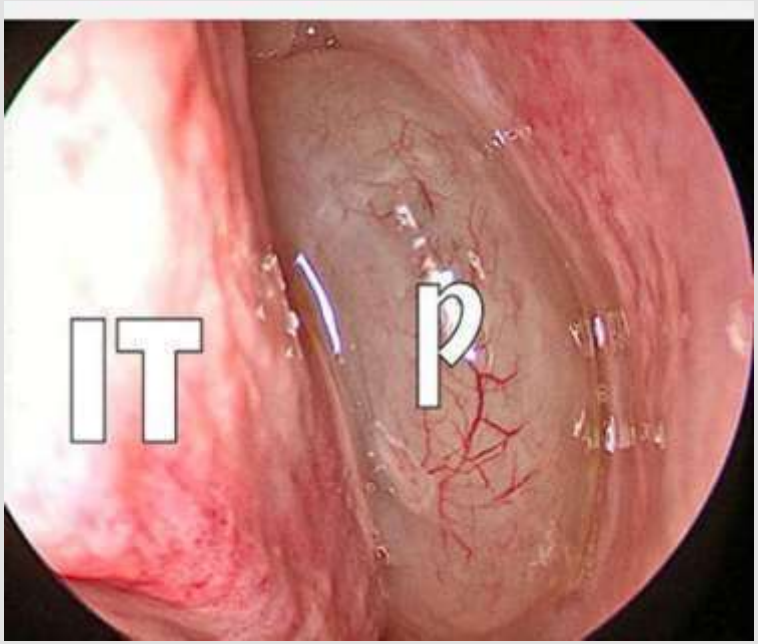
Edematous pedunculated masses arising from the mucous lining of paranasal sinuses



- **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.





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.

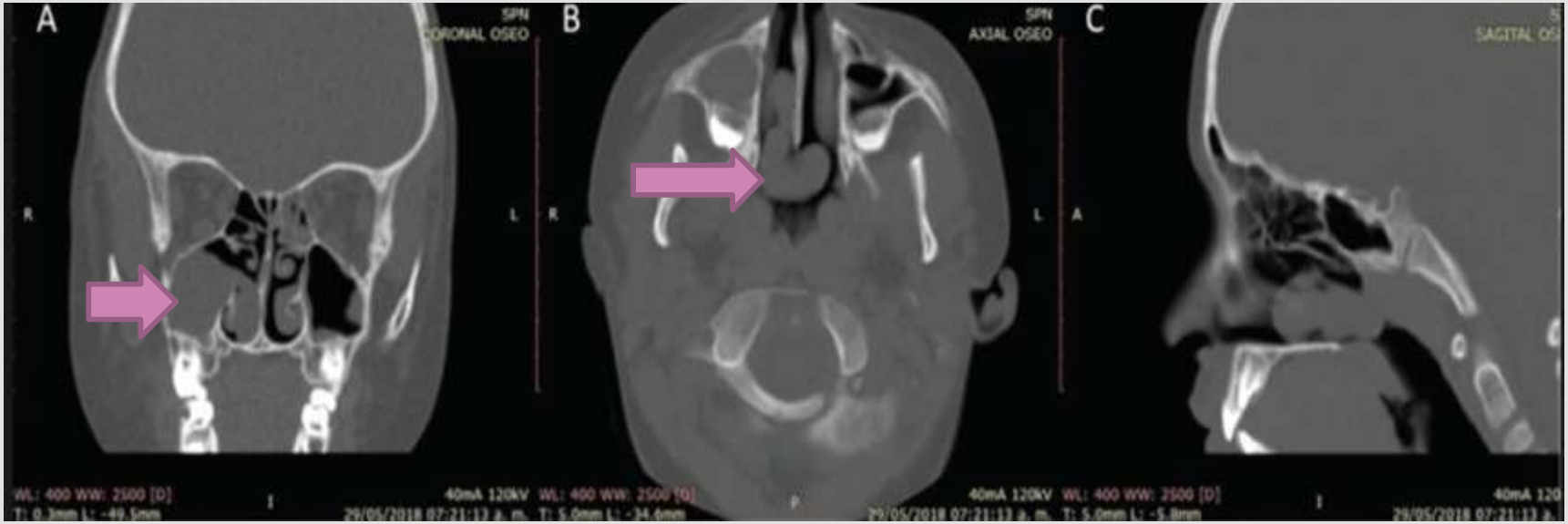
Classification

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	Allergy or multifocal	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

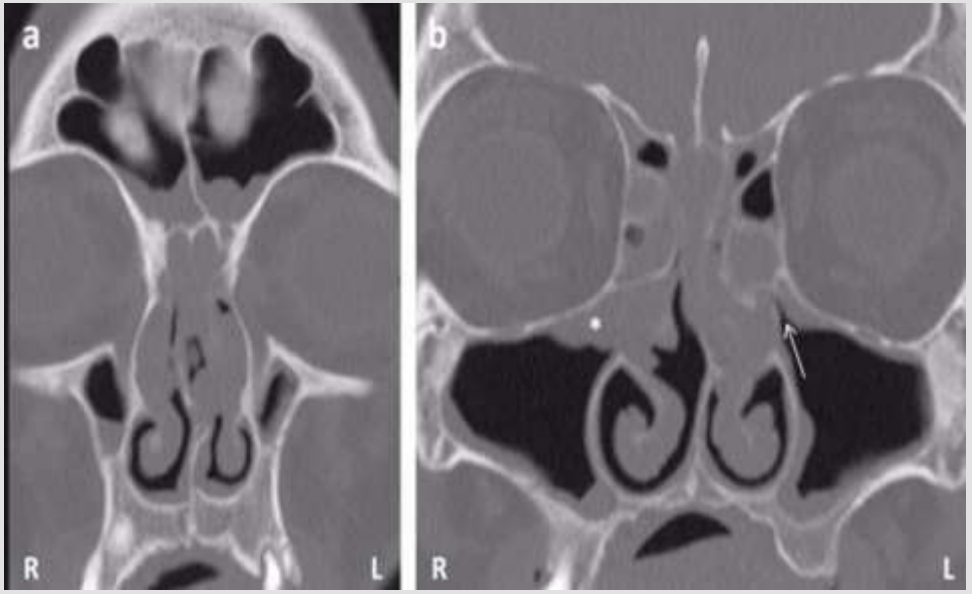
Antrochoanal polyp

Seen more commonly in adolescents and young children



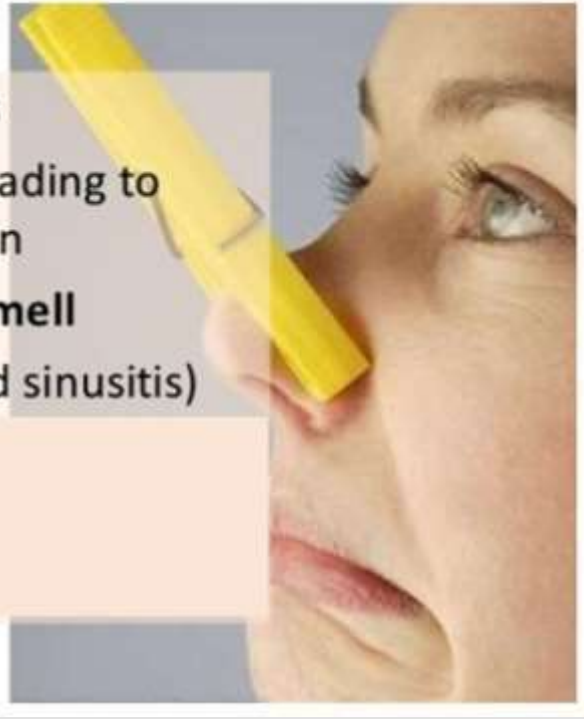
Ethmoid polyps

Usually presents in middle aged adults



Clinical presentation

- Mostly seen in **adults**
- Nasal **stuffiness** → 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

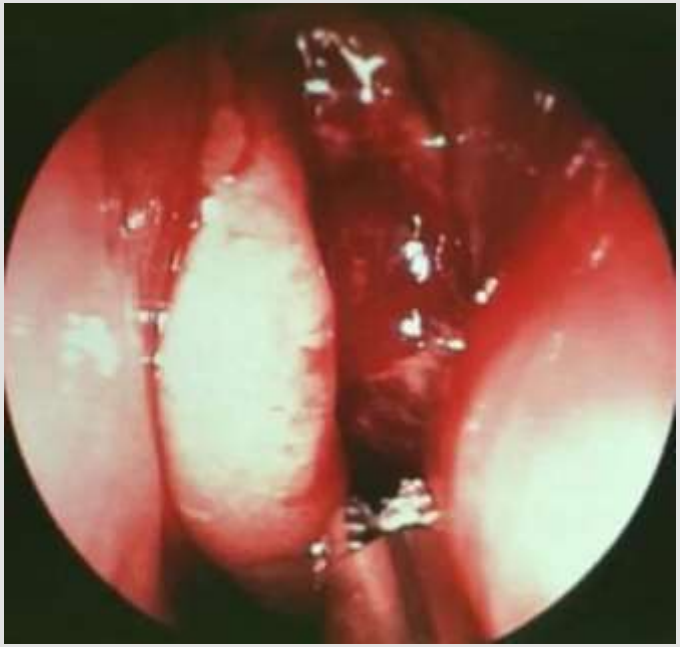
- **Clinical examination**
- **CT scan of paranasal sinuses**
  - exclude neoplasia
  - plan surgery
- **Histological examination**
  - especially in people >40 years

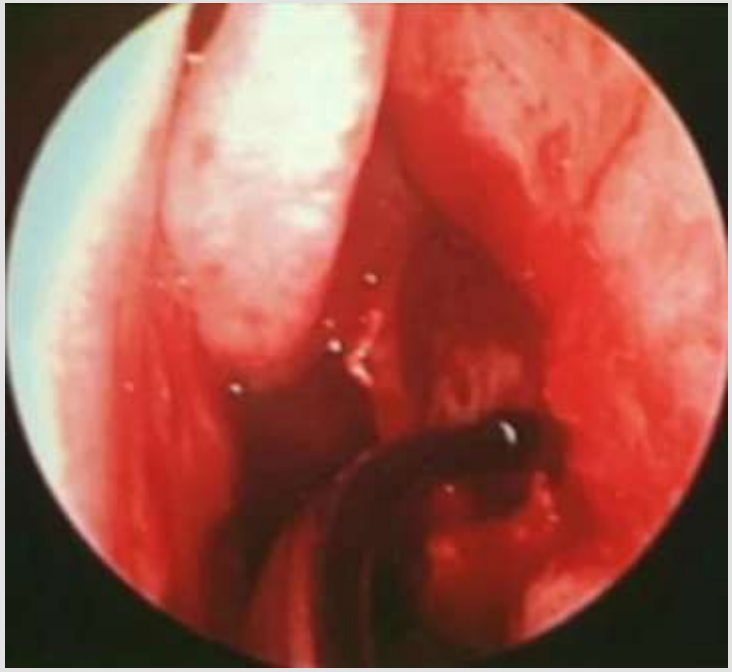
Management ethmoidal polyps

- 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

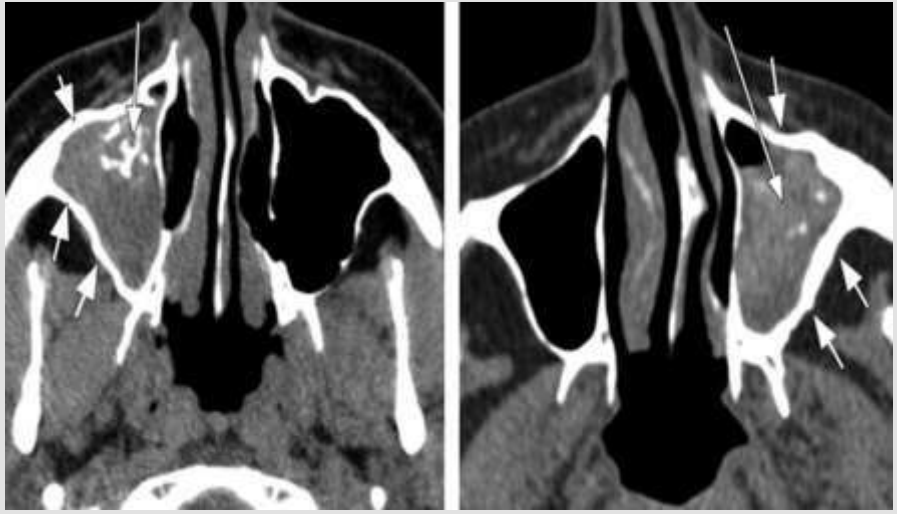
CLASSIFICATION OF INFECTION

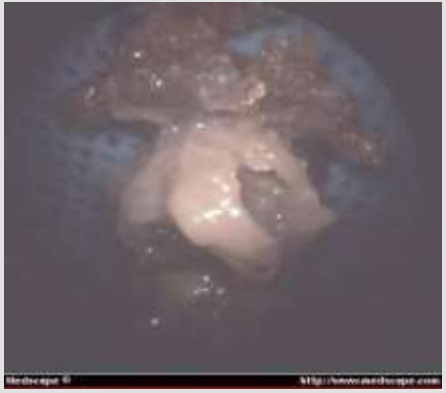
- **Non-invasive**
  - Sinus fungal ball (Mycetoma)
  - Allergic fungal RS

- **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)

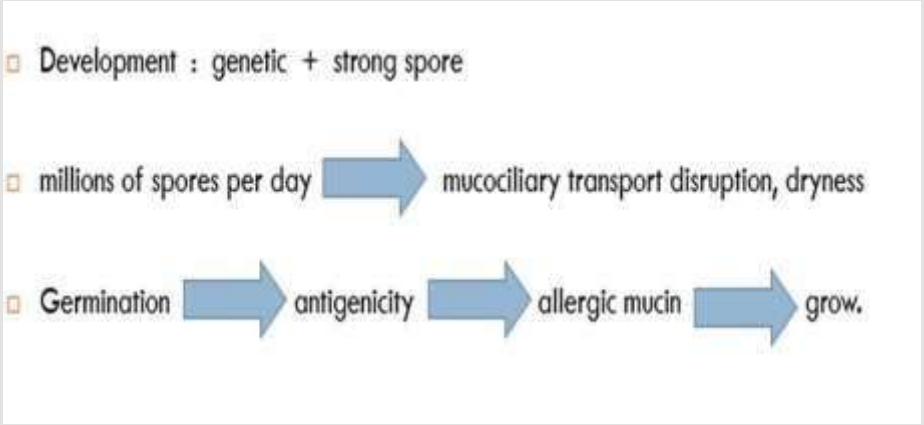
- hyphal elements detected by fungal stains.
- Culture : variety of fungal species.
- vary geographically:

** 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

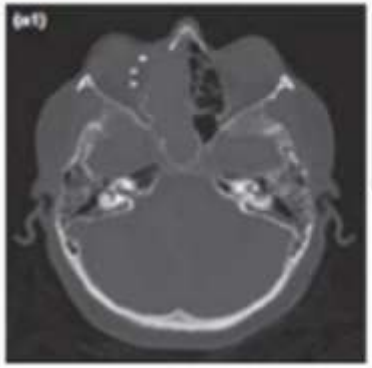


Diagnostic criteria of AFRS

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

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

MRI

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

Thanks!