MedStar Health

Diagnosis and Management of Acute Sinusitis in Children Aged 1 to 18 Years

Clinical Practice Guideline
MedStar Health
Antibiotic Stewardship

"These guidelines are provided to assist physicians and other clinicians in making decisions regarding the care of their patients. They are not a substitute for individual judgment brought to each clinical situation by the patient's primary care provider in collaboration with the patient. As with all clinical reference resources, they reflect the best understanding of the science of medicine at the time of publication but should be used with the clear understanding that continued research may result in new knowledge and recommendations."

MedStar Pediatrics and MedStar Family Choice accept and endorse the clinical practice guidelines set forth by the American Academy of Pediatrics published in July 2013. "Clinical Practice Guideline for the Diagnosis and Management of Acute Bacterial Sinusitis in Children Aged 1 to 18 Years" The online version of these guidelines is available at: http://pediatrics.aappublications.org/content/132/1/e262

Antibiotics should not be used for viral respiratory illnesses, including bronchitis, bronchiolitis, pharyngitis, and sinusitis.

https://www.choosingwisely.org/clinician-lists/american-academy-pediatrics-antibiotics-for-children-with-viral-respiratory-illness/

Key Points:

1. **Differentiate uncomplicated viral URI and allergic rhinitis from Acute Bacterial Sinusitis (ABS)**

   Uncomplicated URI usually characterized by nasal symptoms (discharge and congestion/obstruction) or cough or both.
   - Nasal discharge begins as clear and watery. Typically, the nasal discharge becomes thicker and more mucoid and may become purulent for several days. Then the situation reverses, with the purulent discharge becoming mucoid and then clear again or simply resolving. May have sensation of congestion/obstruction. Course is 5-7 days
   - Associated symptoms: Fever and other constitutional symptoms tend to occur *early* in the illness and disappear within 24 to 48 hours. Cough may be secondary to post-nasal drip, which is usually worse at night, or associated viral cough.
   - Course: Usually 5 to 7 days, peak at 3-6 days but resolving symptoms may persist for 10-14 days.

   Uncomplicated Allergic Rhinitis

   - Nasal discharge Clear nasal discharge, pale nasal mucosa
   - Associated symptoms: Pruritic eyes and nasal mucosa, allergic shiners, cobble stoning of the conjunctiva or pharyngeal wall
   - Course: often seasonal unless indoor allergen, clear persistent discharge during exposure to allergen. Can go on to secondary bacterial sinusitis

2. Presumptive Diagnosis of Acute Bacterial Sinusitis:
Clinicians may make a presumptive diagnosis of ABS when a child with an acute upper respiratory infection (URI) presents with the following:

Persistent illness, ie, nasal discharge (of any quality) or daytime cough or both lasting more than 10 days without improvement; **OR**

Worsening course ie, worsening or new onset of nasal discharge, daytime cough, or fever after initial improvement; **OR**

Severe onset, ie, concurrent fever (temperature ≥ 39ºC/102.2ºF) and purulent nasal discharge for at least 3 consecutive days.

3. Other Diagnostic Considerations for Acute Bacterial Sinusitis:

- *History:* Consider ABS for recurrent URIs characterized by an improvement followed by a recurrence of symptoms
- *Other signs/symptom*s: Bad breath, fatigue, headache, and decreased appetite, although common, are *non-specific* indicators of acute sinusitis and may be more common in younger children. Older children may have specific symptoms such has headache and facial pain.
- *Physical exam:* most physical findings are *non-specific* and not helpful in distinguishing ABS from uncomplicated viral URI (Erythema and swelling of the nasal turbinates, tenderness on percussion of the sinuses
- *Labs:* Nasopharyngeal cultures do *not* reliably predict the etiology of acute bacterial sinusitis
- *Imaging:* Clinicians should *not* obtain imaging studies (plain films, contrast-enhanced computed tomography (CT), MRI, or ultrasonography) to distinguish acute bacterial sinusitis from viral URI. Obtain a contrast-enhanced CT scan of the paranasal sinuses and/or an MRI with contrast if suspect orbital or central nervous system complications of acute bacterial sinusitis.
- Consider underlying causes such as allergic rhinitis, foreign body (unilateral symptoms), structural abnormality, dental disease.

4. Antibiotic Treatment for Acute Bacterial Sinusitis:

- **Severe onset and/or worsening course** -> Prescribe Empiric Antibiotic Therapy
- **For children with persistent Illness** (nasal discharge of any quality or cough or both for at least 10 days without evidence of improvement) **that is not severe onset or worsening**
  -> Prescribe Empiric Antibiotic Therapy **OR**
  -> Offer additional outpatient observation **without antibiotics** for 3 days to children based on clinical judgement
  First-Line: **Amoxicillin** with or without **clavulanate** as first-line treatment
- Common bacterial pathogens include S. pneumoniae, H. influenzae, and M. catarrhalis.

First Line

Amoxicillin: Amoxicillin remains the antimicrobial agent of choice for first-line treatment of uncomplicated acute bacterial sinusitis in situations in which antimicrobial resistance is not suspected.

i. **Low dose**: For children age ≥ 2 years with mild uncomplicated acute bacterial sinusitis, not in daycare and not treated with an antibiotic with last 4 weeks
Amoxicillin *45 mg/kg per day in 2 divided doses x 10-14 days* (max 1000 mg/dose)

ii. **High-dose**: For children > 2 years old, not in daycare, in communities with a **high prevalence of non-susceptible S pneumonia** (> 10%,

including intermediate- and high-level resistance)
Amoxicillin *80 – 90mg/kg per day in 2 divided doses (maximum of 2 gm/dose).*

Severe infection OR geographic regions with high endemic rate (≥ 10%) of invasive penicillin-non susceptible (PNS) S. pneumoniae.

Amoxicillin-Clavulanate:

- **Low dose**: **<40 kg: 45 mg/kg/dose of Amoxicillin PO q12h using the Augmentin ES-600 suspension**
- **≥40 kg: 2000 mg of Amoxicillin PO q12h using the Augmentin 1000 mg XR tablets**
- **High Dose**: Patients presenting with moderate to severe illness as well as those **younger than 2 years, attending childcare**, or who have been treated with an antimicrobial in the past 30 days may receive high dose ***Amoxicillin 80 – 90mg/kg per day gm/dose Clavulanate with 6.4 mg/kg per day in 2 divided doses (maximum of 2 gm/dose) x 10-14 days***

Alternative Agents

Ceftriaxone

Children who are vomiting, unable to tolerate oral medication, or unlikely to be adherent to the initial doses of antibiotic
50mg/kg dose IM or IV. Max 1000mg/dose
If clinical improvement is observed in 24 hours, an oral antibiotic can be substituted to complete the course of therapy.
Children who are still significantly febrile or symptomatic at 24 hours may require additional parenteral doses before switching to oral therapy.

Cefdinir or **Cefuroxime**

Children allergic to amoxicillin with a non-type 1 (late or delayed, > 72 hours) hypersensitivity reaction can be safely treated with cefdinir or cefuroxime
Cefdinir 14 mg/kg per day orally divided in 1 or 2 doses (maximum 600 mg/day)
Cefuroxime 30 mg/kg/day divided in 2 doses (maximum 500 – 1000 mg/day).

Clindamycin and Cefixime

In young children (< 2 years) with a serious type I hypersensitivity to penicillin and moderate or more severe sinusitis, consider a combination **Clindamycin 30 – 40 mg/kg/**day every 8 hours and a third-generation cephalosporin (cefixime) to achieve the most comprehensive coverage against resistant S pneumonia and H Influenza.

Levofloxacin

Levofloxacin is recommended for children with a history of type I hypersensitivity to penicillin.
6 months to <5 years: 10mg/kg/dose PO q12h (max 500 mg/day)
≥5 years: 10 mg/kg/dose PO q24h (max 500 mg/day) 10–14 days.

Other Recommendations:

a. Macrolides (clarithromycin and azithromycin) or Trimethoprim-sulfamethoxazole are **not recommended** for empiric therapy due to high rates of resistance among S. pneumoniae (~30%).

b. Second-and third-generation oral cephalosporins are no longer recommended for empiric monotherapy of ABRS due to variable rates of resistance among S. pneumoniae.

c. Combination therapy with a third-generation oral cephalosporin (cefixime or cefpodoxime) plus clindamycin may be used as second-line therapy for children with non–type I penicillin allergy or from geographic regions with high endemic rates of PNS S. pneumoniae.

Adjuvant/Supportive Therapy:

- Nasal saline rinses may be helpful to thin mucous and help with drainage.
- Inhaled nasal steroids may be helpful to decrease intranasal swelling.
- Oral decongestants are **not** recommended.

5. Follow-up

- Reassess initial management if there is either a caregiver report of worsening OR failure to improve within 72 hours of initial management
- If the diagnosis of acute bacterial sinusitis is confirmed in a child with worsening symptoms or failure to improve in 72 hours, then clinicians may change the antibiotic therapy for the child initially managed with antibiotics OR initiate antibiotic treatment of the child initially managed with observation

6. Complications:

- Orbital complications are the most common. Signs of orbital infection include eyelid swelling, proptosis, and impairment of extraocular muscle movement.
- Complications divided into those involving:
    - The orbit (optic neuritis, orbital and periorbital cellulitis, orbital and subperiosteal abscess),
    - The central nervous system (meningitis, subdural and epidural empyema, brain abscess and venous sinus thrombosis),
    - The bone (maxillary osteitis, frontal osteitis, Pott puffy tumor)

REFERENCES:

1. Pediatric Treatment Recommendations. (2016, March 4). Retrieved August 14, 2016, from http://www.cdc.gov/getsmart/community/for-hcp/outpatient-hcp/pediatric-treatment-rec.html
2. Infectious Disease Society of America (ISDA), 2015. Promoting antimicrobial stewardship in human medicine. Retrieved from https://www.idsociety.org/policy--advocacy/antimicrobial-resistance/antimicrobial-stewardship/
3. Wald, E. R., Applegate, K. E., Bordley, C., Darrow, D. H., Glode, M. P., Marcy, S. M., . . . Weinberg, S. T. (2013, July). Clinical Practice Guideline for the Diagnosis of Acute Bacterial Sinusitis in Children Aged 1 to 18. American Academy of Pediatrics Clinical Practice Guideline, 132(1). Retrieved from http://pediatrics.aappublications.org/content/132/1/e262.
4. Badr DT, Gaffin JM, Phipatanakul W. Pediatric Rhinosinusitis. *Curr Treat Options Allergy*. 2016;3(3):268-281. doi:10.1007/s40521-016-0096y https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5193235/

5. Leung AKC, Hon KL, Chu WCW. Acute bacterial sinusitis in children: an updated review. Drugs in Context 2020; 9: 2020-9-3. DOI: 10.7573/dic.2020-9-3

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