

EBEM Commentator

Marcia L. Edmonds, MD, MSc

*From the Division of Emergency Medicine,
University of Alberta, Edmonton, Alberta,
Canada.*

Antibiotic Treatment for Acute Bronchitis

[Edmonds ML. Antibiotic treatment for acute bronchitis. *Ann Emerg Med.* July 2002;40:110-112.]

SYSTEMATIC REVIEW SOURCE

This is a systematic review abstract, a regular feature of the *Annals'* Evidence-Based Emergency Medicine (EBEM) series. Each features an abstract of a systematic review from the Cochrane Database of Systematic Reviews and a commentary by an emergency physician knowledgeable in the subject area.

The source for this systematic review abstract is: Smucny J, Fahey T, Becker L, Glazier R. Antibiotics for acute bronchitis (Cochrane Review). In: *The Cochrane Library*. Issue 1. Oxford, United Kingdom: Update Software; 2002.

The *Annals'* EBEM editors prepared the abstract of this Cochrane systematic review as well as the Evidence-Based Medicine Teaching Points.

OBJECTIVE

To determine if antibiotic therapy is effective in the treatment of patients with acute bronchitis.

DATA SOURCES

Studies were identified by searching MEDLINE, EMBASE, reference lists of articles, the authors' personal collections up to 1996, and SciSearch

from 1989 to 1996. Reviewers wrote to study authors and drug manufacturers. An update search of the Cochrane Controlled Trials Register and MEDLINE was conducted in March 2000.

STUDY SELECTION

Studies were included if they were randomized controlled trials comparing any antibiotic therapy with placebo in acute bronchitis or acute productive cough without other obvious cause for patients without underlying pulmonary disease. Studies lacking a placebo control or enrolling patients with chronic bronchitis were excluded.

DATA EXTRACTION

At least 2 reviewers extracted data and assessed trial quality. Authors were contacted for missing data. Relative risks (RR), weighted mean difference (WMD), and number needed to treat (NNT) with 95% confidence intervals (CIs) were reported.

MAIN RESULTS

Nine trials that involved more than 750 patients aged 8 to 65 years or older and enrolled smokers and nonsmokers were included. Although the methodologic quality of the trials varied, all had clear concealment of allocation. A variety of outcome measures were assessed. Overall, patients receiving antibiotics had better outcomes than did those receiving

placebo. At follow-up, they were less likely to have a cough (RR=0.64 [95% CI 0.49 to 0.85]; NNT=5 [95% CI 3 to 14]), to show no improvement on physician assessment (RR=0.52 [95% CI 0.31 to 0.87]; NNT=14 [95% CI 8 to 50]), or to have abnormal lung findings (RR=0.48 [95% CI 0.26 to 0.89]; NNT=11 [95% CI 6 to 50]) at a follow-up visit. The antibiotic group had a shorter duration of cough (WMD 0.58 days [95% CI 0.01 to 1.16]), productive cough (WMD 0.52 days [95% CI 0.01 to 1.03]), and days feeling ill (WMD 0.58 days [95% CI 0.00 to 1.16]). There were no significant differences regarding night cough, productive cough, or activity limitations at follow-up. In a sensitivity analysis including data from 2 studies of patients with upper respiratory tract infections with productive cough, the benefits of antibiotics were less apparent. Patients treated with antibiotics reported significantly more adverse effects such as nausea, vomiting, headache, skin rash, or vaginitis (RR=1.48 [95% CI 1.02 to 2.14]; number needed to harm=17 [95% CI 9 to 100]).

CONCLUSIONS

Antibiotics appear to have a modest beneficial effect for patients diagnosed with acute bronchitis. The magnitude of this benefit, however, is similar to that of the risk of potential adverse effects. Furthermore, patients with other symptoms of the common cold who have been ill for less than one week are not likely to receive any benefit from antibiotics.

Cochrane Systematic Review Author Contact

John Smucny, MD

Lafayette Family Medicine Residency

2394 Route 11, Lafayette, NY 13084

E-mail smucnyj@vax.cs.hscsyr.edu

COMMENTARY: CLINICAL IMPLICATION

Acute bronchitis is a common clinical problem, with more than 2 million ED visits attributed to this diagnosis in 1996.¹ Despite its frequency, there is controversy over which clinical features suggest the diagnosis of acute bronchitis. Furthermore, there are no confirmatory laboratory investigations for bronchitis.² The majority of cases of acute bronchitis in healthy individuals are presumed to be viral. Recent guidelines recommend withholding antibiotics in patients with a diagnosis of acute bronchitis, although this is an area of continuing controversy.^{3,4} For example, recent studies suggest that physicians prescribe antibiotics for acute bronchitis 42% to 79% of the time.^{1,5} In addition, because mild asthma and bronchitis are hard to differentiate, many patients with asthma may be inappropriately prescribed antibiotics rather than anti-inflammatory agents.

This systematic review searched for the best available evidence regarding the use of antibiotics in the treatment of acute bronchitis. Although the primary analysis demonstrated a small benefit in antibiotic-treated patients in clinical status, this benefit was of questionable clinical importance (0.5 day less symptoms) and offset by an increase in side effects attributed to the medications. The limited number of patients studied, the lack of information on other important outcomes (such as lost time from work or school), and the limited power to detect infrequent complications (such as pneumonia) limit the strength of the conclusions that can be drawn. Moreover, this evidence suggests that a large clinical benefit of antibiotic therapy is unlikely. Given the available informa-

tion and increasing concern about the role of antibiotic overuse by physicians in the rapid rise in bacterial resistance, it appears warranted to limit the use of antibiotics in otherwise healthy patients with symptoms of acute bronchitis.

TAKE HOME MESSAGE

Acute bronchitis is a common emergency department presenting complaint. Antibiotic overuse results in a potential public health problem. Treatment of acute bronchitis with antibiotics appears to have only a modest beneficial effect. However, this benefit is similar to that of the risks of adverse effects. Moreover, patients with symptoms of the common cold who have been ill for less than one week are not likely to receive any benefit from antibiotics. Restrictive antibiotic use in the ED should be encouraged.

EBEM Commentator Contact

Marcia L. Edmonds, MD, MSc

University of Alberta

Division of Emergency Medicine

1G1.63 WMC, 8440-112 Street

Edmonton, Alberta T6G 2B7 Canada

E-mail medmonds@ualberta.ca

EVIDENCE-BASED MEDICINE TEACHING POINTS

Publication bias. It has been shown that studies in which an intervention was not found to be effective (so called "negative" trials) are less likely to be published. Consequently, systematic reviews that only include published literature may overestimate the true effect of an intervention. This is a major reason for the exhaustive attempts by Cochrane reviewers to include unpublished literature in their systematic reviews and has led to recommendations for

registration of all randomized controlled trials. A number of statistical methods can be used to attempt to detect and estimate the effects of publication bias on trial results, although they are relatively weak.

Sensitivity analysis. Sensitivity analyses are used to determine how much the results of a study or systematic review change when changes are made to how the research was performed. In this case, the systematic review authors conducted sensitivity analyses to assess the effects of including only trials in which patients had a short duration of illness and including unpublished trials. Sensitivity analyses are used to assess how robust the results are to assumptions or uncertain decisions about the data or the methods used in performing a trial or systematic review. Sensitivity analyses may also be used to explore the effects of missing data, trial study quality, or the statistical methods used in a systematic review.

REFERENCES

1. Stone S, Gonzales R, Maselli J, et al. Antibiotic prescribing for patients with colds, upper respiratory tract infections, and bronchitis: a national study of hospital-based emergency departments. *Ann Emerg Med.* 2000;36:320-327.
2. Oeffinger KC. Diagnosis of acute bronchitis in adults: a national survey of family physicians. *J Fam Pract.* 1999;45:402-409.
3. Alberta Clinical Practice Guidelines. Guideline for the management of acute bronchitis. Available at: <http://www.albertadoctors.org/resources/cpg/acute-bronchitis-guideline.pdf>. Accessed May 7, 2002.
4. Talan CA, Moran GJ. Why did the chicken cross the road? To get the antibiotics. *Ann Emerg Med.* 2000;36:353-355.
5. Mainour S, Zoorob R, Hueston W. Current management of acute bronchitis in ambulatory care: the use of antibiotics and bronchodilators. *Arch Fam Med.* 1996;5:79-83.