

ACUTE BRONCHITIS

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Week 18

Educational Objectives:

1. Define acute bronchitis and distinguish it from pneumonia and chronic bronchitis
2. Discuss the natural history of acute bronchitis and recognize symptoms suggestive of *B. pertussis* infection
3. Recognize when diagnostic testing is warranted
4. Understand treatment options and their limitations, including the role of adult vaccination against pertussis

CASE ONE:

Your first patient in clinic today is a 35-year-old man with no significant past medical history, who now presents to you complaining of a six-day history of cough. He reports that initially his cough was nonproductive, but now he is coughing up thick yellowish-green sputum. He tells you that his 60-year-old mother was recently diagnosed with “chronic bronchitis” and remembers that her doctor advised her to let him know right away if her sputum turned green because she might need antibiotics. Because he is now suffering from green sputum and cough, he wonders if he needs antibiotics as well.

Questions:

1. **How is acute bronchitis different from chronic bronchitis? What is the relevance of purulent sputum in cases of acute bronchitis? Does it suggest the presence of a bacterial infection?**

Acute bronchitis refers to the clinical condition of acute, self-limited inflammation of the large airways of the lung, typically characterized by a productive cough. Although pulmonary function testing may be abnormal in patients with acute bronchitis (typically manifested by a reduced FEV1 or bronchial hyperreactivity), these abnormalities are expected to be fully reversible over time. In contrast, chronic bronchitis is defined by a chronic productive cough for three months in each of two successive years in a patient in whom other causes of chronic cough have been excluded. Chronic bronchitis is a form of chronic obstructive pulmonary disease (COPD), and the airflow obstruction seen in that condition is not fully reversible.

It has been estimated that approximately 50% of patients with acute bronchitis present with purulent sputum. Although the development of purulent sputum (typically described as thick green or yellow and similar in appearance to pus) in a patient suffering from chronic obstructive pulmonary disease may indicate the presence of a bacterial

superinfection, this is not typically the case with acute bronchitis. In an otherwise healthy host with acute bronchitis, purulent sputum is usually due to the presence of sloughed tracheobronchial epithelium and inflammatory cells and does not indicate the presence of a bacterial infection – regardless of color.

CASE ONE CONTINUED:

During your interview he reports feeling “lousy,” but denies fevers, chills, or frank shortness of breath. He doesn’t remember any sick contacts and denies any recent travel. He is on no other medications.

On exam, he appears to be breathing comfortably. His pulse is 72 and regular, his blood pressure is 124/80, his respiratory rate is 14, and he is afebrile. You note some mild nasal congestion but no sinus tenderness, and his oropharynx is clear. Despite his prominent cough during your exam, he has good air movement bilaterally, and you do not appreciate egophony, wheezes or rales. His exam is otherwise unremarkable.

2. What diagnostic work-up is indicated? Specifically, does he need a chest x-ray or sputum cultures?

Studies have shown that patients with cough, but normal vital signs, and the absence of rales or egophony on exam, are very unlikely to have a diagnosis of pneumonia. In this circumstance, additional diagnostic testing, such as sputum cultures or a chest x-ray, is usually not required. One notable exception, however, is cough in an elderly patient. In patients over the age of 75, community-acquired pneumonia often presents with atypical symptoms and the absence of fever or tachycardia in this age group is far less specific. The threshold for additional diagnostic testing should be lower in this cohort of patients.

Similarly, sputum cultures are rarely necessary with acute bronchitis because bacterial pathogens only rarely play a clinically significant role in this diagnosis (with one notable exception to be discussed below). Viruses are usually the causative agents responsible for acute bronchitis, most commonly influenza A and B, parainfluenza, coronavirus (types 1-3), rhinovirus, respiratory syncytial virus, and human metapneumovirus. With the exception of influenza, there is no effective treatment for the viruses that cause acute bronchitis, and it is usually not clinically relevant to isolate the viral species. During flu season, a patient who presents with cough associated with fever, headaches, prominent myalgias, or other stigmata of influenza should be evaluated and treated accordingly.

CASE ONE CONTINUED:

He recalls being seen by another practice for similar symptoms in the past and being given antibiotics at that time. He wonders if he needs them again.

3. Are antibiotics indicated? What other treatments are available?

As noted above, bacterial pathogens only rarely are causative agents in acute bronchitis, and multiple studies have shown that there is no role for antibiotics in the vast majority of cases. Although commonly requested by patients, in general, they should not be prescribed for this purpose.

There are many other commonly prescribed medications used to treat acute bronchitis, and as with antibiotics, there are little data to support the use of most of them. Beta-2-agonists may be effective in a subset of patients with airflow obstruction, but has been shown to be otherwise ineffective in a recent Cochrane Review. (Smucny, 2004) Similarly, a brief trial (seven days) of inhaled corticosteroids is often prescribed when a patient presents with a prolonged (20 or more days) history of cough, but there are no data to support this practice. Likewise, there are no clinical trials available to support the use of mucolytic agents.

Although it will not alter the natural history of the illness, symptom control can best be achieved through the judicious use of rest, acetaminophen or nonsteroidal anti-inflammatory medications, anti-tussive agents, and tincture of time.

4. BONUS ACTIVITY (OPTIONAL): Patients may sometimes request or demand medical treatment such as antibiotics for acute bronchitis when the data do not support its use. Although a potential source of conflict, this may also represent an excellent opportunity for patient education and counseling on the risks of inappropriate antibiotic use (including side effects, C. diff infection, allergic reactions, etc.). Time permitting – use this as an opportunity to engage in role play with the rest of the team. How would you handle a patient who demands antibiotics when you do not believe they are indicated?

CASE TWO:

Your next patient presents with somewhat similar symptoms, but with a far more prolonged and bothersome cough. This patient is in her 40s and otherwise healthy. She works as a unit secretary in a pediatric unit in your hospital. She initially thought she had a cold with prominent nasal congestion, sneezing, and malaise but tells you that after about a week of symptoms, she developed a cough that seemed to get worse as her other symptoms improved. She has now been ill for at least three weeks and reports that her cough occurs in prolonged fits that often culminate in an episode of post-tussive vomiting. Her lung exam is unremarkable but during her exam, she suffers through an episode of a “staccato-like” cough. Thankfully, she does not vomit while you are examining her.

5. Does this patient require antibiotics?

Cough after acute bronchitis typically persists for 10-20 days but may sometimes last for a month or more and, as stated previously, would not require antibiotics unless there was objective evidence of pneumonia or another treatable bacterial infection. Cough duration should not independently determine whether antibiotics are appropriate – but very prolonged cough may indicate the presence of an alternate diagnosis, such as chronic bronchitis which was defined in question 1 above.

*However, this patient has a history suggestive of *Bordetella pertussis*. Although pertussis is usually associated with a very characteristic inspiratory “whoop” in young children (hence the name “whooping cough”), this feature is often absent in adults who typically present with a prolonged history of paroxysmal cough (the so-called paroxysmal stage) and post-tussive emesis following what was presumed to be a viral upper respiratory infection (the catarrhal stage). This is a highly contagious disease that was classically thought to be an infection of childhood, but has been increasingly recognized in adults as their immunity from childhood vaccination wanes.*

*Macrolide antibiotics are empirically indicated in cases where there is a high clinical suspicion for pertussis because diagnostic testing is not always commercially available and results of culture, serology, or PCR testing may be delayed – although most guidelines still recommend testing when available. When started within the first week of symptoms, antibiotics may help to reduce the severity of illness. However, catarrhal stage symptoms can be virtually indistinguishable from the common cold so there are few clues in this stage to suggest the need for antibiotics other than a high index of suspicion. For this reason, if symptoms persist beyond three to four weeks and the provider remains suspicious for *B. pertussis*, empiric use of antibiotics should be strongly considered to help limit infectivity. In healthcare workers and those likely to be in contact with high risk persons (such as infants and pregnant women), antibiotics should be considered even six to eight weeks into the course of infection.*

6. Who should receive the adult acellular pertussis vaccine?

The Advisory Committee on Immunization Practices (ACIP) recommends a single booster dose of Tdap (ADACEL) for all adults aged 19 to 64 years. If an adult in that age group has not yet received the Tdap vaccine but has recently received the Td vaccine, the minimum interval since the last Td should be two years before the Tdap vaccine is given, but the clinician need not wait until the next Td would have been due (even shorter intervals may be appropriate during outbreaks and in high risk situations). The vaccine is not approved for use in pregnancy (Class C). Unlike the childhood DTaP vaccine, the formulation in adults contains lower quantities of diphtheria and pertussis toxoids, leading to fewer injection reactions and adverse events while still remaining highly immunogenic in adults, with a vaccine efficacy estimated at around 92%. Subsequent Td vaccines should be in 10-year intervals throughout adulthood. The ACIP does not recommend the use of a pertussis vaccine after age 64, and instead the Td vaccine should continue to be administered in 10-year intervals.

Primary References:

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