

# Sinusitis & its complication

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- Definition
- Types
- Clinical manifestation
- Complications
- Diagnosis
- Management.

# Introduction

- The term rhinosinusitis ( RS) is used to denote inflammation of the sinus and nasal passages, which often occur simultaneously.
- Rhinosinusitis is common and increasing in prevalence worldwide.
- Significant burden:
  - Healthcare services,
  - Quality of patients' lives,
  - Lost patient productivity.
- The prevalence of acute rhinosinusitis increased from 11% (or 26 million) of American adults in 2006 to 13% ( 29 million)

# Types

- Acute rhino sinusitis ( ARS)
- Chronic rhino sinusitis ( CRS)
  - With Nasal polyps ( CRSwNP)
  - Without nasal polyps ( CRSsNP)



# Severity

- Low severity: easily tolerated symptoms
- Moderate severity reflects steady symptoms that are tolerable.
- Severe severity symptoms are difficult to tolerate or interfere with sleep or daily activities

\*\* management tailored according to severity of the symptoms

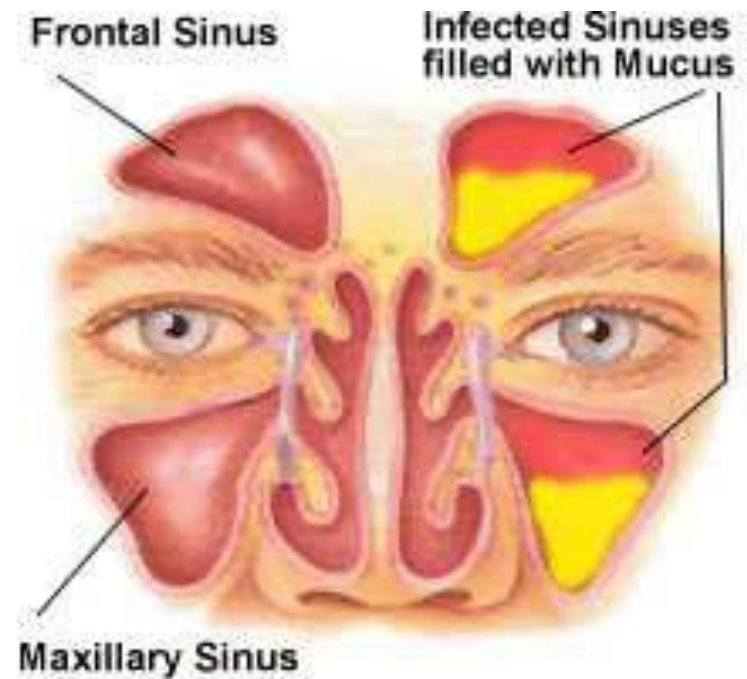
# Acute rhinosinusitis

## Diagnosis

1-**Duration** : greater than 7 days.

2-**Symptoms/sign**:

- At least 2 of major symptoms must be present, one of which must be :
  - (obstruction) or D (discharge).
- P: facial **P**ain/pressure
- O: nasal **o**bstruction
- D: nasal purulence or post nasal **d**ischarge
- S: **s**mill alterations (hyposmia/ anosmia).



# ARS

## Microbiology

### Children :

- *Streptococcus pneumoniae* (30-43%)
- *Haemophilus influenzae* (20-28%)
- *Moraxella catarrhalis* (20-28%)
- Other *Streptococcus* species
- Anaerobes

### Adult :

- *Streptococcus pneumoniae* (20-45%)
- *Haemophilus influenzae* (22-35%)
- Other *Streptococcus* species
- Anaerobes
- *Moraxella catarrhalis*
- *Staphylococcus aureus*

# ARS

## Management

- Intranasal corticosteroids



mild

or

moderate

- Antibiotics



Sever

or

no response after 72 hrs



# ARS

## Antibiotics

### 1<sup>st</sup> line :

- Amoxicillin (first-line choice) with trimethoprim/ sulfamethoxazole (TMP/SMX)
- Macrolides (b-lactam allergy)

### 2<sup>nd</sup> line agent

- Amoxicillin/ clavulanic acid
- Fluoroquinolones

Risk of resistance ,  
Complication of 1<sup>st</sup> line therapy,  
1<sup>st</sup> line failure .

# Chronic rhinosinuitis etiology

- Allergic rhinitis,
- Asthma,
- Ciliary dysfunction,
- Immune dysfunction,
- Lost ostia patency,
- Aspirin-exacerbated respiratory disease,
- Cystic fibrosis.

# CRS

## Microbiology

### Children

- Anaerobes
- Other *Streptococcus* species
- *Staphylococcus aureus*
- *Streptococcus pneumoniae*
- *Haemophilus influenzae*
- *Pseudomonas aeruginosa*

### Adult :

- Anaerobes
- Other *Streptococcus* species
- *Haemophilus influenzae*
- *Staphylococcus aureus*
- *Streptococcus pneumoniae*
- *Moraxella catarrhalis*

# Chronic rhinosinusitis

## Diagnosis

1- **Duration:** 8 -12 weeks

2- **Symptoms/sign :**

- Presence of 2 or more CPODS.

- C : facial Congestion/fullness
- P : facial Pain/pressure,
- O: nasal Obstruction/blockage,
- D: nasal Drainage,
- S : smell dysfunction  
(hyposmia/anosmia).

3- **Objective evidence** using either endoscopy or computed tomography



# CRSwNP management

- Intra nasal corticosteroid
- Short course of systemic steroid
- Systemic antibiotics ( if infection)
- Allergy testing
- Leukotriene receptor antagonist
- Endoscopic sinus surgery ( if no response in 4 months )

# CRSsNP management

- Intra nasal corticosteroid
- Systemic antibiotics
- Saline nasal irrigation
- Optional : Short course of systemic steroid
- Endoscopic sinus surgery ( if no reponse in 4 weeks)

# CRS antibiotics

- **second-line agent** :
- broad-spectrum coverage
  - Amoxicillin-clavulanic acid inhibitors,
  - Fluoroquinolones

# Ancillary therapy

- **Saline irrigation** has emerged in as a strong recommendation from the experts despite limited evidence.
- The use of saline irrigation as adjunct therapy is primarily based upon reported symptomatic improvement and its good safety profile.



# Allergy testing

- Indication :
  - Recurrent ARS
  - CRS
- Whether allergy treatment helps minimize symptoms is not known, but knowledge and avoidance of identified allergens remains a prudent approach none the less

# Prevention

- The importance of hand washing is highlighted as fundamental factors :
  - Reduce viral transmission,
  - Prevention of ARS and acute exacerbations of CRS.
- Although studies are lacking, the expert recommendation strongly encourages educating patients regarding strategies to reduce the likelihood of contracting a viral illness

# Sinusitis complication

- Orbital
- Intracranial
- Bony

\*\* CT paranasal sinus , orbit , brain with contrast is mandatory in all cases where complications is suspected

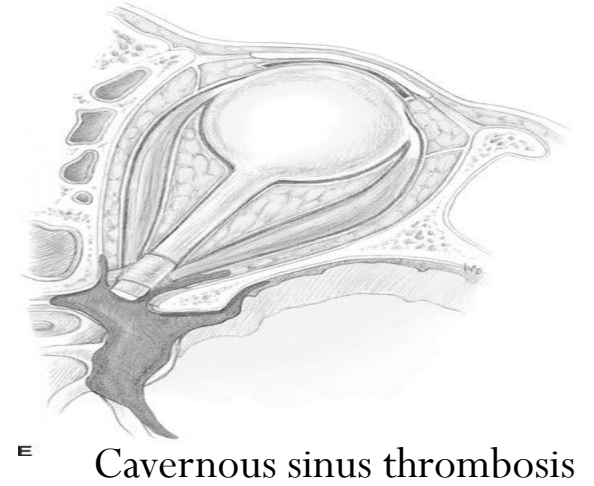
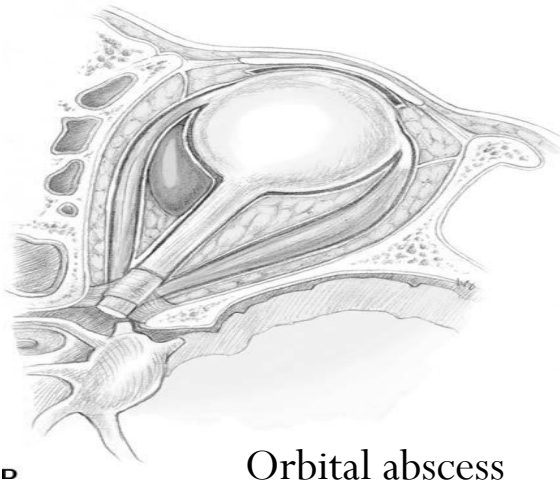
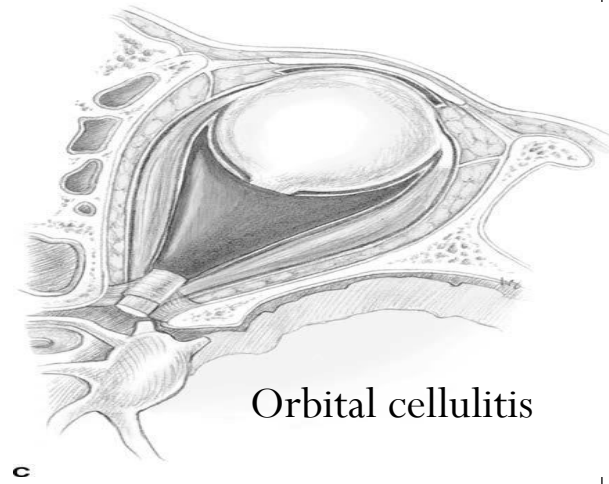
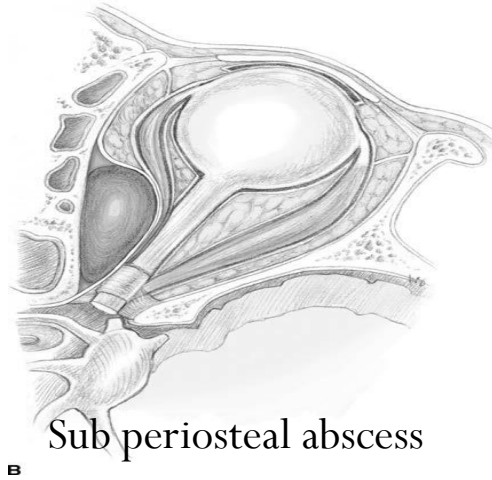
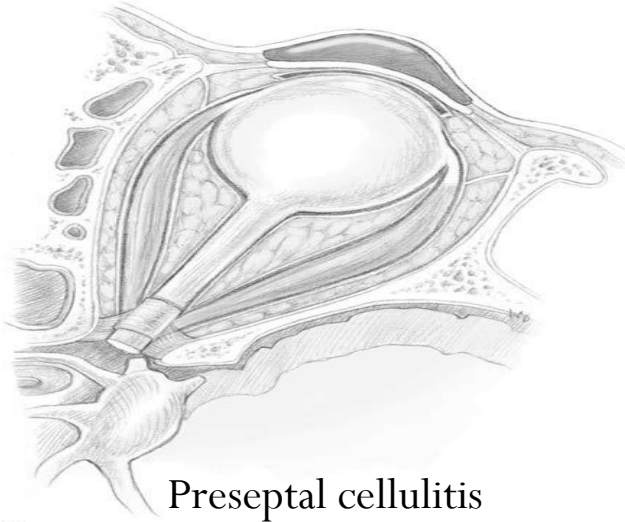
# Sinusitis

## orbital complication

- The close proximity of the orbit to the paranasal sinuses, especially the **ethmoid sinuses**, make it the most commonly involved structure in complications of sinusitis.
- **Children** appear to be more prone to orbital complications of sinusitis.
- Primarily results from:
  - Congenital or other dehiscence in the lamina papyracea,
  - Thrombophlebitis and interference with the venous drainage of the orbital contents.
- **Microbiology** :
  - Streptococcus viridans (including Streptococcus milleri group),
  - S. aureus,
  - S. pneumonia
- **Ophthalmological evaluation** is required in all cases

# Orbital complication

## Chandler classification



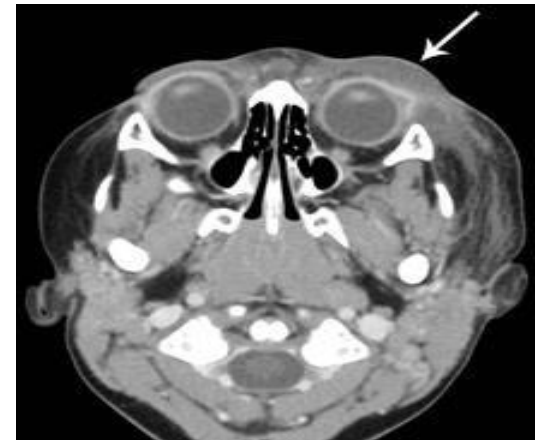
# Preseptal cellulitis

## S/S:

- Edematous, erythematous eyelids
- Extraocular muscles (EOM) intact
- Normal vision

## Rx: ( medical therapy)

- IV Broad-spectrum antibiotic followed by oral Abx
- Nasal decongestant, either topical or oral,
- Mucolytics or saline irrigations may help promote sinus drainage.



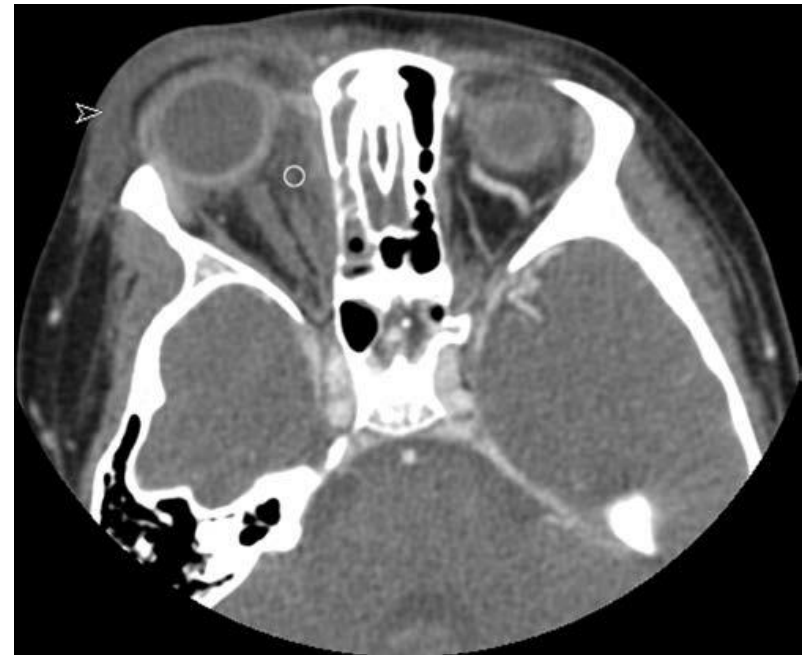
# Orbital cellulitis

## S/S:

- More diffuse orbital edema
- $\pm$  Impaired EOM
- Usually normal vision until later in disease course

## Rx:

- Medical therapy
- Surgical sinus drainage :
  - 20/60 or worse visual acuity is observed on initial evaluation,
  - Progression of orbital signs and symptoms occurs despite medical treatment,
  - Lack of improvement is seen within 48 hours despite aggressive medical treatment



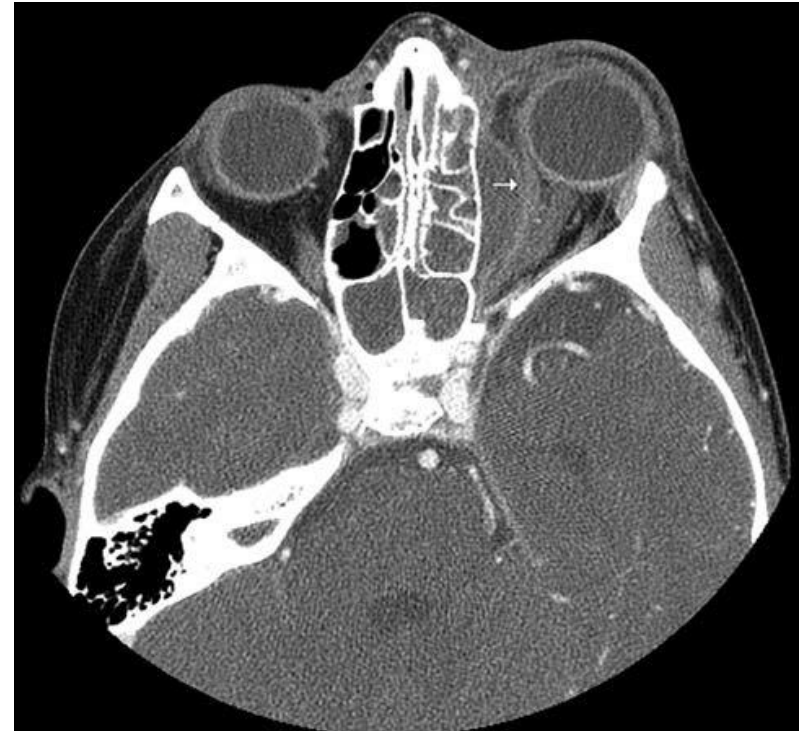
# Sub periosteal abscess

## S/S:

- Edematous, erythematous eyelids;
- Proptosis , Impaired EOM,
- Visual changes more likely with larger abscesses

## Rx:

- Medical therapy
- ± Sinus drainage
- ± Abscess drainage





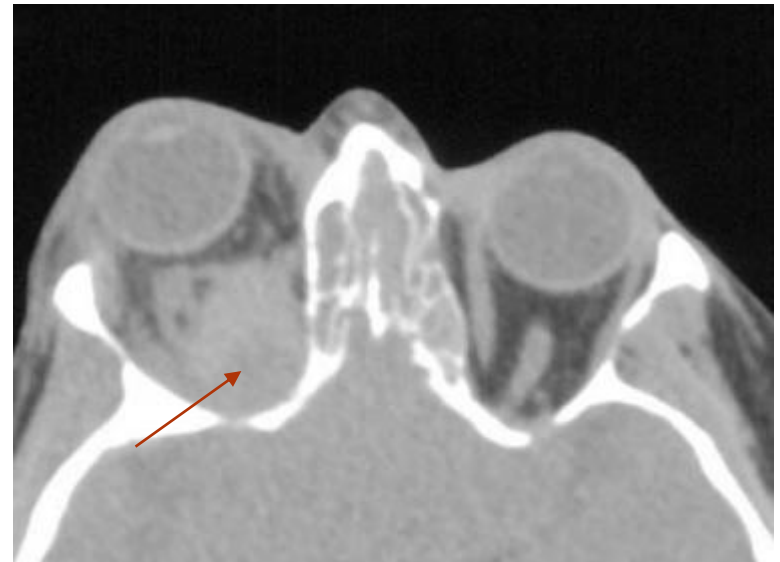
# Orbital abscess

## S/S:

- Severe exophthalmos, chemosis,
- Ophthalmoplegia,
- Visual impairment.

## RX:

- Medical therapy
- Sinus drainage,
- Abscess drainage.



# Cavernous sinus thrombosis

## S/S:

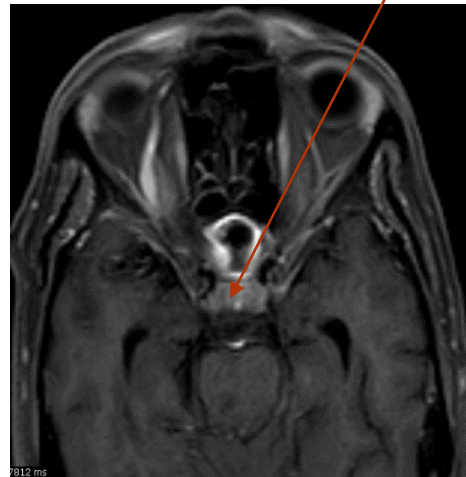
- Bilateral orbital pain, chemosis, proptosis
- Ophthalmoplegia
- CN III, IV, V1, V2, V3, VI can be affected

Dx: MRI with contrast

## Rx:

- Medical therapy
- Sinus drainage, often
- $\pm$  Anticoagulation (controversial)

\*\* Mortality rate up to 30%



# Intracranial complication

- The intimate relationship and the complex venous network that traverses this area result in the occurrence of infectious intracranial complications of sinonasal disease.
- Most of times due to chronic rhino sinusitis.
- The incidence, morbidity, and mortality decreased:
  - Widespread use of oral antibiotics,
  - Improved imaging technology,
  - Expeditious treatment of underlying sinusitis,
  - Improved intensive care medicine.

# Intracranial complication microbiology

- *S. viridans* (including *S. milleri* group),
- *S. aureus*,
- *Streptococcus* sp.,
- Anaerobic organisms (*Peptostreptococcus*, *Bacteroides* sp.,
- *S. pneumoniae*

- Coagulase-negative *Staphylococcus*
- gram negative bacilli
- (*H. influenza*, others)



Less  
common

# Meningitis microbiology

- *S. pneumoniae*,
- *S. aureus*,
- *Streptococcus* sp.

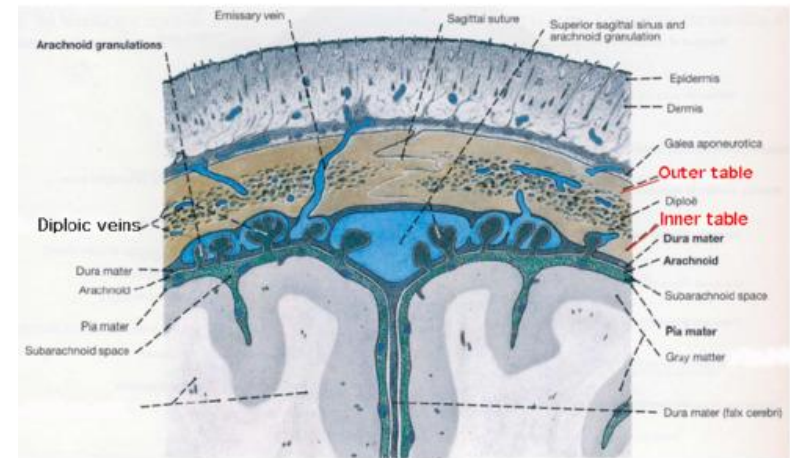
- Anaerobic organisms (*Fusobacterium* sp.),
- gram negative bacilli,
- *H. influenzae*

Less  
common

# Intracranial complication

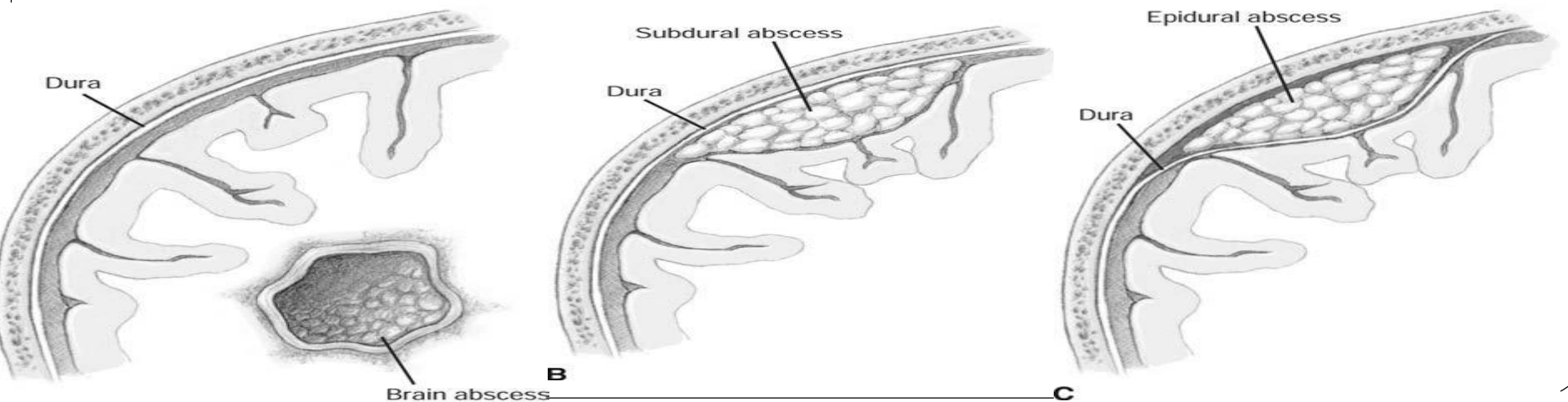
## Route of spread :

- Hematogenous
  - Retrograde septic thrombophlebitis
- Direct extension
  - congenital or traumatic dehiscences



# Intracranial complication classification

- Meningitis
  - Extra dural abscess
  - Subdural abscess
  - Brain abscess ( frontal lobe)
  - Sinus thrombosis
- frontal  
sinusitis



# Intracranial complication clinical manifestation

- Headache Lasting greater than 1 week.
- Fever ,
- Altered mental status,
- Orbital edema ( ↑ ICP) ,
- Papilledema ( ↑ ICP),
- Nausea and vomiting ( ↑ ICP),
- Focal neurologic deficits ( nuchal rigidity).

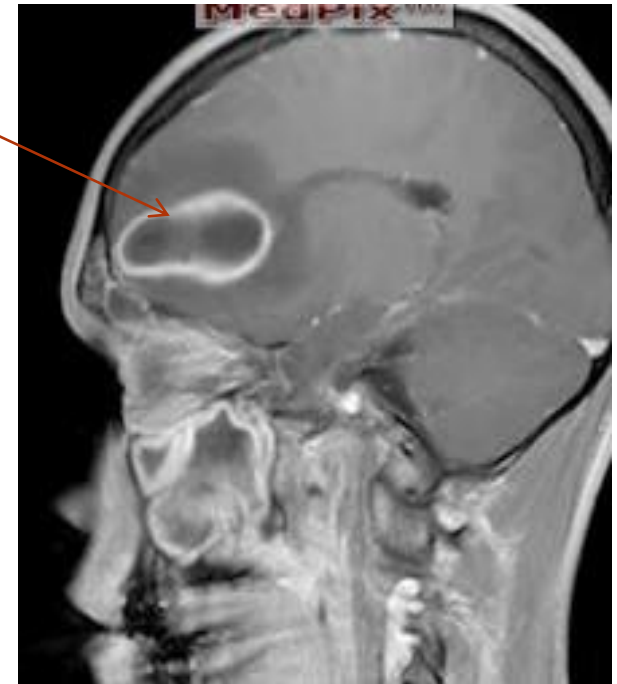
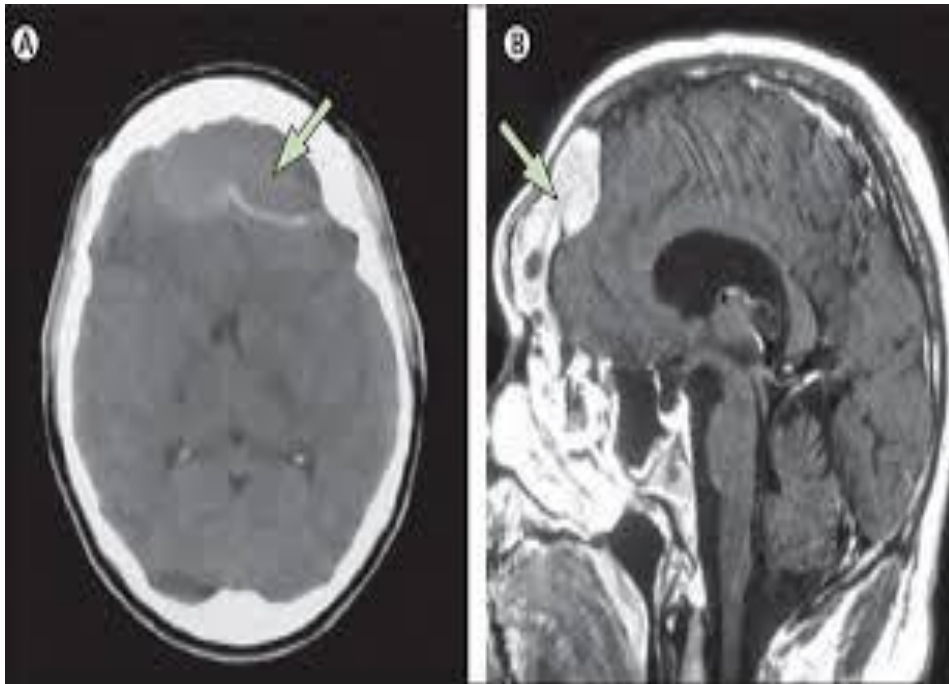


# Intracranial complication clinical manifestation ( late)

- asymptomatic until late in their course, especially when “silent” areas of the brain are involved
- S/S: seizures, hemiparesis, and other focal neurologic findings
- It would indicate poorer prognosis

# Intracranial complication diagnosis

- MRI with contrast is study of choice .
- CT scan of the sinuses is also generally obtained to assist in treatment planning.



# Intracranial complication management

Multidisciplinary urgent approach including :

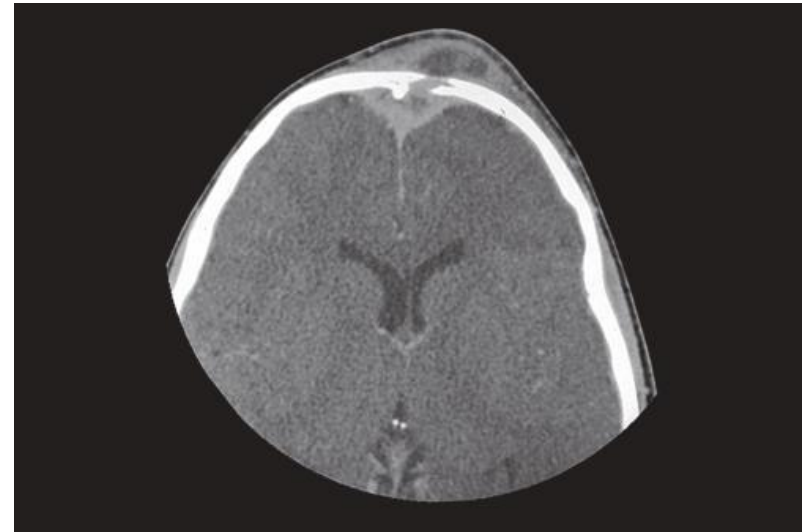
- Otolaryngologist,
- Neurosurgeon,
- Pediatrician,
- Internist,
- Critical care & infectious disease specialist.

# Intracranial complication management

- High-dose, broad spectrum IV antibiotics with good intracerebral penetration ( 4- 8 weeks)
- Neurosurgical drainage of the intracranial abscess is usually performed
- Paranasal sinus drainage indicated in :
  - Evidence of acute/chronic RS
- Steroid and anticonvulsant medications may be adjunctively :
  - Secondary cerebral edema ,
  - Reduce the risk of seizures.

# Bony complication

- Frontal sinusitis complicated by osteomyelitis of the frontal bone is known as Pott puffy tumor.
- **Microbiology** :
  - *S. viridans* group
  - *S. aureus*
- **S/S** :
  - Forehead fluctuant swelling



# Bony complication management

- **Dx:**
- CT with contrast
- MRI with contrast
  - Extension of the disease
- **Management:**
- IV antibiotics and
- Drainage of the abscess with
- Removal of infected bone

# Conclusion

- The knowledge base of ARS and CRS pathology and management continues to grow and evolve as the role of pathogens are discerned, antimicrobial resistance rates change, and treatment strategies are improved.

# Conclusion

- Diagnosing complications of sinusitis requires a high index of suspicion. Presenting symptoms are often not those of sinusitis but rather headache, fever, and/or eye swelling.
- CT scan with contrast of the sinuses and orbits is the study of choice to evaluate orbital complications,
- MRI with contrast of the brain and orbits is the study of choice for intracranial complications



# Conclusion

- Orbital complications require ophthalmological evaluation , management is supportive in most of cases .
- Management of intracranial abscess is usually a combination of medical and surgical treatments.

THANK YOU