

Guideline for

The Management of Acute Bronchitis

This clinical practice guideline was developed by an Alberta Clinical Practice Guideline Working Group. This guideline does not apply to the following:

- any patient with underlying lung disease
- immunocompromised patients or those with significant underlying systemic disease

DEFINITION

- ◆ Acute bronchitis: acute inflammation of the bronchial tree

ISSUES

- ◆ Acute bronchitis in adults and children (and bronchiolitis in infants) is almost exclusively viral in etiology
- ◆ Meta-analyses have shown no benefit of antibiotics in patients with acute bronchitis
- ◆ The inappropriate use of antibiotics in acute bronchitis has led to increasing antimicrobial resistance
- ◆ Pertussis may mimic acute bronchitis and is under-diagnosed in adults and children

GOALS

- ◆ To avoid the unnecessary use of antibiotics in the treatment of acute bronchitis
- ◆ To avoid the unnecessary use of laboratory and diagnostic imaging services in the management of acute bronchitis

PREVENTION

- ◆ Limit the spread of viral infections (e.g., hand washing)
- ◆ Smoking cessation and avoidance of environmental tobacco smoke

DIAGNOSIS

- ◆ Acute bronchitis is a diagnosis based on acute onset of cough often with:
 - Sputum production
 - Fever
 - Chest discomfort

PRACTICE POINT

Green/yellow sputum production is indicative of inflammatory reaction and does not necessarily imply bacterial infection.^{1,2}

Physical Examination

- ◆ Fever might be present but should not be sustained, i.e., it should last ≤ 3 days
- ◆ Respiratory exam is usually normal but wheezes might be present

PRACTICE POINT

Evidence of consolidation (localized crackles, bronchial breath sounds, dullness on percussion) should alert to possibility of pneumonia

Investigation

- ◆ Routine investigations (i.e., sputum cultures, pulmonary function testing, or serological testing) are not recommended as they do not enhance clinical diagnosis
- ◆ Chest X-rays are indicated only if there is any suspicion of pneumonia based on history or physical exam

MANAGEMENT

- ◆ Antibiotics are **NOT** recommended in the management of acute bronchitis

The above recommendations are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. They should be used as an adjunct to sound clinical decision making.

- ◆ Management is primarily symptomatic. The following might help:
 - Smoking cessation
 - Increased humidity
 - Good hydration
 - Analgesics/antipyretics
 - Antitussives might alleviate cough but will not reduce duration of illness
 - Bronchodilators might offer modest improvement of protracted cough
- ◆ Corticosteroids (inhaled or oral) are **not recommended** as there is insufficient evidence to support their use in acute bronchitis
- ◆ Expectorants are **not routinely recommended** due to limited efficacy

- ◆ Follow-up is not routinely recommended unless:
 - Symptoms worsen or new symptoms develop
 - Cough persists for >1 month
 - Symptoms recur (>3 episodes per year)

BACKGROUND

Introduction

Acute bronchitis is a clinical diagnosis based on history and physical examination. Acute bronchitis continues to be treated with antibiotics, although little evidence supports the effectiveness of antibiotic treatment in this illness.

Epidemiology

Acute bronchitis is one of the most common respiratory infections diagnosed by family physicians.³⁻⁵ It is more common in the winter months when viral respiratory tract infections are most prevalent. This condition affects both adults and children.

The incidence of acute bronchitis may be overestimated as a variety of conditions may cause similar symptoms, most notably, cough. These include viral upper respiratory tract infections, pertussis, sinusitis, allergic syndromes and asthma.

Pathogenesis

Acute bronchitis is characterized by infection of the bronchial tree with resultant bronchial edema and mucus production.⁶ The mechanism for cough is not clearly understood. For more virulent viruses such as influenza and adenovirus, cough may result from the destruction of the lower respiratory epithelium which may be extensive. For less virulent viruses such as the common cold viruses, it is postulated that activation of inflammatory mediators and altered bronchial mucociliary function play a more important role.

The severity of symptoms appears to be increased by exposure to tobacco smoke and air pollutants.

Differential Diagnosis

- Pneumonia
- Asthma*
- Acute exacerbation of chronic bronchitis*
- Pertussis (Whooping cough)
- Post nasal drip
- Reflux*
- Aspiration of foreign body

FOLLOW-UP

PRACTICE POINT

- ◆ Following viral infection, prolonged cough **alone** does not merit antibiotic therapy:
 - 45% of patients cough after 2 weeks
 - 25% of patients cough after 3 weeks
- ◆ Pertussis causes persistent cough and vomiting

Unlike the chronic inflammatory changes of asthma, the inflammation of acute bronchitis is transient and resolves spontaneously. Cough, however, may persist for a prolonged period.⁷ One study of the common cold indicated that 45% of patients still have cough 2 weeks after onset of symptoms and 25% are still coughing after 3 weeks.⁸ Due to the extensive respiratory epithelium damage of some viruses, it is not unusual for cough to persist for more than 3 weeks.

Using spirometric testing, it has been shown that the symptoms of acute bronchitis are very similar to those of mild asthma.⁹ In one study, forced expiratory volume in one second (FEV₁), and peak flow values declined to less than 80% of the predicted values in almost 60% of patients during episodes of acute bronchitis.⁹ In the 5 weeks following infection, these values returned to normal. In another study, patients with acute bronchitis were 6.5 times more likely to have been told they had asthma in the past and 9 times more likely to be diagnosed with asthma in the future.¹⁰ The findings of these studies suggest that patients with acute bronchitis may have an underlying predisposition to bronchial reactivity in times of viral infection. This reactivity may evolve into the more chronic bronchial inflammation that characterizes asthma.

Etiology

Viruses are the most common cause of acute bronchitis in otherwise healthy adults and children. Common cold viruses such as rhinoviruses and coronaviruses are frequent etiologic agents of acute bronchitis. More invasive viruses such as Adenovirus, Respiratory Syncytial Virus, influenza and parainfluenza viruses also cause this condition.

Bacterial pathogens are thought to play a very minimal role in acute bronchitis. Although both *Streptococcus pneumoniae* and *Haemophilus influenzae* are occasionally recovered on microbiologic cultures, this finding is thought to represent colonization rather than true infection.¹¹ In one study, serologic evidence of pneumococcal infection could be found in only 6% of patients with a clinical diagnosis of acute bronchitis.¹²

Both *Mycoplasma pneumoniae* and *Chlamydophila pneumoniae* have been implicated as etiologic agents in acute bronchitis. Both organisms are associated with a wide spectrum of respiratory symptoms ranging from mild cough to severe pneumonia. Both organisms tend to cause self-limiting disease. The role of antibiotics for these organisms has not been established in the setting of acute bronchitis.

Bordetella pertussis may be associated with signs and symptoms of acute bronchitis and should be considered in both adults and children with prolonged/paroxysmal cough.

Diagnosis

Clinical Presentation

Acute bronchitis implies an acute infection of the tracheobronchial tree.¹¹ Its hallmark is a cough that is often productive. Cough occurs in approximately 50% of viral respiratory infections in both adults and children.² Patients with acute bronchitis usually have a viral respiratory tract infection with transient inflammatory changes and symptoms of airway obstruction. The cough of acute bronchitis produces initially mucoid followed by purulent sputum. Cough often becomes more prominent as the illness progresses. While this cough generally lasts 7 to 10 days, it can persist.

Physical Examination

While physical examination is usually normal, wheezing might be present in some patients.

Diagnostic Studies

Microbiological studies to determine the etiology of acute bronchitis are of no value. Since acute bronchitis is essentially viral in nature, microscopic examination or culture of sputum in otherwise healthy adults or children with acute bronchitis is not recommended.^{11,13} As the role of *Mycoplasma pneumoniae* and *Chlamydophila pneumoniae* has not been established, investigations for these organisms are not routinely recommended.¹¹

No diagnostic test is currently available to make a diagnosis of acute bronchitis. While decreased pulmonary function has been demonstrated in patients with acute bronchitis, pulmonary function testing is not routinely recommended.

When underlying asthma is suspected, pulmonary function testing should be considered. Since acute bronchitis causes transient pulmonary function abnormalities, a diagnosis of asthma can only be made if abnormalities persist after the acute phase of the illness.

If pneumonia is suspected, chest radiographs and pulse oximetry may be helpful in making the diagnosis.

Differential Diagnosis

The most important condition to rule out before diagnosing acute bronchitis is pneumonia. Acute bronchitis or pneumonia can present with fever, constitutional symptoms and a productive cough. While patients with pneumonia often have crackles, this finding is neither sensitive nor specific for this illness.

Upper respiratory tract infections (URTI) and sinusitis can also be confused with acute bronchitis. All of these illnesses may be associated with a productive cough. The presence of upper respiratory tract symptoms does not exclude the possibility of also having acute bronchitis, because there are several pathogens that can simultaneously affect different parts of the respiratory tract. Abnormal lung sounds (except stridor) can localize a process below the carina. However, a normal lung exam does not necessarily rule out acute bronchitis.

Asthma or bronchospasm due to environmental and occupational exposures can mimic the productive cough of acute bronchitis. When obstructive symptoms are not obvious, mild asthma may be diagnosed as acute bronchitis. Since respiratory tract infections can trigger bronchospasm in asthma, patients with asthma that occurs only in the presence of respiratory tract infections resemble patients with acute bronchitis.

In children, a prolonged cough, usually following a viral upper respiratory tract infection is often diagnosed

as bronchitis. However, these children have reactive airway disease or asthma. These episodes may be repetitive (several times a year) with the cough lasting longer than one month, and occur most commonly in the spring and fall. There may be a family history of atopic disease and many children will have coughing that may be worse at night and with exercise. Intermittent cough associated with vomiting may indicate pertussis.

The differential diagnosis should also include other non-infectious causes of cough and shortness of breath. In older patients, congestive heart failure may cause cough, shortness of breath or wheezing. Symptoms are often worse at night. Reflux esophagitis with chronic aspiration can cause bronchial inflammation with cough and wheezing.¹⁴ Finally, bronchogenic tumors may produce a cough and obstructive symptoms.⁵

Treatment

Antibiotic therapy for acute bronchitis is common despite the fact that studies have shown no benefit. It is estimated that physicians who diagnose acute bronchitis prescribe antibiotic therapy 50 to 79% of the time.¹⁵⁻¹⁷ In a study of 1,398 outpatient visits of children <14 years old, with a chief complaint of cough, bronchitis was diagnosed in 33% of cases and 88% of these were prescribed an antibiotic.¹⁸

Eight double-blind, randomized, placebo controlled antibiotic trials for acute bronchitis among patients >8 years old have been published.^{19,20}

A meta-analysis that included 6 of these studies concluded that there is no evidence to support the use of antibiotics for acute bronchitis.¹⁹ Four trials that evaluated erythromycin, doxycycline, or TMP/SMX demonstrated minimal improvement in symptoms and/or time lost from work in the antibiotic treated group.²¹⁻²⁴ The other 4 trials showed no difference in outcomes between placebo recipients and those treated with erythromycin or doxycycline.^{7,13,25,26}

Several paediatric studies have evaluated the use of antibiotics for cough.²⁷⁻³⁰ None of these showed

any benefit of antibiotic use. Antibiotics do not prevent secondary bacterial infections of the lower respiratory tract. A meta-analysis of 9 trials that evaluated antibiotic treatment for preventing bacterial infections of viral respiratory illnesses concluded that antibiotics did not prevent or decrease the severity of bacterial infection.³¹

The pulmonary function findings in mild asthma and acute bronchitis are similar. Thus, it has been hypothesized that bronchodilating agents may offer symptomatic relief to patients with bronchitis. There is evidence that bronchodilators are a useful modality for acute bronchitis, and that cough associated with acute bronchitis is more likely to subside within 7 days when treated with a bronchodilator rather than antibiotics.³¹⁻³³ In a study by Hueston³³ the effectiveness of aerosolized salbutamol for the treatment of acute bronchitis was studied in patients treated with erythromycin or placebo. After a 7-day period, follow-up indicated that patients treated with salbutamol were less likely to be coughing than were patients receiving placebo. When the analysis was stratified by the use of erythromycin, the differences between salbutamol patients and controls persisted.

Cough suppressants are often used in the management of acute bronchitis. While they may provide symptomatic relief, cough suppressants do not shorten the course of illness. A recent review of randomized, double-blind, placebo controlled studies found support for symptomatic use of codeine, dextromethorphan and diphenhydramine in the management of bronchitis.³⁴ A double-blind trial of 108 outpatients compared the efficacy of a combination of oral dextromethorphan-salbutamol with dextromethorphan.³⁵ The authors found no statistically significant differences between the 2 groups in terms of cough severity during the day, sputum quantity or ease of expectoration.

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TOWARD OPTIMIZED PRACTICE (TOP)

PROGRAM

The successor to the Alberta Clinical Practice Guideline (CPG) program, TOP is an initiative directed jointly by the Alberta Medical Association, Alberta Health and Wellness, the College of Physicians and Surgeons, and Alberta's Health Regions. The TOP Program promotes appropriate, effective and quality medical care in Alberta by supporting the use of evidence-based medicine.

TOP Leadership Committee

Alberta Health and Wellness
 Alberta Medical Association
 Regional Health Authorities
 College of Physicians and Surgeons of Alberta

TO Provide Feedback

The Alberta CPG Working Group for Antibiotics is a multi-disciplinary team composed of family physicians, infectious diseases specialists, internal medicine, pediatricians, microbiologist, hospital and community pharmacists, epidemiologist, consumers, and Alberta Health and Wellness representative. The team encourages your feedback. If you have difficulty applying this guideline, if you find the recommendations problematic, or if you need more information on this guideline, please contact:

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