

Clinical Features and Treatment of Acute Bronchitis

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Although several surveys rank acute bronchitis as one of the ten most frequent diagnoses made by primary care physicians, its clinical features are poorly defined and treatment with antibiotics is controversial. This study was designed to determine the clinical characteristics that providers use to diagnose acute bronchitis and to examine the use of antibiotics in treating this illness. Charts of patients with the diagnosis of acute bronchitis or upper respiratory tract infection (URI) were randomly selected and progress notes from these visits were reviewed. Signs, symptoms, laboratory tests, and antibiotics prescribed were recorded. Patients with a diagnosis of acute bronchitis had more productive cough, purulent sputum, and abnormal lung examinations than patients with a diagnosis of URI ($P < .05$ for each characteristic). Laboratory tests, including chest roentgenograms, were not frequently used in making the diagnosis of acute bronchitis. Antibiotics were prescribed for 27 of 29 patients (92 percent) with a diagnosis of acute bronchitis but for only 4 of 19 patients (21 percent) with a diagnosis of URI. Erythromycin was prescribed for 60 percent of patients with acute bronchitis. From this study it can be concluded that providers use the term *acute bronchitis* to designate a specific clinical syndrome that they treat with antibiotics. Further clinical trials are needed to evaluate the efficacy of such antibiotic therapy.

Acute bronchitis is a problem of major public health and medical economic significance. "Acute bronchitis" was the fifth most common illness in the Virginia study of diagnoses in family practice,

conducted from 1973 to 1975.¹ In the more recent National Ambulatory Medical Care Surveys, "acute lower respiratory tract infection" ranked seventh (1957 to 1976) and sixth (1977 to 1978).² By extrapolating the incidence of acute bronchitis from the Virginia data to the United States as a whole, one sees that in 1975 approximately 12 million physician visits were made for acute bronchitis. This results in a cost of \$200 million to \$300 million per year for physician visits and antibiotic prescriptions alone.

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Although acute bronchitis is a common problem, the clinical features of this illness and the indications for antibiotics are inconsistently defined. Taylor's textbook of family medicine defines acute bronchitis as cough productive of white mucoid or mucopurulent sputum lasting one to two weeks.³ A primary care internal medicine text, however, describes acute bronchitis as cough, with or without sputum, persisting for longer than one to two weeks after the onset of an acute upper respiratory tract infection (URI).⁴ These definitions differ both in whether sputum needs to be present and in the duration of symptoms required to make the diagnosis. Given the variability in the definition of acute bronchitis, it is not surprising that recommendations regarding the use of antibiotics in this illness are inconsistent. Most reviews and texts state that acute bronchitis is self-limited and that antibiotics are not indicated.³⁻⁵ Some primary care physicians continue to recommend antibiotics for acute bronchitis, however.⁶

This study examines how physicians define and treat acute bronchitis in adults. First, charts of patients with the diagnosis of either acute bronchitis or URI were retrospectively compared to determine what clinical features were used to differentiate these diagnoses. Second, the antibiotic prescribing habits of providers for these diagnoses were examined.

Methods

The study was conducted at the Chelsea Family Practice Center, which is the clinical site for the University of Michigan Department of Family Practice. Located in a small town in a semirural area, the center serves a population that is predominantly white and mainly from lower and middle socioeconomic backgrounds. Physicians at the center are all full-time family practice faculty (all board-certified family physicians) and family practice residents.

A computer listing of all patients given the diagnosis of either acute bronchitis or URI between September 1, 1982, and January 31, 1983, was obtained. There were approximately 250 patients in each diagnostic category. Fifty patients were randomly sampled from each category by arranging

the charts by registration number and selecting every fifth chart for review. Patients who were aged under 18 years or had complicated illnesses or other indications for antibiotic therapy were then excluded. Excluded patients included those with a history of chronic bronchitis or other chronic lung disease and patients with a secondary diagnosis of another bacterial infection such as otitis media.

After applying these exclusion criteria, 29 patients with acute bronchitis and 19 with URI remained. The following information was recorded from the progress notes in these charts: the presence or absence of several clinical signs and symptoms, laboratory tests ordered, and antibiotics prescribed. Because physicians record progress notes with varying amounts of completeness, the presence or absence of certain signs and symptoms was not always specified. Statistical analysis was performed comparing the presence or absence of symptoms in acute bronchitis and URI using the method of a one-sided Fisher's exact test. The category "not specified" was not included in this analysis.

Results

Table 1 lists the signs and symptoms of patients with acute bronchitis and URI. Sputum production, purulent sputum, and an abnormal lung examination were found more frequently in patients with a diagnosis of acute bronchitis than in patients with a diagnosis of URI. These results were statistically significant at the $P < .05$ level. Patients with either diagnosis frequently had symptoms of a "cold": congestion and runny nose or a sore throat. Fever was not characteristic of either diagnosis.

An examination of the laboratory tests ordered showed that three chest roentgenograms and one sputum culture were ordered for the 29 patients with acute bronchitis. Three throat cultures were ordered for the 19 patients with URI. These roentgenograms and cultures were all negative.

Table 2 lists the antibiotic therapy of patients with a diagnosis of acute bronchitis or a diagnosis of URI. Twenty-seven of 29 patients with acute bronchitis received antibiotics. Erythromycin, the most common antibiotic prescribed, was given to

Table 1. Clinical Characteristics of Patients With a Diagnosis of Acute Bronchitis and Patients With a Diagnosis of Upper Respiratory Tract Infection (URI)

	Acute Bronchitis			URI		
	Present	Absent	Not Specified	Present	Absent	Not Specified
Symptoms	29	0	0	12	2	5
Cough	21	4	4	6	8	5*
Sputum production	18	4	7	4	8	7**
Purulent sputum	13	1	15	9	1	9
Congestion or rhinorrhea	8	0	21	5	2	12
Sore throat	1	0	28	3	0	16
Otagia	9	8	12	4	5	10
Fever						
Signs	3	12	14	1	10	8
Temperature > 100.5°F						
Abnormal lung examination	14	14	1	1	15	3***
Abnormal tympanic membranes	1	15	13	3	13	3
Abnormal pharynx	14	7	8	8	9	2
Rhinorrhea	2	3	24	2	3	14

*P < .05
**P < .01
***P < .005

16 patients. Four of the 19 patients with URI were given an antibiotic.

Discussion

Physicians in this study apparently differentiated acute bronchitis from URI by the presence of cough productive of purulent sputum and abnormal findings on lung examination. These abnormal findings were variable and included localized and diffuse wheezes, rales, and rhonchi, and other descriptive terms. Laboratory tests, including chest roentgenograms, were not frequently used in making the diagnosis of acute bronchitis. This low incidence of use of chest films occurred despite the high incidence of abnormal lung findings (14 of 29 patients) and the easy availability of x-ray equipment at the center. Physicians apparently did not consider abnormal lung findings in the absence of fever, pleurisy, or other signs of pneumonia to be an indication for a chest film. Although not using x-ray equipment may have resulted in the diagnosis of acute bronchitis in some patients who

Table 2. Antibiotic Therapy for Patients With a Diagnosis of Acute Bronchitis and Patients With a Diagnosis of Upper Respiratory Tract Infection (URI)

Treatment	Acute Bronchitis	URI
No antibiotic	2	15
Antibiotic (total)	27	4
Erythromycin	16	2
Penicillin, ampicillin, or amoxicillin	5	1
Tetracycline or doxycycline	5	1
Trimethoprim-sulfamethoxazole	1	0

actually had pneumonia, this practice probably had no clinical significance because most patients with acute bronchitis were treated with an antibiotic.

In addition to the clinical characteristics noted above, other variables may have influenced the

physicians' diagnostic processes. For example, some physicians are more likely to prescribe antibiotics for respiratory tract infections to patients who smoke. One could postulate that to justify this antibiotic therapy, smokers would be more likely to receive the diagnosis of acute bronchitis than URI. Unfortunately, the smoking history of most patients could not be determined from their charts, and it was not possible to measure the influence of this variable.

Providers apparently do consider the diagnosis of acute bronchitis to be an indication for antibiotic therapy. Of 29 patients with this diagnosis, 27 were given an antibiotic. Erythromycin was the most common antibiotic prescribed. This antibiotic choice probably reflects the view that mycoplasma is a significant cause of respiratory tract infections such as acute bronchitis.⁷ There are scant data concerning the actual role of mycoplasma in this illness, however.

There is some evidence to support the use of antibiotics in acute bronchitis. One study has shown increased incidence of oropharyngeal colonization of pathogenic bacteria during episodes of viral URI.⁸ One could postulate that these bacteria subsequently contaminate the large airways and cause acute bronchitis. The strongest evidence of antibiotic treatment comes from a recent double-blind placebo-controlled study of trimethoprim-sulfamethoxazole in patients with acute bronchitis.⁹ This study showed that patients treated with this antibiotic combination had a statistically significant decrease in the presence of night cough and fever and were more likely to have returned to work than patients who were treated with placebo. Based on these data, the authors recommended the use of this antibiotic combination.⁹

There is also evidence against the use of antibiotics in acute bronchitis, however. One line of evidence comes from data that show that 82 percent of sputum cultures from patients with a diagnosis of acute bronchitis grew only normal flora.¹⁰ Another line of evidence comes from two placebo-controlled double-blind clinical trials of doxycycline in patients with acute bronchitis. In both studies all patients recovered, and there was no difference in the speed of resolution of symptoms between those patients treated with an antibiotic and those treated with placebo. The authors therefore concluded that antibiotic therapy was not indicated.^{11,12}

There is an obvious need for further investigations to determine the efficacy of antibiotics in acute bronchitis. The results of such studies could significantly benefit providers by guiding the treatment of this common illness. Before such investigations are undertaken, however, the question "What is acute bronchitis?" should be answered. This study provides a definition of acute bronchitis by identifying the clinical features that providers use to make this diagnosis—productive cough and an abnormal lung examination. The ability to generalize from these results is limited by the relatively small number of charts reviewed (48) and by the limitation of the examination to the practices of only one group of family physicians in one geographic area. In addition, the diagnosis was not correlated with the results of chest roentgenograms, sputum cultures, or the examination of pathologic changes in the bronchi. It will be important to compare these results with data from other practice sites and, if possible, with radiographic, bacteriologic, and pathologic data.

Acknowledgment

Dr. Marie Diener, The Johns Hopkins School of Public Health, provided biostatistical assistance.

References

1. Marsland DW, Wood M, Mayo F: Content of family practice: Part 1. Rank order of diagnoses by frequency. *J Fam Pract* 3:37, 1976
2. Rosenblatt RA, Cherkin DC, Schneeweiss R, et al: The structure and content of family practice: Current status and future trends. *J Fam Pract* 15:681, 1982
3. Taylor RB: *Family Medicine Principles and Practice*. New York, Springer-Verlag, 1978, pp 998-999
4. Koster F: Acute bronchitis. In Barker LR, Burton JR, Zieve PD (eds): *Principles of Ambulatory Medicine*. Baltimore, Williams & Wilkins, 1982, pp 227-228
5. Fekety R: Office treatment of infection: 1. Respiratory infection. *Postgrad Med* 67(2):74, 1980
6. McSherry JA: Why not prescribe antibiotics for "heavy colds"? *J R Coll Gen Pract* 31:49, 1981
7. Cassell GH, Cole BC: Mycoplasma as an agent of human disease. *N Engl J Med* 304:80, 1981
8. Ramirez-Ronda CH, Fuxench-Lopez Z, Nevarez M: Increased pharyngeal bacterial colonization during viral illness. *Arch Intern Med* 141:1599, 1981
9. Franks P, Gleiner JA: The treatment of acute bronchitis with trimethoprim-sulfamethoxazole. Presented at the North American Primary Care Research Group Conference, Banff, Alberta, Canada, April 17, 1983
10. The treatment of respiratory infection in general practice: A multi-centre trial. *Br J Clin Pract* 34(5):136, 1980
11. Stott NC, West RR: Randomised controlled trial of antibiotics in patients with cough and purulent sputum. *Br Med J* 2:556, 1976
12. Williamson HA Jr: A randomized, controlled trial of doxycycline in the treatment of acute bronchitis. Presented at the North American Primary Care Research Group Conference, Banff, Alberta, Canada, April 17, 1983