Principles of Appropriate Antibiotic Use for Acute Sinusitis in Adults

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In this guideline, we will present the supporting evidence for and make specific recommendations on how clinicians evaluating acute sinusitis can differentiate bacterial causes from viral causes and how they can determine when the use of antibiotics is beneficial. The numbers in square brackets are cross-references to the numbered sections in the accompanying background paper, "Principles of Appropriate Antibiotic Use for Acute Rhinosinusitis in Adults: Background," which is part 2 of this guideline (see pages 498-505).

ACUTE SINUSITIS

The term *sinusitis* refers to inflammation of the mucosa of the paranasal sinuses. Because sinusitis is invariably accompanied by inflammation of the contiguous nasal mucosa, *rhinosinusitis* has become the preferred term. Rhinosinusitis is one of the 10 most common diagnoses in ambulatory practice and is the fifth most common diagnosis for which an antibiotic is prescribed. Primary care physicians tend to think of sinusitis as an acute bacterial infection and prescribe an antibiotic in 85% to 98% of cases. However, sinusitis is frequently caused by viral infection. It will often resolve in most patients without antibiotic treatment, even if it is bacterial in origin [1.0].

Acute rhinosinusitis is defined by symptom duration of less than 4 weeks. Acute bacterial sinusitis is usually a secondary infection resulting from sinus ostia obstruction, impaired mucus clearance mechanisms caused by an acute viral upper respiratory tract infection, or both. According to epidemiologic estimates, only 0.2% to 2% of viral upper respiratory tract infections in adults are complicated by bacterial rhinosinusitis. The gold standard for diagnosis of bacterial sinusitis is sinus puncture, and *Streptococcus pneumoniae* and *Haemophilus influenzae* are the bacteria most commonly isolated from infected maxillary sinuses. However, sinus puncture is an invasive procedure seldom performed in primary care. Because no simple and accurate office-based test for acute bacterial sinusitis exists, clinicians rely on clinical findings to make the diagnosis. However, signs and symptoms of acute bacterial sinusitis and those of prolonged viral upper respiratory tract infections are very similar, resulting in frequent misclassification of viral cases [1.1, 1.2].

Diagnosis: Bacterial Compared with Viral

Overdiagnosis of acute bacterial rhinosinusitis is not surprising, considering the lack of specific clinical features that distinguish it from nonbacterial upper respiratory tract infections. Often, patients and physicians believe that an upper respiratory tract infection "has gone on too long" and that antibiotic treatment is therefore needed. In a study of the natural history of rhinovirus illness, length of illness ranged from 1 to 33 days. Most patients were well or nearly well in 7 to 10 days, and one fourth of patients were still symptomatic after 14 days. Bacterial rhinosinusitis is not common in patients whose symptoms have lasted less than 7 days; therefore, presence of symptoms for at least 7 days is a moderately sensitive but nonspecific predictor of bacterial rhinosinusitis [3.0].

Since 1976, seven investigators have published reports attempting to identify signs and symptoms specific to acute bacterial rhinosinusitis. All of these studies have limitations, such as a suboptimal gold standard or selection criteria that allowed the inclusion of patients whose symptoms had been present for more than 1 month. However, considering the results of all seven studies, purulent nasal discharge along with maxillary tooth or

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facial pain (especially when unilateral), unilateral sinus tenderness, and worsening of symptoms after initial improvement seem to be helpful findings for predicting a higher likelihood of bacterial infection in patients with rhinosinusitis-like symptoms [3.2].

Several investigators have studied the accuracy of sinus radiography in predicting the presence of purulent sinus fluid by using complete opacification, air-fluid level, or various degrees of mucosa thickening as the diagnostic criteria. Complete opacification and air-fluid level are the most specific findings, with specificities of 85% (range, 76% to 91%) and 80% (range, 71% to 87%), respectively. The finding of mucosal thickening has a low specificity, probably no better than that of skilled clinical judgment, which is 40% to 50%. The absence of all three findings has an estimated sensitivity of approximately 90% and is helpful in ruling out bacterial rhinosinusitis. Given these test characteristics and the known high prevalence of abnormal radiography findings in patients with viral rhinosinusitis, sinus radiography has limited value in routine diagnosis of acute bacterial rhinosinusitis [4.0].

Treatment

For acute bacterial rhinosinusitis, randomized, double-blind, placebo-controlled trials of antibiotic treatment using pretreatment and post-treatment culture of sinus aspirates have not been performed. Five randomized, double-blind clinical trials with good methods have compared antibiotic treatment with placebo for acute rhinosinusitis in adults. Two recent meta-analyses, one under the auspices of the Cochrane Collaboration and the other under contract from the Agency for Healthcare Research and Quality (AHRQ), have recently been published. Both concluded that although antibiotics are statistically more efficacious than placebo in reducing or eliminating symptoms at 10 and 14 days, the effect size (degree of benefit) is relatively small. Moreover, most patients who receive placebo improve without antibiotic therapy. The AHRQ report pointed out that symptoms improved or resolved in 69% (CI, 57% to 79%) of patients by 14 days without any antibiotic treatment at all. When the 40% to 50% prevalence of bacterial rhinosinusitis in patients whose diagnosis is determined by signs and symptoms and the modest effectiveness of antibiotic treatment were considered, a cost-effectiveness model sponsored by the AHRQ favored antibiotic treatment for patients with moderate to severe symptoms and symptomatic treatment for those with mild symptoms [5.0–5.3].

Summary

In summary, most cases of acute rhinosinusitis diagnosed in ambulatory care are caused by uncomplicated viral upper respiratory tract infections. Bacterial and viral rhinosinusitis are difficult to differentiate on clinical grounds. The clinical diagnosis of acute bacterial rhinosinusitis should be reserved for patients with rhinosinusitis symptoms lasting 7 days or more who have purulent nasal secretions and maxillary facial or tooth pain or tenderness. Patients who have symptoms of rhinosinusitis for less than 7 days are unlikely to have bacterial infection. Sinus radiography is not recommended for diagnosis in routine cases. Acute bacterial rhinosinusitis resolves without antibiotic treatment in most cases. Symptomatic treatment and reassurance are the preferred initial management strategy for patients with mild symptoms. Antibiotic therapy should be reserved for patients with severe symptoms who meet the criteria for the clinical diagnosis of acute bacterial rhinosinusitis, regardless of duration of illness. Initial antibiotic treatment should be with narrow-spectrum agents. On the basis of clinical trials, amoxicillin, doxycycline, and trimethoprim–sulfamethoxazole are the favored antibiotics [5.4, 5.5].

RECOMMENDATIONS

Recommendation 1. Sinus radiography is not recommended for the diagnosis of uncomplicated sinusitis.

The greatest barrier to efficient antibiotic treatment of acute bacterial rhinosinusitis is lack of a simple and accurate diagnostic test. Until a better test is widely available in office practice, the office diagnosis of acute bacterial rhinosinusitis will remain imprecise. Duration of illness is a useful clinical criterion because acute bacterial sinusitis is not common in patients whose symptoms last for less than 7 days. Patients who do not have persistent purulent nasal drainage, maxillary facial or tooth pain or tenderness, or both are unlikely to have bacterial rhinosinusitis, regardless of duration of illness.

Recommendation 2. Acute bacterial sinusitis does not require antibiotic treatment, especially if symptoms are mild or moderate.

Because most patients with a clinical diagnosis of rhinosinusitis improve without antibiotic treatment, symptomatic treatment or reassurance is the preferred initial management strategy. Appropriate doses of analgesics, antipyretics, and decongestants should be offered, as well as patient education about the chosen management strategy.

Recommendation 3. Patients with severe or persistent moderate symptoms and specific findings of bacterial sinusitis should be treated with antibiotics. Narrow-spectrum antibiotics are reasonable first-line agents.

In most cases, antibiotics should be used only for patients with the specific findings of persistent purulent nasal discharge and facial pain or tenderness who are not improving after 7 days or those with severe symptoms of rhinosinusitis, regardless of duration. On the basis of clinical trials, amoxicillin, doxycycline, or trimethoprim–sulfamethoxazole are the favored antibiotics.

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