

Acute Sinusitis in Pediatrics

Becky DeCamillis, MHS, PA-C, MLS(ASCP)

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Learning Objectives

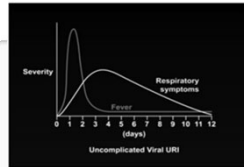
Learner will be able to:

- Identify symptoms and differentiate features of viral and bacterial sinusitis
- Describe first line therapies for acute bacterial sinusitis (ABS)
- Counsel patients and families on appropriate treatment plans, whether or not those include antibiotics

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What is acute sinusitis?

- Acute sinusitis
 - Inflammation of the mucosal lining of the paranasal sinuses
 - Common during uncomplicated URIs
 - Symptoms resolve within 30 days



Schematic characterization of the natural history and time course of fever and respiratory symptoms associated with an uncomplicated viral upper respiratory infection (URI) in children (courtesy of Dr. Ellen Walsh; adapted from Swallow et al [32] and Rosenfeld et al [13]).

UpToDate Acute bacterial rhinosinusitis in children: Clinical features and diagnosis
Swallow DA, Swallow DA, Swallow DA, Swallow DA. Rhinovirus infections in an industrial population 5. Characteristics of illness and antibody response. JAMA. 1987; 257(22):494-500.
Rosenfeld RM, Archer D, Shattner-Hervey N, et al. Clinical practice guideline: acute otitis. Otolaryngol Head Neck Surg. 2007; 137(5):61-71.

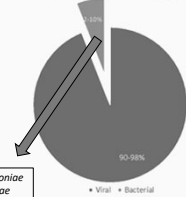
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The “rub” with acute sinusitis

- Viral >> bacterial
 - 90-98% viral
 - 2-10% bacterial
 - Rate of acute bacterial sinusitis following viral URI: 7.5% (peds)

Therefore, the onus is on the provider to distinguish features of viral vs bacterial sinusitis

Acute sinusitis etiology



Wald E, Henkle CH, et al. Acute bacterial sinusitis in children: an updated review. Clininfect Dis. 2020; 70(10):1735-1742.
Brook I. Microbiology of Sinusitis. Proceedings of the American Thoracic Society. 2010; 6(3):160-163.

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Clinical presentation of acute sinusitis

- URI symptoms
 - Nasal congestion
 - Cough
- +/-
 - Fever
 - Facial pain
 - Maxillary tooth pain
 - Headache
 - Purulent nasal discharge
 - Halitosis



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Guidelines: Diagnosis & Treatment
American Academy of Pediatrics (AAP)
Infectious Disease Society of America (IDSA)

- Wald, et al. Clinical Practice Guideline for the Diagnosis and Management of Acute Bacterial Sinusitis in Children Aged 1 to 18 Years. Pediatrics, 2013; 132(1): 262-280.
- Chow, et al. IDSA Clinical Practice Guideline for Acute Bacterial Rhinosinusitis in Children and Adults. Clinical Infectious Diseases, 2012; 54(8): 72-112.

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Diagnosis

- Gold standard: sinus aspiration with culture (X)
- Imaging? (X)
 - Not recommended in uncomplicated cases
- Clinical criteria (✓)



Source: Getty Images, via USA Today

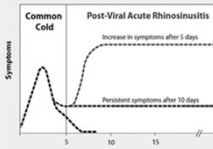
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Clinical presentation of acute bacterial sinusitis

- Onset with *persistent* signs/symptoms, lasting ≥ 10 days with no evidence of improvement
- Onset with *severe* signs/symptoms for $\geq 3-4$ days at the beginning of illness:
 - Fever $>102^{\circ}\text{F}$
 - Purulent nasal discharge
 - Facial pain
- Onset with *worsening* signs/symptoms – new fever, headache, increased nasal discharge – after a period of symptom improvement (“double sickening”)

Definition of Acute Rhinosinusitis

Increase in symptoms after 5 days, or persistent symptoms after 10 days with less than 12 weeks duration



Signs of potential acute bacterial rhinosinusitis

At least 3 of:

- Fever above 38°C
- Double sickening
- Unilateral disease
- Severe pain
- Raised ESR/CRP

Johnson, et al. (2015) 2015 European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS-2): A Summary for Clinicians and Patients. *Rhinology*, May 2015, 54(5): 1-13.
 Smith, L, et al. Common Cold and Acute Rhinosinusitis: Up-to-Date Management in 2020. *Current Allergy and Asthma Reports*, 20 Jan 2020, 20(1):24.

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Recommendations for treatment

- Watchful waiting
 - Uncomplicated viral sinusitis usually resolves within 7-10 days on its own
- If symptoms suggest bacterial etiology, antibiotics usually hasten recovery in children
 - For patients with reliable follow up and no significant underlying immunocompromise, outpatient observation for 3 days is an option in cases of persistent illness


UpToDate Acute Bacterial Rhinosinusitis in Children: Clinical Features and Diagnosis.

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Recommendations for treatment of ABS

- Look at your patient:
 - Age $<2?$
 - How ill are they?
 - “mild-moderate”
 - “moderate-severe”
 - Do they have risk factors for resistance?
 - Endemic *S. pneumoniae* resistance rates
 - Daycare attendance
 - Recent antibiotic exposure (within 4 weeks)

Resistance of *Streptococcus pneumoniae* to Penicillins



The Center for Disease Dynamics, Economics & Policy. Resistance to Penicillins in *Streptococcus pneumoniae*. 2022.

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Recommendations for treatment of ABS, non-PCN allergic patients

Patient profile	Treatment of choice	Dose
Group 1: - mild-mod illness - age ≥ 2 years - no risk factors for resistance	amoxicillin	45mg/kg/day divided into 2 doses
	amoxicillin-clavulanate	45 mg/kg/day of amox component, divided into 2 doses
Group 2: - mod-severe illness - Age <2 years - risk factors for resistance	amoxicillin-clavulanate	80-90 mg/kg/day of amox component, with 6.4 mg/kg/day of clavulanate, divided into 2 doses*

*max: 2g per dose

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Recommendations for treatment of ABS, PCN allergic patients

Allergy profile	Treatment of choice
Non-type 1 hypersensitivity	cefdirir
	cefuroxime
	cefepodoxime
Serious type 1 hypersensitivity*	cefixime + : clindamycin or linezolid
	levofloxacin

*consider penicillin allergy testing

- If vomiting, ceftriaxone 50mg/kg/day IM/IV then switch to oral when tolerable
- AVOID: macrolides, trimethoprim/sulfa due to high resistance rates of *Strep pneumoniae*, *Haemophilus influenzae*

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Recommendations for treatment of ABS, duration & adjuvant therapy

- Duration
 - Variable
 - At least 10 days +/- 7 days s/p symptom resolution
- Adjuvant therapy
 - Acetaminophen, NSAIDs
 - Scant data
 - Intranasal steroids may help
 - Saline irrigation/lavage may help
 - Can consider antihistamines in kids with atopy who also have acute sinusitis, but not primarily for AS alone

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Antibiotic Use and Stewardship

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Antibiotic Use and Stewardship

- Educate, educate, educate
 - Indication:
 - Uncomplicated URI vs acute bacterial sinusitis
 - 3 day observation period for patients who meet persistent illness criteria and who have reliable follow up
 - Delayed prescribing may be appropriate
 - Agent:
 - Correct antibiotic
 - Allergy testing if appropriate
 - Correct dose
 - Correct duration

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Common Myths

- All cases of sinusitis are bacterial, therefore require an antibiotic for treatment.
- If I have a cold and still have nasal congestion past day 10, I need an antibiotic to get better.
- It's best to get a Z-pack "just to knock it out"
- Parents/families always want an antibiotic for URI symptoms.

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Managing Family Expectations

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Family Expectations

- Families don't always want antibiotics, EVEN WHEN they question the treatment plan
- If antibiotics aren't indicated, avoid "no treatment is necessary."
 - Offer alternatives/adjuncts when appropriate and a clear plan if symptoms worsen or fail to improve.
- Balance positive and negative treatment recommendations:
 - "Great news! Your symptoms aren't consistent with a bacterial sinusitis right now. Antibiotics are more likely to hurt than help at this point, but you can try nasal saline irrigation for the congestion and some warm tea with honey for the cough. If you aren't starting to feel better within the next 5 days, call us back."

Mangione-Smith, et al. Communication Practices and Antibiotic Use for Acute Respiratory Tract Infections in Children. Annals of Family Medicine, 2015;13(2):221-227.

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Patient Scenario

- 7-yo Johnny presents with his mother to the clinic with a 6-day history of runny nose, sore throat, and cough. He had a low-grade fever at first, but it resolved. They have a family trip planned in a few days and his mother wants to make sure he gets an antibiotic if needed before they leave.
- Are his symptoms improving?

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Johnny

- "Yes, he hasn't any more fevers. He still has nasal congestion but it isn't worsening."
 - Counseling, reassurance
- "Things were getting better but this morning he woke up with a new fever to 103 and a bad headache."
 - Double sickening
 - Evaluation reveals he has mild-moderate illness and doesn't have risk factors for resistance, so Rx amoxicillin x 10 days

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Take Aways

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References

- Wald, et al. Clinical Practice Guideline for the Diagnosis and Management of Acute Bacterial Sinusitis in Children Aged 1 to 18 Years. *Pediatrics*, 2013; 132(1): 262-280.
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- Jaume, F, et al. Common Cold and Acute Rhinosinusitis: Up-to-Date Management in 2020. *Current Allergy and Asthma Reports*, 02 Jun 2020, 20(7):28.
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- Mangione-Smith, et al. Communication Practices and Antibiotic Use for Acute Respiratory Tract Infections in Children. *Annals of Family Medicine*, 2015, 19(3): 221-227.

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