

Chronic Bronchitis — Symptoms and Treatment

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Chronic bronchitis is characterized by expectoration for a period of more than three months, in more than two consecutive years. Chronic irritation caused by smoking promotes hyperplasia of mucous glands and increases the production of mucus. Central and peripheral airways are involved in the pathophysiology of the disease and it includes inflammation, oxidative stress, inhibited repair processes, and an imbalance of proteinases/anti- proteinases. This article will prepare you perfectly well for your next exam!



Definition and Background of Chronic Bronchitis

Chronic bronchitis is defined as a **chronic productive cough** that lasts for at least **three months**, for **two consecutive years** in a patient in whom other causes of chronic cough have been excluded, such as bronchiectasis. Airflow limitation may precede the development of chronic bronchitis.

Chronic bronchitis is considered one of the top conditions for which patients seek medical attention. The main characteristic of the condition is an **inflammation of the bronchial tubes** or bronchi, and the air passage extending from the trachea into the small airways and alveoli.

Pathophysiology of Chronic Bronchitis

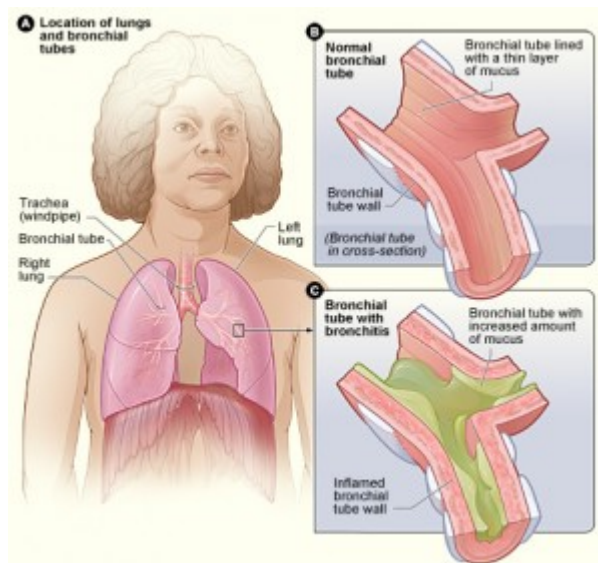


Figure A shows the location of the lungs and bronchial tubes in the body. Figure B is an enlarged, detailed view of a normal bronchial tube. Figure C is an enlarged, detailed view of a bronchial tube with bronchitis. The tube is inflamed and contains more mucus than usual.

An episode of acute bronchitis is characterized by **irritation of the cells of the bronchial-lining tissue**, in addition to **hyperemia and edema** in the mucous membrane, which results in **decreased bronchial mucociliary function**, leading to **clogged airways** by debris and increases in the irritation. The characteristic cough of bronchitis is developed due to the development of copious secretion of mucus.

The attachment of the organism (*Mycoplasma pneumoniae*) to the respiratory mucosa results in **bronchial irritation**, leading to **sloughing of the affected cells**. Bronchopneumonia may develop if the inflammation extends downward to the bronchioles.

Epidemiology of Chronic Bronchitis

Approximately **8.7 million cases in the United States** were diagnosed with chronic bronchitis during the year 2014, which is around **3.6 % of the population**.

The term bronchitis is commonly used to describe a self-limited nonspecific cough, which results in overdiagnosis of the condition, hence increasing its incidence even though many patients do not actually have bronchitis.

Acute bronchitis is usually diagnosed among children younger than **5 years of age**; however, chronic bronchitis is more common among patients **above the age of 50**. The incidence appears to be **higher in males** than in females, and it usually affects people with **low socioeconomic status**.

Presentation of Chronic Bronchitis

Symptoms of chronic bronchitis

A **complete thorough history** of information regarding **smoking** and exposure to **toxic substances** is important. Patients presenting with bronchitis are usually **overweight** and **cyanotic**. The most important symptom in chronic bronchitis patients is a **cough**.

Other symptoms may include:

- Sore throat
- Headache
- Extreme fatigue
- Muscle aches
- Runny nose
- **Dyspnea** and cyanosis may be observed
- Fever, nausea, vomiting, and **diarrhea** are rare in cases of chronic bronchitis

Signs of chronic bronchitis

Findings on physical examination may include:

- Pharyngeal erythema
- Localized lymphadenopathy
- Rhinorrhea
- Coarse rhonchi
- **Wheezes**
- Use of accessory muscles
- Inspiratory stridor
- Heave along the left sternal border
- Clubbing or peripheral cyanosis may be observed in cases of cystic fibrosis

Causes of Chronic Bronchitis

Smoking and irritants

The most predominant cause for the development of chronic bronchitis is **cigarette smoking**. Other causes include **exposure to irritants**, such as **chemicals**, and **pollution**.

Viral and bacterial infections in acute bronchitis

The most common viruses that may cause acute bronchitis include:

- Influenza A and B
- Parainfluenza
- Respiratory syncytial virus
- Coronavirus

Bacterial infections that may result in the development of acute bronchitis may include:

- Mycoplasma species
- Chlamydia pneumoniae
- Streptococcus pneumoniae
- Moraxella catarrhalis

- Haemophilus influenzae

Differential Diagnosis of Chronic Bronchitis

Other medical conditions to consider include the following:

- Bacterial tracheitis
- [Cough](#)
- Exercise-induced [asthma](#)
- Influenza
- [Cystic fibrosis](#)
- Tonsillitis
- Retained foreign body
- Hyperreactive airway disease
- Acute sinusitis
- Occupational exposures
- [Alpha1-Antitrypsin deficiency](#)
- [Asthma](#)
- Bacterial pharyngitis
- Bronchiolitis
- Bronchiectasis
- [Bronchitis](#)
- Chronic sinusitis
- [Chronic Obstructive Pulmonary Disease \(COPD\)](#)
- Group A streptococcal infections
- Influenza
- [Gastroesophageal reflux disease](#)
- Viral pharyngitis

Diagnosis of Chronic Bronchitis

Patients with **acute respiratory infection** suffering from a **cough** are suspected to have bronchitis; however, bronchitis is considered a **diagnosis of exclusion** because there are many other serious respiratory diseases that may cause a similar picture.

Chronic Obstructive Asthma: Atopic asthma since childhood plus heavy smokers in their 20s-30s could present with a combination of COPD+ Asthma which needs to be distinguished for the purposes of clinical management.

Chronic bronchitis: These patients fulfill the definition of 3 months of a productive cough over successive 2-year span with normal PFTs not considered to be COPD.

Blood and microbiology tests in chronic bronchitis

- **Complete blood count** with a **differential** is obtained.
- Bacterial infections can be distinguished from non-bacterial infections using **procalcitonin levels**, which helps guide therapy and reduce the use of antibiotics.
- It may be useful to do **influenza tests**. However, serologic tests for atypical pneumonia are not suggested.
- If a cough is persistent, it might be helpful to use **sputum cytology**.

Imaging studies in chronic bronchitis

Patients with physical findings suggestive of [pneumonia](#) should have **chest radiographs**. However, elderly patients may not have any signs of pneumonia, but still, they need chest radiographs to rule out pneumonia.



[Image](#): "Pneumonia in chest X-ray" by Hellerhoff.
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[Image](#): "Normal Epiglottis" by Med Chaos. License: [CC BY-SA 3.0](#)

Bronchoscopy is used to rule out many conditions such as **tuberculosis, tumors, foreign body aspiration**, and other chronic diseases of the lungs and the tracheobronchial tree.

Epiglottitis can be excluded using **laryngoscopy**.

Cultures

Cultures are obtained for **Mycoplasma pneumoniae, Bordetella pertussis**, and **influenza virus**. In cases of bacterial super-infection, it might be helpful to use **blood cultures**.

Others

- Characteristic findings found in the small airways in chronic obstructive pulmonary disease (COPD) include **mucosal and submucosal inflammatory cells, edema, increased smooth muscle, intra-luminal mucous plugs, peribronchial fibrosis, and goblet cell hyperplasia.**
- Patients suffering from bronchitis usually have **significant bronchospasm** with a large **reduction in forced expiratory volume in one second (FEV₁).** **Spirometry** may be useful in these patients.

Management of Chronic Bronchitis

Management of bronchitis focuses on the **elimination of the symptoms.** A combination of drugs may be prescribed to open obstructed bronchial airways and thin obstructive mucus making it easily coughed. **Bed rest** is recommended for these patients and **adequate oxygenation** should be ensured.

It is important to **avoid cigarette smoking** and other **environmental irritants** to control cough and sputum production in patients with chronic bronchitis.

Symptomatic treatment of chronic bronchitis

- It is recommendable to use **central cough suppressants** such as codeine for short-term symptomatic relief in patients suffering from acute or chronic bronchitis.
- Symptoms such as dyspnea, bronchospasm, and chronic cough may be controlled with **beta-agonists** such as **theophylline** and **ipratropium bromide.**
- Patients suffering from underlying lung diseases that present with a cough and a wheeze may benefit from **beta2-agonist bronchodilators.**
- Pain and other constitutional symptoms of acute bronchitis may be treated using **non-steroidal anti-inflammatory drugs (NSAIDS).**
- **Mucolytics** may be used to reduce acute exacerbations.

Antibiotic therapy of chronic bronchitis

The use of antibiotics is recommended in patients suffering from **acute exacerbations.** However, it is not recommended if there is no risk of serious complications. Elderly patients with acute cough and a history of hospitalization in the past year, and also have congestive heart failure or diabetes mellitus, or are receiving steroids may need antibiotic therapy.

Influenza vaccination

The **risk of upper respiratory tract infections is reduced** with the use of influenza vaccine, which results in a reduction of the incidence of acute bacterial bronchitis.

Zinc

Most studies have shown that the use of zinc is **beneficial against influenza A.**

Long-term monitoring in chronic bronchitis

- If symptoms worsen, such as **high fever, shortness of breath, persistent cough,** and **vomiting;** then an alternative diagnosis should be considered.
- **Further investigations** are recommended in cases of **symptoms recurrence** (more than 3 episodes a year).

Review Questions

The answers are below the references.

1. A 66-year-old male patient, who was a smoker, died of chronic bronchitis. His medical history is not significant for other medical problems or conditions. Which of the following is the least to be observed in the autopsy of his lungs?

- A. Granulomatous inflammation
- B. Mucous gland enlargement
- C. Patchy squamous metaplasia
- D. Thickened bronchial walls
- E. Neutrophil infiltration

2. A 44-year-old male patient presented to your office complaining of chronic productive cough for the past few years. He is a smoker for the past 25 years and he smokes one pack per day. An enlarged heart was revealed through a chest x-ray. The pulmonary function tests seen in this patient would be similar to those seen in a patient suffering from:

- A. Prior lung radiation
- B. Emphysema
- C. Asymptomatic asthma
- D. Silicosis
- E. Coal worker's pneumonitis

3. A 72-year-old male patient visits the office of his pulmonologist for a checkup. He has had a history of chronic obstructive pulmonary disease (COPD) for the past 10 years. Physical examination revealed digital clubbing and cyanosis. Bilateral lung wheezes were revealed by auscultation. He is suffering from a productive cough which has thick yellow sputum. Which one of the following findings is most likely found in this man?

- A. Increased arterial blood pH
- B. Increased compliance of the right ventricle
- C. Decreased arterial carbon dioxide content
- D. Increased arterial resistance in the lungs
- E. Increased cerebral vascular resistance

References

Carlo Raj. [Obstructive Lung Disease: Chronic Bronchitis](#). Lecturio. Accessed March 14, 2016.

Jazeela Fayyaz. [Bronchitis](#). Medscape. Accessed March 14, 2016.

[Chronic Bronchitis](#). WebMD. Updated September 9, 2014. Accessed March 14, 2016.

[Chronic Obstructive Pulmonary Disease \(COPD\) Includes: Chronic Bronchitis and Emphysema](#). Centers for Disease Control and Prevention. Accessed March 15, 2016.

Correct answers: 1A, 2B, 3D

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Notes