

Acute Rhinosinusitis and its complications

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LECTURE OUTLINES:

- Definitions of acute Rhinosinusitis
- Classification of rhinosinusitis
- The common cold
- Etiology
- Acute rhinosinusitis in children
- Recurrent acute rhinosinusitis
- Complications of acute rhinosinusitis
- Key learning points
- References

DEFINITIONS OF ACUTE RHINOSINUSITIS

- Because rhinitis and sinusitis usually coexist, the correct and accepted terminology is Rhinosinusitis.
- :an inflammation of the mucosal lining of the nasal passage and paranasal sinuses



Rhinosinusitis

acute

Recurrent acute

chronic

Exacerbation
Of
Chronic



➤ **Classification (based on duration):**

- **Acute sinusitis:** < 12 weeks
- **Chronic sinusitis:** > 12 weeks
- **Recurrent sinusitis:** > 4 attacks / year with resolving period



rhinosinusitis

acute

chronic

viral

bacterial

fungal

infective

Non-infective

specific

Non-specific

ACUTE RHINOSINUSITIS EPIDEMIOLOGY

- It is the most common acute illness of human being
- The American Academy of Otolaryngology (AAO) reports a direct health care costs of \$3.4 billion / year
- The incidence of acute bacterial Rhinosinusitis is 2%
- Acute bacterial rhinosinusitis is more common among females (60%)
- Acute Rhinosinusitis is more seen in winter
- More than 50% of patients who are diagnosed to have acute bacterial rhinosinusitis by experienced GPs do not to have correct diagnosis
- 20% of antibiotic prescription in general goes to acute Rhinosinusitis

PATHOGENS

- **Viral agents:**

- Rhinovirus,
- Adenovirus,
- Respiratory syncytial virus
- Influenza virus,
- Para-influenza virus

- **Fungi:** aspergillus and Candida

- **Bacteria:**

- strep pneumonia
- hemophilus influenza,
- Moraxella catarrhalis
- staphylococcus aureu
- streptococcus pyogenes

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- **The sinus most commonly involved is: Maxillary > ethmoid > frontal > sphenoid**

VIRAL ACUTE RHINOSINUSITIS

- **Common cold micro-organisms:**
- **Rhinovirus:** **most** common micro-organism
- **Adenovirus:** causes also **conjunctivitis**
- Vast majority of infectious RS are **acute**, self-limited **viral (95%)** events (common cold).
- < **2%** of colds in **adults** and **5%** of colds in **children** progress to **bacterial** RS

PATHOPHYSIOLOGY:

Pathophysiologic Characteristics of Sinus Disease

Ostial patency	Ciliary Function	Mucous
<ul style="list-style-type: none"> -Edema <ul style="list-style-type: none"> -allergens -infection -Polyps <ul style="list-style-type: none"> -atopy -CF -chronic infection -Structural factors <ul style="list-style-type: none"> -septal deviation -Haller's cells -concha bullosa -instrumentation 	<ul style="list-style-type: none"> -Decreased ciliary beat frequency <ul style="list-style-type: none"> -ciliotoxins -cold air -Loss of metachronous coordination <ul style="list-style-type: none"> -scarring, synechia -Loss of ciliated cells <ul style="list-style-type: none"> -airway irritants/pollutants -increased intranasal airflow -inflammatory mediators -viral/bacterial-mediated cell death -surgical 	<ul style="list-style-type: none"> -Changes in quantity <ul style="list-style-type: none"> -allergens -airway irritants/pollutants -goblet cell metaplasia -Changes in quality <ul style="list-style-type: none"> -abnormal water-electrolyte transport -dehydration -CF

DIAGNOSIS OF RHINOSINUSITIS

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].

VIRAL VS BACTERIAL ?

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- first 3-4 days, acute viral (AVRS) cannot be distinguished from an early transition to acute bacterial (ABRS)
 - Purulent discharge **does not** indicate the presence of bacteria within the mucus, but rather it demonstrates the presence of neutrophils, which is characteristic of acute inflammation regardless of the etiology.
 - Clear rhinorrhea may be indicative of AVRS, allergic rhinosinusitis, or other causes of non-allergic rhinosinusitis, such as vasomotor rhinitis

CLINICAL PRESENTATIONS BEST IDENTIFY PATIENTS WITH ACUTE BACTERIAL VERSUS VIRAL RHINOSINUSITIS (ANY OF THE FOLLOWING):

- persistent symptoms or signs compatible with acute rhinosinusitis, lasting for **more than 10 days** without any evidence of clinical improvement
- **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** (“doublesickening”)
- **Severe** symptoms or signs of **high** fever (**39C [102F]**) and purulent nasal discharge or facial pain lasting for at **least 3–4 consecutive** days

BACTERIOLOGY:


- Most cases ABRS follow AVRS.
- The bacteria most often responsible:
 - Strep. Pneumonia (20-40%)
 - H. influenza (20-35%)
 - Moraxella catarrhalis (2-10%)
 - Strep. Pyogenes
 - Staph. Aureus (0-9%)
 - Kleb. pneumoniae.
- **Anaerobic** organisms and **mixed** infections are seen in (10%) of **dental** origin.
- **Note: coagulase negative staph aureus** is a normal flora in 35% of patients

DIAGNOSIS

- **Clinical:**
- **History**
- **Endoscopy:** (best by seeing **pus** drain from the middle meatus)
- **CT scan is indicated only in case of :**
 - suspected complications
 - immunocompromised patient who are at risk of complications
 - clinical deterioration while on medical therapy

TREATMENT OF ACUTE BACTERIAL RHINOSINUSITIS:

- Antibiotics (10-14 days)
- topical decongestants (e.g., oxymetazoline, phenylephrine)
- mucolytics (e.g., guaifenesin)
- Nasal saline irrigation.
- Topical corticosteroid

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- **antihistamines** are to be avoided in ABRS because **anticholinergic** adverse effects will **thicken** and **dry** secretions
 - Surgical treatment of ARS: Only limited to patients with complications of sinusitis (orbital or intracranial)

ANTIBIOTIC GUIDELINES FOR THE TREATMENT OF ABRs IN ADULTS

Initial Therapy	Dose	Switch Therapy Options (No Improvement or Worsening symptoms in 72 hour)
Amoxicillin/clavulanate	1gm/kg BID	levofloxacin 500 mg/day
Beta-lactam allergic		
Doxycycline	100 mg bid	levofloxacin
Pregnant woman with allergy		
azithromycin	500 mg tid for 3 days	

ANTIBIOTIC GUIDELINES FOR THE TREATMENT OF ABRS IN CHILDREN

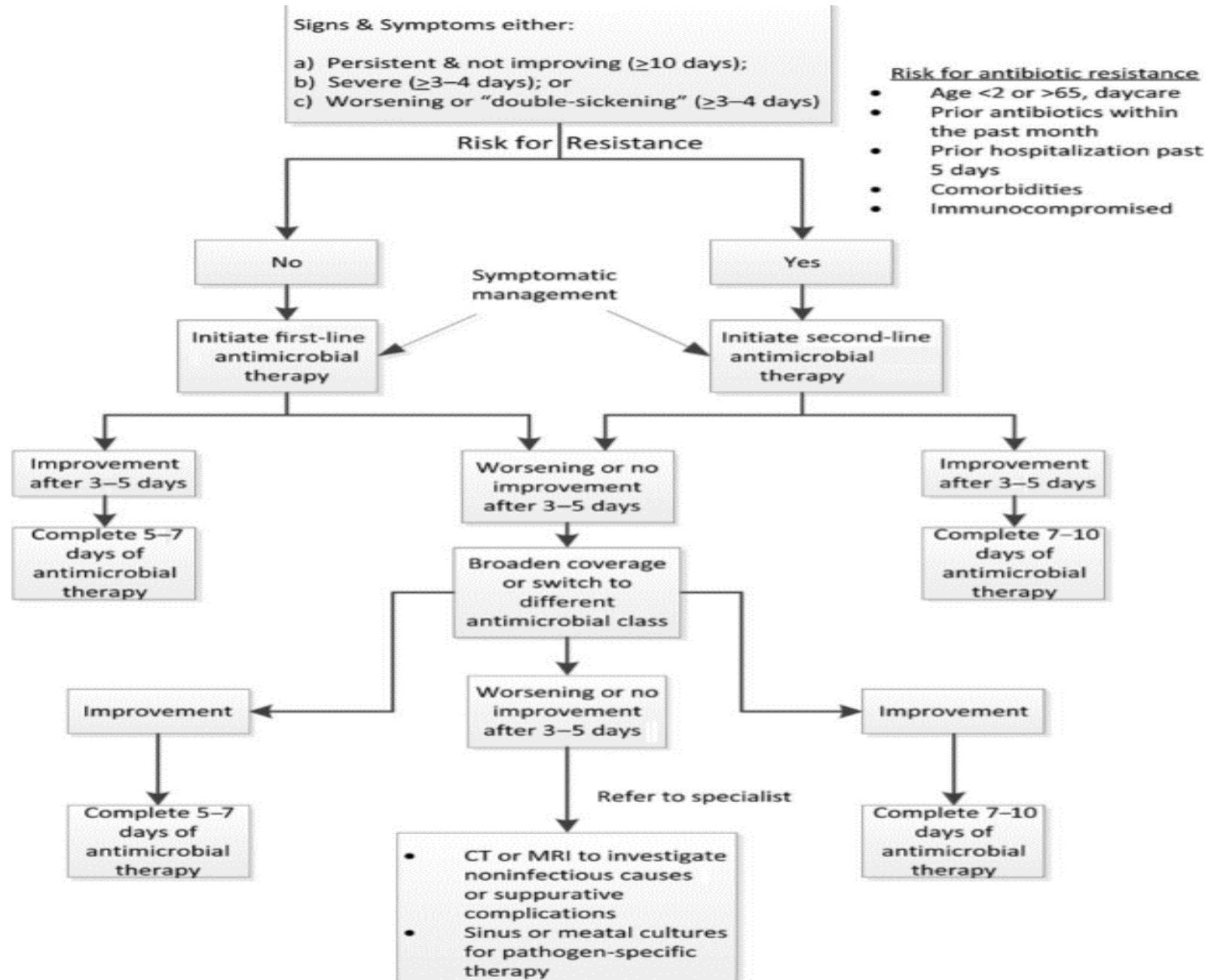
Initial Therapy	Dose	Switch Therapy Options (No Improvement or Worsening symptoms in 72 hour)
Amoxicillin/clavulanate	90 mg/kg/day BID	cefixime or cefpodoxime plus clindamycin
Beta-lactam allergic		
levofloxacin		

SHOULD EMPIRIC ANTIMICROBIAL THERAPY FOR ABRS BE ADMINISTERED FOR 5–7 DAYS VERSUS 10–14 DAYS?

- The recommended duration of therapy for uncomplicated ABRS in adults is 5–7 days
- In children with ABRS, the longer treatment duration of 10–14 days is still recommended

HOW LONG SHOULD INITIAL EMPIRIC ANTIMICROBIAL THERAPY IN THE ABSENCE OF CLINICAL IMPROVEMENT BE CONTINUED BEFORE CONSIDERING ALTERNATIVE MANAGEMENT STRATEGIES?

- An alternative management strategy is recommended if symptoms worsen after 48–72 hours of initial empiric antimicrobial therapy or fail to improve despite 3–5 days of initial empiric antimicrobial therapy (strong, moderate).



Acute sinusitis	Chronic sinusitis
<ol style="list-style-type: none"> 1. Streptococcus pneumonia 2. Non typable H.Influnza 3. Morexella cateralis 4. Staph aureus 5. Streptococcus pyogen 	<ol style="list-style-type: none"> 1. Coagulase -ve Staphylococcus aureus 2. Streptococcus viridian 3. Pseudomonas aurginosa(more common in immunecombromised) 4. Klebsilla 5. Proteus 6. Enterobactersia 7. Anerobs: <ol style="list-style-type: none"> a. Anerob streptococcus b. Fusobacterium c. prevotella
Mainly G+ve	Mainly G-ve
Anerobs 10 % (in case of sinusitis of dental origin)	Anerobs 30%
Antibiotic for 2 weeks	Antibiotics for 4 weeks
<ol style="list-style-type: none"> 1. fluid level 2. frothy or strand secretions 	Bone sclerosis in CT scan

Table 120.1 Complications of rhinosinusitis.

Orbital	Intracranial	Bony	Chronic
Preseptal cellulitis	Meningitis	Osteomyelitis (Pott's puffy tumour)	Mucocoele/pyocoele
Postseptal cellulitis or orbital cellulitis without abscess	Epidural abscess		
Subperiosteal abscess	Subdural abscess		
Orbital or intraperiosteal abscess	Intracerebral abscess		
Cavernous sinus thrombosis	Cavernous or sagittal sinus thrombosis		

ORBITAL COMPLICATIONS:

- The most common complications
- **spread of infection:**
 - congenital dehiscence in lamina papyracea
 - direct extension of infection
 - thrombophelbitis of the valveless superior + inferior ophthalmic veins
 - direct entry of bacteria into perivascular structures
- the most common micro-organism is **streptococcus viridian**

HUBERT'S (CHANDLER) CLASSIFICATION OF ORBITAL COMPLICATIONS OF SINUSITIS

- **Pre-septal cellulitis**
- **Post septal cellulitis/ orbital cellulitis:**
- **Pre-septal abscess:**
- **Post septal abscess/Orbital abscess:**
- **Cavernous sinus thrombosis.**

CAVERNOUS SINUS THROMBOSIS:

- 80 % fatal
- The most common cause is **ethmoiditis**
- The most common micro-organism is coagulase **+ve staph aureus**
- **Contra** lateral involvement of the other eye
- **Spiking** fever
- **First nerve to be affected is VI**
- Nerves that are involved: II, III,IV,VI
- Treatment:
- Mainly medical with **high**-dose IV antibiotics that cross the BBB (cephalosporin+ metronidazol)
- Consideration of the use of **anticoagulants**

INDICATION OF SURGERY:

- Blindness
- Falling visual acuity
- Abscess collection
- Lack of improvement within 48 hr of aggressive Tx
- Progression of orbital signs & symptoms despite medical treatment

INTRACRANIAL COMPLICATIONS

- **Order of frequency:**
- Subdural abscess (**most common cause**)
- Intra-cerebral abscess: streptococcus **milleri**
- epidural-Dural abscess : **best prognosis**
- Meningitis
- Cavernous sinus thrombosis
- Sagittal sinus thrombosis
- Spread into the subarachnoid space can occur via **perineural space** around the olfactory nerves.
- **Meningitis** more common among **infants** because arachnoid mater is **immature**
- **Meningitis** usually occur due to **septic Thrombophlebitis**
- **Frontal sinus** is the most common source of **brain abscess**
- **Symptoms frequency:** headache > fever > altered mental status > purulent rhinorrhea (last symptom to occur)