

Sarah-Anne Schumann, MD,
and John Hickner, MD, MSc
Department of Family Medicine
The University of Chicago

PURLs EDITOR

Bernard Ewigman, MD,
MSPH, Department of Family
Medicine, The University of
Chicago

Patients insist on antibiotics for sinusitis? Here is a good reason to say “no”

Convincing evidence emerges from primary care trials

Practice changer

Stop prescribing antibiotics for adults with a clinical diagnosis of acute sinusitis, unless the patient has severe symptoms. Antibiotics have little if any positive effects on the severity and duration of symptoms, and they cause adverse effects and create unnecessary expense.

Strength of recommendation

A: Based on a meta-analysis of 9 randomized trials in primary care practice.

Young J, De Sutter A, Merenstein D, et al. Antibiotics for adults with clinically diagnosed acute rhinosinusitis: a meta-analysis of individual patient data. *Lancet*. 2008;371:908-914.¹

ILLUSTRATIVE CASE

A 23-year-old woman presents to your office with a 1-week history of cough, purulent nasal discharge, and unilateral facial pain. You diagnose acute sinusitis.

Should you prescribe an antibiotic?

No. Yet it's no wonder that most adults treated for acute sinusitis leave the doctor's office with a prescription for antibiotics. Until the

publication of the meta-analysis by Young and colleagues¹ featured in this PURL, we have lacked A-level evidence from studies conducted in realistic settings—like your practice and ours.

Review of serial data from the National Ambulatory Medical Care Surveys (NAMCS) from 1999 through 2005 does show a slight downward trend in antibiotic prescribing for acute sinusitis: 1999-2002 data showed that 83% of cases of acute sinusitis were treated with an antibiotic.² Data from the 2004 and 2005 NAMCS reveal that family physicians prescribed antibiotics for 80% of patients with acute sinusitis in 2004 and 76% of patients in 2005 (S. Medvedev, unpublished data, NAMCS database, March 2008).

Is this continued high rate of antibiotic prescribing justified?

Do antibiotics improve symptoms and shorten the duration of illness or not?

These questions are important, obviously, not only because of the high rate of prescribing but also because sinusitis is one of the most common diagnoses: approximately 20 million cases annually in the United States, or about 21% of all outpatient antibiotic prescriptions for adults.²

PURLs®

INSTANT POLL

What is the likelihood that most of your patients would accept your recommendation not to use an antibiotic to treat sinusitis?

- Extremely likely
- Fairly likely
- Fairly unlikely
- Extremely unlikely

Check our new **Instant Poll** and find out what your colleagues are doing
www.jfponline.com

Which patients might benefit from antibiotics?

Common clinical signs and symptoms cannot identify patients with rhinosinusitis for whom treatment is clearly justified, given the cost, adverse events, and bacterial resistance associated with antibiotic use

- Severity of symptoms is important only in that signs suggestive of a serious complication are the sole reason for immediate antibiotic treatment
- Purulent discharge noted in the pharynx on exam was associated with a higher likelihood of benefit from antibiotics, but NNT was 8
- Antibiotics are not justified even if a patient reports having symptoms for longer than 7-10 days

Source: Young et al.¹

■ A diagnostic dilemma

Before we discuss the evidence that is summarized in the excellent meta-analysis by Young and colleagues,¹ let's acknowledge that acute sinusitis is undeniably a diagnostic dilemma. Distinguishing bacterial from viral infection is nearly impossible on clinical grounds because the symptoms are so similar. A litany of identical upper respiratory symptoms accompanies both viral and bacterial sinus infections. Purulent nasal secretions, maxillary facial pain (especially with unilateral predominance), maxillary tooth pain (which is uncommon with sinus infection), altered sense of smell, and worsening illness after improvement constitute the short list of signs and symptoms that has some predictive value, but even the presence of all of these is not a terrific predictor of bacterial sinus infection. Plain x-rays have

low accuracy in distinguishing viral from bacterial infection. Computed tomography (CT) sinus scans are better but far from perfect, are not readily available in practice, and are expensive.

■ Sinusitis in the real world

How effective are antibiotics for patients diagnosed not by sinus x-rays or CTs, but by signs and symptoms—as we typically do in daily practice?

A meta-analysis³ of 13 randomized controlled trials (RCTs) found that sinusitis improved without antibiotics, but it included trials in which patients were recruited based on results of imaging studies and cultures, which are not normally used in primary care clinical practice. That study compared antibiotic treatment to placebo for acute uncomplicated sinusitis; 35% of placebo-treat-

FAST TRACK

Treating 15 patients with an antibiotic to possibly benefit 1 patient after 2 weeks does not seem like a good idea when one considers cost and complications

PURLs methodology

This study was selected and evaluated using FPIN's Priority Updates from the Research Literature (PURL) Surveillance System methodology. The criteria and findings leading to the selection of this study as a PURL can be accessed at www.jfponline.com/purls.

ed patients were clinically cured by 7 to 12 days and 73% were improved after 7 days. Antibiotic therapy increased cure rates by 15% and improvement rates by 14%, yielding a number needed to treat of 7 to achieve 1 additional positive outcome at 7 days.

STUDY SUMMARY

■ Meta-analysis of primary care trials

Young and colleagues¹ aggregated and analyzed individual patient-level data from all known placebo-controlled, randomized, antibiotic treatment trials of adults with clinical symptoms of acute sinusitis that were conducted in primary care settings. They excluded trials that used imaging or bacterial culture as part of patient recruitment.

Studies were included that allowed the use of concomitant medication such as nonsteroidal anti-inflammatory drugs, decongestants, or nasal steroids, as long as patients in both groups had access to the same medications. All trials excluded patients with severe symptoms such as high fever, periorbital swelling or erythema, or intense facial pain, important exclusions that we will discuss below.

They identified 10 such studies and completed an intent-to-treat analysis of the 9 double-blind trials for which patient level data were available. Using individual data from 2547 patients, the odds ratio for an overall antibiotic treatment effect was 1.37 (95% confidence interval, 1.13-1.66), with a number needed to treat (NNT) of 15.

This finding means that 15 patients needed to be given an antibiotic for 1 additional patient to be cured at 8 to 15 days after treatment commenced. Using statistical modeling, they determined that 64% of patients treated with placebo were cured at 14 days compared with 70% given an antibiotic. One patient out of 1381 treated with placebo experienced a serious complication, a brain abscess.

■ Do antibiotics benefit any subgroups?

The investigators also analyzed the prognostic value of specific signs and symptoms to answer the question: Is there any subgroup of patients who might benefit more from antibiotic treatment?

Duration. Patients with a longer duration of symptoms, more severe symptoms, or increased age took longer to cure, but were no more likely to benefit from antibiotic treatment than other patients.

Symptoms, such as a previous common cold, pain on bending, unilateral facial pain, tooth pain, and purulent nasal discharge did not have any prognostic value.

Only one sign—purulent discharge noted in the pharynx on examination—was associated with a higher likelihood of benefit from treatment with antibiotics, but the NNT was still 8 in this group. Patients with symptoms for 7 days or longer were no more likely to respond to antibiotics than those with symptoms for fewer than 7 days.¹

WHAT'S NEW

■ Realistic evidence from realistic settings

We believe this meta-analysis provides a high level of evidence against routine treatment of sinusitis with antibiotics in primary care practice. Treating 15 patients with an antibiotic to possibly benefit 1 patient 2 weeks after treatment commences does not seem like a good idea when one considers the cost and complications of antibiotic use. Diarrhea and other adverse outcomes are 80% more common among patients with sinusitis who are treated with an antibiotic compared with placebo.³ As noted above, prior meta-analyses of antibiotic treatment for acute sinusitis have been more encouraging than this meta-analysis, with a number needed to treat of 7, but those meta-analyses are clearly overly optimistic for the results one will achieve in primary care practice using clinical signs and symptoms

FAST TRACK

The current recommendation to use antibiotics if illness lasts more than 1 week was based on expert opinion, not clinical trials

to diagnose acute sinusitis.^{3,4} Unlike the Young study, they included trials in specialty clinics with CT scans and sinus puncture and culture used for the diagnostic standard.

■ Symptoms >1 week are not a reason to prescribe

One very important new finding in this meta-analysis that should change practice is that the duration of illness did not predict a positive response to antibiotics.

Current national recommendations are to use an antibiotic for patients with a duration of illness longer than 1 week, as these patients are presumably more likely to have a bacterial infection.⁵⁻⁷ However, that recommendation had been based on expert opinion, not on data from clinical trials. A longer duration of symptoms should not be a reason to prescribe an antibiotic for sinusitis symptoms.

■ How can you help your patient?

What to do, then, for patients with acute sinusitis? Treat the symptoms, which means recommending pain medication for facial pain or headache and saline nasal spray for the nasal discharge, not antibiotics or nasal corticosteroids. Side effects will be fewer and costs will be lower.

- **Saline irrigation.** A 2007 Cochrane review of 8 chronic and recurrent sinusitis trials showed that nasal saline irrigation is effective for reducing symptoms of chronic and recurrent sinusitis.⁸ Although we do not have high-quality RCT data on saline nasal irrigation for treatment of acute sinusitis, nasal saline irrigation is harmless and inexpensive.

- **What about nasal steroids?** The evidence is equivocal, and the most recent high-quality RCT of nasal steroids showed no effect.⁹

CAVEATS

■ Refer seriously ill patients and complicated cases

A very important caveat to our recommendation is that seriously ill patients must be managed differently. Very infrequently a patient develops a serious complication of acute sinusitis such as brain abscess, periorbital cellulitis, or meningitis. Therefore, seriously ill patients with signs and symptoms of acute bacterial sinusitis, such as high fever, periorbital erythema or edema, severe headache, or intense facial pain must be carefully evaluated and treated with great caution and close follow-up. These patients should be referred immediately for consultation with an otolaryngologist.

Of course, mildly ill patients today may become quite ill tomorrow, so always provide advice to patients to return if they are getting worse, a good clinical practice for any condition that is usually benign but occasionally serious.

Patients who have prolonged or recurrent sinusitis symptoms need further evaluation for other diagnoses such as allergies, cystic fibrosis, fungal sinus infection, and other illnesses associated with immune compromise. These complicated patients benefit from consultation with an otolaryngologist who has a specific interest in chronic and recurrent sinusitis, and perhaps consultation from an infectious disease specialist as well.

CHALLENGES TO IMPLEMENTATION

■ The patient who wants a pill

Some patients may be accustomed to receiving an antibiotic prescription for their “sinus infections” and may resist conservative management. It may be difficult to convince them that antibiotics won’t make a difference when they attribute past resolution of symptoms to antibiotics.

Take enough time to educate your patients on the natural course of illness, the positive benefits of nasal saline, and the reasons not to use unnecessary antibiotics

FAST TRACK

Saline nasal spray and pain medications lead to fewer side effects and lower cost

(eg, they are not effective, have potential adverse effects, and can contribute to future antibiotic resistance); this effort will save you time in future visits.¹⁰ A “just in case you don’t get better” prescription to be filled only if the patient is not improving in the next few days is about 50% effective in reducing antibiotic usage for upper respiratory infections.¹¹ ■

Acknowledgement

We acknowledge Sofia Medvedev of the University HealthSystem Consortium (UHC) in Oak Brook, IL for analysis of the National Ambulatory Medical Care Survey data.

The PURLs Surveillance System is supported in part by Grant Number UL1RR024999 from the National Center For Research Resources, a Clinical Translational Science Award to the University of Chicago. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center For Research Resources or the National Institutes of Health.

References

1. Young J, De Sutter A, Merenstein D, et al. Antibiotics for adults with clinically diagnosed acute rhinosinusitis: a meta-analysis of individual patient data. *Lancet*. 2008;371:908-914.
2. Sharp HJ, Denman D, Puumala S, Leopold DA. Treatment of acute and chronic rhinosinusitis in the United States, 1999-2002. *Arch Otolaryngol Head Neck Surg*. 2007;133:260-265.
3. Rosenfeld RM, Singer M, Jones S. Systematic review of antimicrobial therapy in patients with acute rhinosinusitis. *Otolaryngol Head Neck Surg*. 2007;137(3 suppl):S32-S45.
4. Williams JW Jr, Aguilar C, Cornell J, et al. Antibiotics for acute maxillary sinusitis. *Cochrane Database Syst Rev*. 2003;(2):CD000243.
5. Hickner JM, Bartlett JG, Besser RE, Gonzales R, Hoffman JR, Sande MA; for the American Academy of Family Physicians; American College of Physicians-American Society of Internal Medicine; Centers for Disease Control; Infectious Diseases Society of America. Principles of appropriate antibiotic use for acute rhinosinusitis in adults: background. *Ann Intern Med*. 2001;134:498-505.
6. Rosenfeld RM, Andes D, Bhattacharyya N, et al. Clinical practice guidelines: adult sinusitis. *Otolaryngol Head Neck Surg*. 2007;137(3 suppl):S1-S31.
7. Anon JB, Jacobs MR, Poole MD, et al; for the Sinus and Allergy Health Partnership. Antimicrobial treatment guidelines for acute bacterial rhinosinusitis. *Otolaryngol Head Neck Surg*. 2004;130(1 suppl):S1-S45.
8. Harvey R, Hannan SA, Badia L, Scadding G. Nasal saline irrigations for the symptoms of chronic rhinosinusitis. *Cochrane Database Syst Rev*. 2007;(3):CD006394.
9. Williamson IG, Rumsby K, Benges S, et al. Antibiotics and topical nasal steroid for treatment of acute maxillary sinusitis: a randomized controlled trial. *JAMA*. 2007;298:2487-2496.
10. Little P, Gould C, Williamson I, Warner G, Gantley M, Kinmonth AL. Reattendance and complications in a randomised trial of prescribing strategies for sore throat: the medicalising effect of prescribing antibiotics. *BMJ*. 1997;315:350-352.
11. Arroll B, Kenealy T, Kerse N. Do delayed prescriptions reduce antibiotic use in respiratory tract infections? A systematic review. *Br J Gen Pract*. 2003;53:871-877.

FAST TRACK

Giving a prescription to be filled only if the patient does not improve is about 50% effective in reducing antibiotic usage

NEW: FAST, EASY LOGIN!

PURLs® INSTANT POLL

What is the likelihood that most of your patients would accept your recommendation not to use an antibiotic to treat sinusitis?

- Extremely likely
- Fairly likely
- Fairly unlikely
- Extremely unlikely

Check out what your colleagues are doing—
Answer the PURLs Instant Poll at www.jfponline.com