An overview of Acute Bacterial Rhinosinusitis

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Introduction

- **Definition:**
  - Sinusitis is defined as an inflammatory disorder of the paranasal sinuses
- **Epidemiology:**
  - Sinusitis is the common reasons for seek care from a primary care physician
  - In the US: 1 in 7 of all noninstitutionalized adults were diagnosed with sinusitis within the previous 12 months
  - Incidence rates among adults are higher for women than men (1.9-fold)
  - Adults between 45 and 74 years are most commonly affected
  - The fifth leading indication for antimicrobial prescriptions by physicians in office practice
  - Is responsible for more than 20 million antibiotic prescriptions per year in the United States
  - The total direct healthcare costs of sinusitis were estimated to exceed $3 billion per year
  - Bacterial infection of the sinuses is estimated to occur in 0.5% to 2% of cases of viral upper respiratory infection (URI) in adults and 6% to 13% of children

Clinical Presentation:

Major Symptoms:

- Purulent anterior nasal discharge
- Purulent or discolored posterior nasal discharge
- Nasal congestion or obstruction
- Facial congestion or fullness
- Facial pain or pressure
- Hyposmia or anosmia
- Fever (for acute sinusitis only)

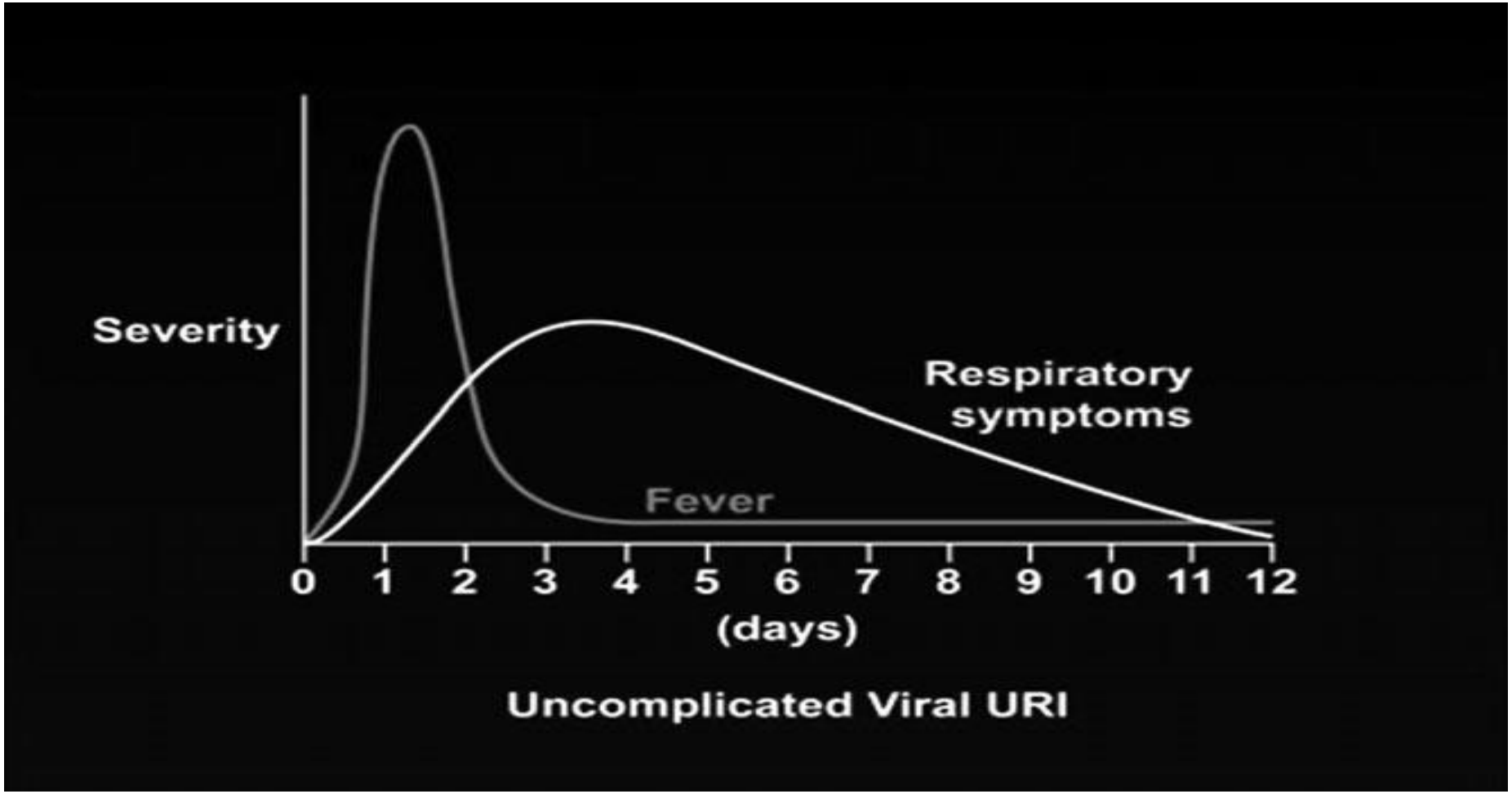
Minor Symptoms:

- Headache
- Ear pain, pressure, or fullness
- Halitosis
- Dental pain
- Cough
- Fever (for subacute or chronic sinusitis)
- Fatigue

Acute Bacterial Rhinosinusitis

- Acute Bacterial Rhinosinusitis(ABRS) is defined as an acute bacterial inflammation of the paranasal sinuses
- Bacterial infection of the sinuses is estimated to occur in about 1% of cases of viral upper respiratory infection in adults and 10% of children
- Microbiology
  - Streptococcus pneumoniae followed by nontypeable Haemophilus influenzae and Moraxella catarrhalis are the most frequently isolated organisms
  - Staphylococcus aureus is not likely a significant cause

Natural history of uncomplicate viral upper respiratory infection (URI)



Diagnosis of ABRS:

- **Onset with persistent symptoms or signs**, lasting at least 10 days without evidence of clinical improvement
- **Onset with severe symptoms or signs** of high fever (≥39° C) and purulent nasal discharge lasting for 3 to 4 consecutive days
- **Onset with worsening symptoms or signs** characterized by the new development of fever, headache, or increased nasal discharge after a typical viral URI that lasted 5 to 6 days with initial improvement

Treatment Strategy for ABRS:

- **Empirical antimicrobial therapy**
  - **Knowledge about microbial etiology**
  - **Assess for antibiotic resistance:**
    - Age <2 or >65 years
    - Severe infection
    - Antibiotic use within the past month
    - Recent hospitalization within the past 5 days
    - Attendance at daycare
    - Immunocompromised / Comorbidity
    - High endemic rates (>10%) of invasive penicillin-nonsusceptible (PNS) S. pneumoniae
  - **Select Antimicrobial regimens:**
    - First-line for antibiotic susceptible
    - Second-line for antibiotic resistance

Table 10. Antimicrobial Regimens for Acute Bacterial Rhinosinusitis in Adults

Indication	First-line (Daily Dose)	Second-line (Daily Dose)
Initial empirical therapy	• Amoxicillin-clavulanate (500 mg/125 mg PO tid, or 875 mg/125 mg PO bid)	• Amoxicillin-clavulanate (2000 mg/125 mg PO bid)
		• Doxycycline (100 mg PO bid or 200 mg PO qd)
β-lactam allergy		• Doxycycline (100 mg PO bid or 200 mg PO qd)
		• Levofloxacin (500 mg PO qd)
		• Moxifloxacin (400 mg PO qd)
Risk for antibiotic resistance or failed initial therapy		• Amoxicillin-clavulanate (2000 mg/125 mg PO bid)
		• Levofloxacin (500 mg PO qd)
		• Moxifloxacin (400 mg PO qd)
Severe infection requiring hospitalization		• Ampicillin-sulbactam (1.5–3 g IV every 6 h)
		• Levofloxacin (500 mg PO or IV qd)
		• Moxifloxacin (400 mg PO or IV qd)
		• Ceftriaxone (1–2 g IV every 12–24 h)
		• Cefotaxime (2 g IV every 4–6 h)

Abbreviations: bid, twice daily; IV, intravenously; PO, orally; qd, daily; tid, 3 times a day.

Table 9. Antimicrobial Regimens for Acute Bacterial Rhinosinusitis in Children

Indication	First-line (Daily Dose)	Second-line (Daily Dose)
Initial empirical therapy	• Amoxicillin-clavulanate (45 mg/kg/day PO bid)	• Amoxicillin-clavulanate (90 mg/kg/day PO bid)
β-lactam allergy		
Type I hypersensitivity		• Levofloxacin (10–20 mg/kg/day PO every 12–24 h)
Non–type I hypersensitivity		• Clindamycin[a] (30–40 mg/kg/day PO tid) plus cefixime (8 mg/kg/day PO bid) or cefpodoxime (10 mg/kg/day PO bid)
Risk for antibiotic resistance or failed initial therapy		• Amoxicillin-clavulanate (90 mg/kg/day PO bid)
		• Clindamycin[a] (30–40 mg/kg/day PO tid) plus cefixime (8 mg/kg/day PO bid) or cefpodoxime (10 mg/kg/day PO bid)
		• Levofloxacin (10–20 mg/kg/day PO every 12–24 h)
Severe infection requiring hospitalization		• Ampicillin/sulbactam (200–400 mg/kg/day IV every 6 h)
		• Ceftriaxone (50 mg/kg/day IV every 12 h)
		• Cefotaxime (100–200 mg/kg/day IV every 6 h)
		• Levofloxacin (10–20 mg/kg/day IV every 12–24 h)

Abbreviations: bid, twice daily; IV, intravenously; PO, orally; qd, daily; tid, 3 times a day.

[a] Resistance to clindamycin (~31%) is found frequently among *Streptococcus pneumoniae* serotype 19A isolates in different regions of the United States [94].

TABLE 63-8 Comparison of Two Major Guidelines for the Diagnosis and Treatment of Acute Bacterial Sinusitis

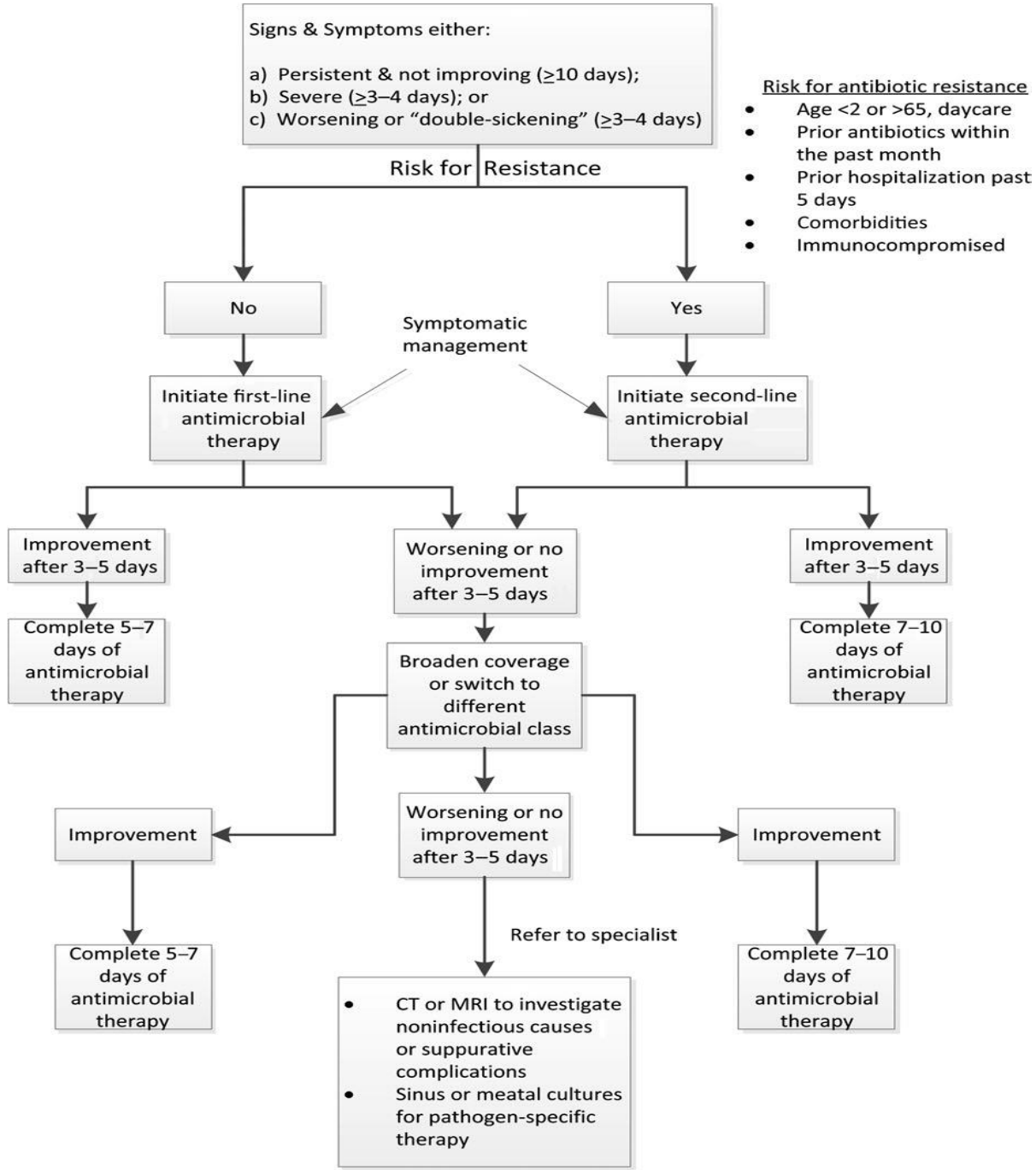
	DIAGNOSIS	TREAT	ANTIMICROBIAL OF CHOICE	AMOXICILLIN DOSE
IDSA[86]	Clinical	All patients	Amoxicillin/clavulanate	40-45 mg/kg/day 80-90 mg/kg/day or 2 g/day for high risk*
AAP[87]	Clinical	All severe patients treat or wait 3 days for mild-moderate	Amoxicillin with or without clavulanate	40-45 mg/kg/day 80-90 mg/kg/day or 2 g/day for high risk*

*≥10% nonsusceptible pneumococci, severe infection, attend day care, age <2 yr or >65 yr, recent hospitalization, and antibiotics in the past month.

TABLE 63-9 Oral Antimicrobial Agents for Acute Bacterial Sinusitis

ANTIMICROBIAL	ADULT DOSAGE	PEDIATRIC DOSAGE
Amoxicillin	500-875 mg q12h	40-80 mg/kg/day divided q12h
Amoxicillin/clavulanate*	875 or 2000 mg q12h	40-80 mg/kg/day divided q12h
Cefpodoxime proxetil	200 mg q12h	10 mg/kg/day divided q12h
Cefixime†	400 mg q12-24h	8 mg/kg/day divided q12-24h
Cefdinir	300 mg q12h or 600 mg q24h	14 mg/kg/day divided 12-24h
Cefprozil	250-500 mg q12h	15-30 mg/kg/day divided q12h
Levofloxacin	500 mg daily	16 mg/kg/day divided q12h†
Moxifloxacin	400 mg daily	400 mg daily for adolescents†

*Dosages specify amoxicillin component.
†Not U.S. Food and Drug Administration–approved for this indication.


Signs & Symptoms either:
a) Persistent & not improving (≥10 days);
b) Severe (≥3–4 days); or
c) Worsening or "double-sickening" (≥3–4 days)
Risk for Resistance
Risk for antibiotic resistance
Age <2 or >65, daycare
Prior antibiotics within the past month
Prior hospitalization past 5 days
Comorbidities
Immunocompromised
No
Yes
Symptomatic management
Initiate first-line antimicrobial therapy
Initiate second-line antimicrobial therapy
Improvement after 3–5 days
Worsening or no improvement after 3–5 days
Improvement after 3–5 days
Complete 5–7 days of antimicrobial therapy
Broaden coverage or switch to different antimicrobial class
Complete 7–10 days of antimicrobial therapy
Improvement
Worsening or no improvement after 3–5 days
Improvement
Complete 5–7 days of antimicrobial therapy
Refer to specialist
Complete 7–10 days of antimicrobial therapy
CT or MRI to investigate noninfectious causes or suppurative complications
Sinus or meatal cultures for pathogen-specific therapy