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ACUTE BRONCHITIS: A REVIEW OF DIAGNOSIS AND EVIDENCE-BASED MANAGEMENT

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Obstetricians and gynecologists are increasingly involved in primary care. Acute bronchitis is among the most common ambulatory complaints. Although the cause of acute bronchitis is predominantly viral, 50–70% of patients presenting with this condition are treated with antibiotics. Because of the increasing bacterial resistance to antibiotics, the cost of prescription drugs, and the potential adverse reactions to them, the present management of acute bronchitis has important shortcomings. Also, inhaled bronchodilators are underused for symptomatic management. Improved awareness among physicians about the recommended management of acute bronchitis has been targeted as an important means of decreasing unnecessary antibiotic use. Patient satisfaction motivates physicians to prescribe antibiotics in managing acute bronchitis. However, patient satisfaction does not necessarily correlate with prescribing of antibiotics but rather with patient education. We present a review of the diagnosis and differential diagnosis of acute bronchitis and its management. (Prim Care Update Ob/Gyns 2002;9:105–109 © 2002 Elsevier Science Inc. All rights reserved.)

The practice of obstetrics and gynecology in the United States is in transition. A key feature of this transition is enhanced emphasis on primary care. Acute bronchitis is a common problem for primary care physicians, representing roughly the ninth most common health problem encountered in ambulatory setting.1,2 In a recent survey, more than 90% of those obstetricians and gynecologists surveyed independently manage upper respiratory tract infections (URIs), and nearly 70% manage acute lower respiratory tract infections without aid of consultation.3 More common and apparently insignificant disorders such as acute bronchitis are often overlooked in physician training; yet management of acute bronchitis has been shown to often be inappropriate, even among internists and family practitioners.4

Acute bronchitis accounts for an estimated 12 to 14 million physician visits per year in the United States.2,5,6 In 1996, upper respiratory tract illness and acute bronchitis precipitated 2.7 million emergency department visits, making them the leading infection-related cause for emergency department visits in the United States.7 Although acute bronchitis is caused by a virus in nearly 95% of patients, 66% of patients with symptoms of acute bronchitis are given prescriptions for antibiotics.6,8 Thus, acute bronchitis is among the most important targets for decreasing inappropriate antibiotic use in ambulatory practice.4 From $200 to $300 million annually is spent needlessly in the United States to treat acute bronchitis, regardless of the risks incurred from increased microbial resistance and potential antibiotic side effects.

Also, effective treatments for cough associated with acute bronchitis are underused, further contributing to its societal costs. Obstetricians and gynecologists should be adept at diagnosing and managing acute bronchitis to practice effective primary care medicine and limit public costs. We review the cause, diagnosis, and evidence-based management of acute bronchitis. In addition, we consider the barriers to evidence-based management of acute bronchitis.

Cause and Pathogenesis

Acute bronchitis was described originally in 1808 as inflammation of the mucous membranes of the bronchi.9 Today, it is still thought of as inflammation of the airways in response to infection. Specifically, mucous membranes of the tracheobronchial tree become hyperemic and edematous, with increased bronchial secretion and impaired mucociliary function.6,8 In addition, airway reactivity and resistance are heightened, not unlike in asthma, manifesting as a cough or signs of bronchial obstruction such as wheezing or dyspnea on exertion that can persist up to 8 weeks.6,8

Unlike the case in asthma, the in-
flammmatory changes of the tracheobronchial tree found in acute bronchitis are transient and resolve with clearance of the infection.

Infectious agents, in most cases, are the same respiratory viruses associated with the common cold, such as rhinovirus and coronavirus, but include more invasive viruses such as adenovirus and influenza virus. Other less common viral causes of acute bronchitis include measles virus, respiratory syncytial virus, parainfluenza virus, and herpes simplex virus. Nonviral causes of acute bronchitis represent less than 10% of cases and include bacteria and inhaled lung irritants. Mycoplasma pneumoniae, Bordetella pertussis, and Chlamydia pneumoniae (Taiwan acute respiratory strain) are the accepted bacterial causes of acute bronchitis. The role of Streptococcus pneumoniae or the Haemophilus influenzae species in acute bronchitis is unclear because these organisms may represent transient indigenous flora of the upper respiratory tract.

Results of spirometric studies done in patients with acute bronchitis mirror the results of studies in patients with mild asthma. In one study, 60% of patients had spirometric studies, such as forced expiratory volume in 1 second (FEV1), peak flow value, and mean forced expiratory flow between 25% and 75% of forced vital capacity (FEF25–75%), in which the values were less than 80% of the predicted values. Patients in whom acute bronchitis is diagnosed are more likely than normal subjects to have the diagnosis of asthma in the future, despite the aforementioned spirometric abnormalities having been shown to be reversed after 5 weeks. This suggests that many patients with acute bronchitis may actually have an irritable airway that reacts to common triggers such as URIs.

**Clinical Presentation and Diagnosis**

Despite being a common ambulatory complaint, acute bronchitis lacks precise diagnostic criteria. Acute bronchitis is a clinical diagnosis, and physicians would have better agreement on treatment if the consensus on diagnosis were better. Even among family physicians, the diagnostic criteria used to identify acute bronchitis vary considerably. Current textbooks and studies of acute bronchitis have varied in their descriptions; yet most physicians think that acute bronchitis is distinguished by the presence of cough with accompanying clinical features of a URI such as rhinorrhea and sore throat. Clinically, a better definition might be acute onset of cough without a history of chronic pulmonary disease or evidence of pneumonia or sinusitis. This definition highlights the first two steps for treatment: 1) identify patients who have chronic pulmonary disease or other coexisting medical illnesses such as congestive heart failure or immunosuppression and 2) appropriately rule out other causes of acute cough, such as pneumonia and sinusitis. After this has been done, the bulk of outpatient presentations of acute cough will be from “uncomplicated acute bronchitis,” which has a nonbacterial cause in more than 90% of cases.

On the basis of pathophysiologic findings in acute bronchitis, symptoms of airway obstruction would be expected. Cough, either dry or productive with a clear to yellow-green sputum; chest tightness; or burning with or without wheezing are all commonly associated with acute bronchitis. As expected for a viral syndrome, characteristic symptoms also include headache, low-grade fever, rhinorrhea, sore throat, malaise, and myalgia. The cough, which often is worse in the morning and disrupts sleep, typically lasts between 7 and 14 days. However, it can persist for more than a month in up to 25% of patients.

Physical examination may show signs of airway constriction such as wheezing or prolongation of the expiratory phase, but this sign is inconsistent. To elicit wheezing, auscultation of patients during forced expiration in a prone position has been recommended. Patients with acute bronchitis would not be expected to have focal changes on auscultation, such as crackles, fremitus, or egophony. Diagnostic studies cannot be recommended routinely because no available test can lead to definitive diagnosis of acute bronchitis. Studies are used mainly to rule out other diseases included in the differential diagnosis. For example, chest radiographs may be useful for patients with suspected pneumonia. A productive cough, either purulent or otherwise, is not predictive of bacterial infection, and microscopic examination or culture of sputum is nearly always unrevealing. Spirometric studies, although potentially abnormal during an episode of acute bronchitis, should be performed only when asthma or chronic obstructive lung disease is suspected and then only after resolution of the acute illness.

**Differential Diagnosis**

The loose definition of “acute bronchitis” as cough in the presence of other respiratory symptoms leaves room for its inappropriate use by clinicians. During the examination, other potential causes of cough must be considered. An important cause of acute and chronic cough is postnasal drip. This is not associated with airway inflammation and can result from viral URIs, acute sinusitis, or allergic rhinitis. Patients with pneumonia can also present with cough associated with fever, wheezing, and malaise. How-
however, these patients usually have focal changes on lung auscultation and radiographs. Clearly, patients with asthma and many of those with chronic obstructive lung disease are predisposed to the development of obstructive airway symptoms in response to common triggers such as URI s. Patients with lung neoplasms and congestive heart failure exacerbations can present with a new cough and dyspnea. Inhalation of toxic or irritating substances such as air pollution, ammonia, chlorine, sulfur dioxide, nitrogen dioxide, or ozone can also lead to airway irritation and cough. Other more chronic causes of cough include cystic fibrosis, gastroesophageal reflux, and medications such as angiotensin-converting enzyme inhibitors. Clearly, the differential diagnosis for acute cough includes many diseases that are not self-limited and some that may be life-threatening. These alternative diagnoses must be considered in all patients and an appropriate evaluation must be performed—particularly in those older than 65 years of age with marked lung impairment or those who have a poor performance status with other co-existing medical conditions.

Management

For the patient who presents with acute onset of cough and no history of chronic pulmonary disease or evidence of other more serious illnesses, studies have consistently shown either no benefit or, at best, modest benefit from the use of antibiotics. This benefit, where evident, has shortened the duration of cough or sputum production by approximately 1 day. For an illness that spontaneously resolves in 10 to 14 days, this cannot be regarded as a substantial benefit. The value of this benefit is further challenged by the cost of antibiotics, the risk of adverse effects, and the negative consequences on antibiotic resistance patterns among bacteria colonizing the individual patient and existing at large.

Some studies have identified subgroups in which antibiotics might have a justifiable benefit. Data are weak, but authors of recent meta-analyses have suggested that patients older than 55 years of age and those without coryza and sore throat may benefit from antibiotic therapy. Least likely to benefit are those whose symptoms have been present for less than 1 week and whose cough is accompanied by URI symptoms.

On the basis of microbiologic findings of acute bronchitis, it is not unexpected that antibiotics would have little benefit. However, antiviral agents are available for treating influenza, and this pathogen is frequently associated with acute bronchitis. These antiviral agents include neuraminidase inhibitors such as oseltamivir and zanamivir, as well as amantadine and rimantadine. The major advantage of neuraminidase inhibitors is their activity against influenza B. However, although patterns change yearly, 99% of reported influenza cases in the 1999–2000 season were from influenza A. Although it would seem that these agents would hold great promise for the treatment of a primarily viral illness, their usefulness in the treatment of acute bronchitis is hindered severely by their weak efficacy against influenza in general. Also, these drugs are relatively expensive and, historically, physicians have been poor at accurately predicting the presence of influenza, even at the height of a seasonal epidemic. These agents have been shown to decrease the duration of influenza symptoms by about 1 day, but only if the treatment is initiated within the first 48 hours of the symptomatic period. However, because of problems with cost, poor efficacy, and difficulties with accurate diagnosis of influenza, these agents cannot be recommended for routine treatment of acute bronchitis.

Patients with acute bronchitis desire treatment of their symptoms and, in particular, relief from coughing. Albuterol has been studied as a treatment for acute bronchitis and has inconsistently demonstrated benefit in decreasing the duration and severity of cough. A meta-analysis of the studies by the Cochrane Collaboration is currently ongoing. Preparations containing dextromethorphan and codeine and humidification of the Airways may slightly improve the cough of acute bronchitis, but there is little supporting evidence for this. Decongestants may also help a cough precipitated by postnasal drip.

Barriers to Evidence-Based Practice

Patients often perceive antibiotics as a panacea and seek an antibiotic prescription at any sign of potential infection. Physicians are generally aware of this and feel obliged to comply with this perceived demand. Failure to comply leads to patient dissatisfaction, and ultimately it may lead a patient to seek care from another provider. Furthermore, to the individual physician, the negative effect of antibiotic overuse is difficult to appreciate. Clinicians do prescribe antibiotics in response to patient expectations. The assumption, however, that patients are more satisfied with an antibiotic prescription is false. Hamm et al. found no association between patient satisfaction and prescriptions for antibiotics among patients seeking care for respiratory infections. Instead, educating patients about the cause of their ailment and spending time with them correlates with patient satisfaction. Gonzales et al. reinforced this finding by comparing antibiotic prescription rates for acute bronchi-

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Acute bronchitis is an important medical problem that is commonly seen in an ambulatory care practice. Despite a predominantly viral cause and numerous randomized controlled studies documenting no meaningful benefit from antibiotics, more than 70% of patients presenting with acute bronchitis are given antibiotic prescriptions. Consequently, penicillin resistance of *Streptococcus pneumoniae* and other bacteria has increased, prompting requests to reduce unnecessary antibiotic use. Diagnosis and management of this problem are flawed, even among providers most involved in ambulatory medicine. Obstetricians and gynecologists are increasingly involved in providing primary care and should be knowledgeable about the evidence regarding the cause and management of acute bronchitis.

The risk of adverse effects is at least as important as the benefit associated with the use of antibiotics. Recent meta-analyses have shown that with antibiotic use, the “number needed to harm” ranges from 14 to 17, whereas the “number needed to treat” ranges from 14 to 18. This means that the use of antibiotics for treating acute bronchitis is almost as likely to result in adverse effects as it is to result in reducing cough. In fact, all three recent meta-analyses on the topic concluded that routine antibiotic treatment for acute bronchitis in adults is not justified.

Conclusions

Acute bronchitis is an important medical condition that is commonly seen in an ambulatory care practice. Despite a predominantly viral cause and numerous randomized controlled studies documenting no meaningful benefit from antibiotics, more than 70% of patients presenting with acute bronchitis are given antibiotic prescriptions. Consequently, penicillin resistance of *S. pneumoniae* and other bacteria has increased, prompting requests to reduce unnecessary antibiotic use. Diagnosis and management of this problem are flawed, even among providers most involved in ambulatory medicine. Obstetricians and gynecologists are increasingly involved in providing primary care and should be knowledgeable about the evidence regarding the cause and management of acute bronchitis.

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