

Difference Between Atelectasis and Pneumothorax

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Key Difference – Atelectasis vs Pneumothorax

Atelectasis and pneumothorax are two pulmonary disorders that can have fatal consequences if not treated appropriately. **Pneumothorax is the presence of air inside the pleural cavity whereas atelectasis is the complete or partial collapse of a lung or lobe of a lung.** Although there are few major differences between these two diseases, the key difference between atelectasis and pneumothorax is the presence or absence of air in the pleural cavity (unless the cause of atelectasis is pneumothorax.)

What is Atelectasis?

A complete or partial collapse of a lung or lobe of a lung is defined as atelectasis. Our lungs have millions of air filled sacs called **alveoli** through which the exchange of gases happens. The deflation of these air filled spaces leads to the collapse of the pulmonary tissues throughout the affected region.

Clinically, two main types of atelectasis have been observed.

Obstructive Atelectasis

When there is an obstruction in the airway, alveoli do not receive the supply of air that is required to keep them inflated. Consequently, a negative intra alveolar pressure is developed. The imbalance in the pressure inside and outside the alveoli compresses the air sacs, resulting in the collapse of lung tissues. The rate at which atelectasis develops depends on main three factors,

- The part of the airway that is occluded
- Presence of collateral air supply between the affected and non-affected segments
- Nature of the obstruction

Causes

- Mucous plugs
- Foreign bodies
- Tumors

Pathophysiology

As discussed previously, air which is entrapped in the part distal to the point of obstruction, is completely absorbed by the blood running through the pulmonary **capillaries**. Eventually, a negative air pressure develops inside the alveoli. The negative pressure inside the alveoli draws the fluid out of the capillaries, resulting in their accumulation inside the air sacs. This predisposes the development of infections.

The collapsed pulmonary tissues compress the adjacent blood vessels, increasing the vascular resistance to blood flow. This condition is further deteriorated by the **vasoconstriction** that is stimulated by **hypoxia**. The increase in the resistance to blood flow shunts blood away from the affected regions of the lung. Therefore the oxygen saturation of the aortic blood is only sparingly affected.

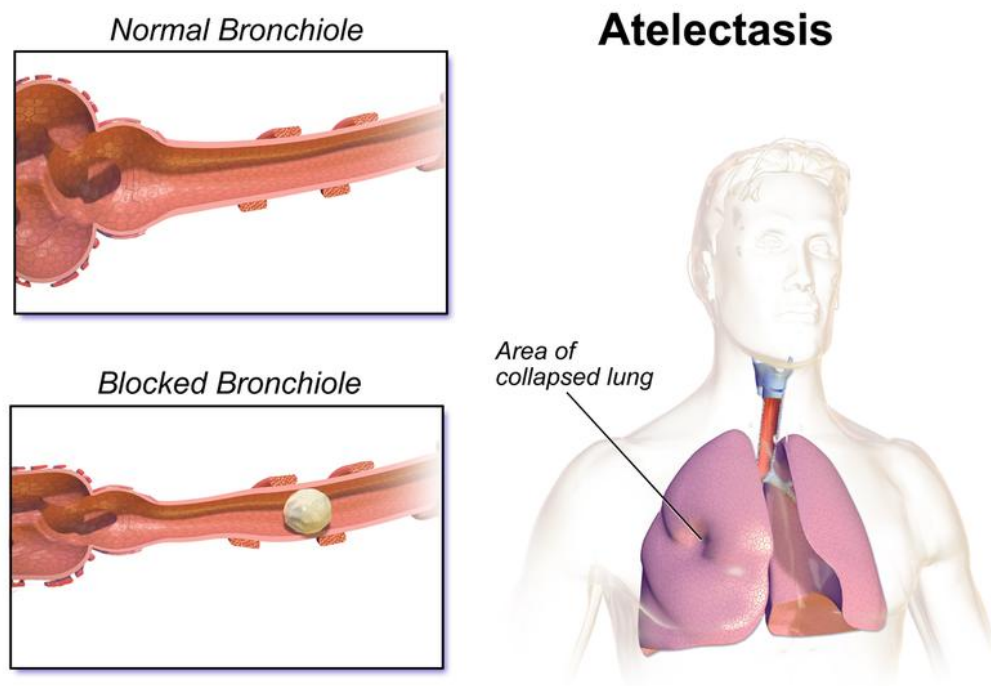


Figure 01: Atelectasis

Nonobstructive Atelectasis

When atelectasis develops owing to a nonobstructive cause, that type is identified as the nonobstructive atelectasis. Here, the visceral pleura and the parietal pleura lose contact with each other and this underlies the pathological basis of the entire process.

Pathophysiology

Surfactants that are produced by a special type of alveolar epithelial cells play a key role in reducing the surface tension inside the alveoli and preventing their collapse. Therefore any condition having an impact on the production of surfactants can be a cause of atelectasis.

Causes

- Respiratory distress syndrome (often seen in neonates)

Symptoms of Atelectasis

- Cough
- [Dyspnea](#)
- Dizziness
- Sometimes chest pain

The duration of the symptoms is extremely important to arrive at a diagnosis.

Investigations

- Chest X ray
- CT scan
- Oximetry
- Bronchoscopy
- It may be necessary to do a biopsy if the presence of a tumor is suspected.

Management

The management of atelectasis depends on the underlying cause

- Surgical removal of the obstruction
- Chest physiotherapy
- Any associated infections can be treated with antibiotics

What is Pneumothorax?

The presence of air inside the pleural cavity is defined as pneumothorax. During the past, the air was injected into the pleural cavity for the treatment of tuberculosis. This was called the artificial pneumothorax. Spontaneous pneumothorax is the sudden entry of air into the pleural cavity without any apparent reason. Further investigations often reveal the rupturing of a bulla.

When the parietal pleura is damaged, air can enter into the pleural cavity from outside. Most of the time, this happens due to penetrating injuries such as stabbings. Pneumothorax of this type is called the open pneumothorax.

A flap of damaged skin can act as a valve. Therefore, each time the patient inspires, the air enters the pleural cavity with the opening of the valve like flap of the skin. But during expiration, the flap remains closed, preventing the escape of air. Consequently, air accumulates inside the pleural cavity, increasing the intrapleural pressure. The buildup of the intra pleural pressure pushes the mediastinum to the opposite direction. This fatal condition is called the tension pneumothorax.

Regardless of the type, the accumulation of air in the pleural cavity exerts an undue pressure on the affected lung in all the forms of pneumothorax. This compresses the lung tissues, resulting in their collapse. In other words, pneumothorax can be a cause of atelectasis.

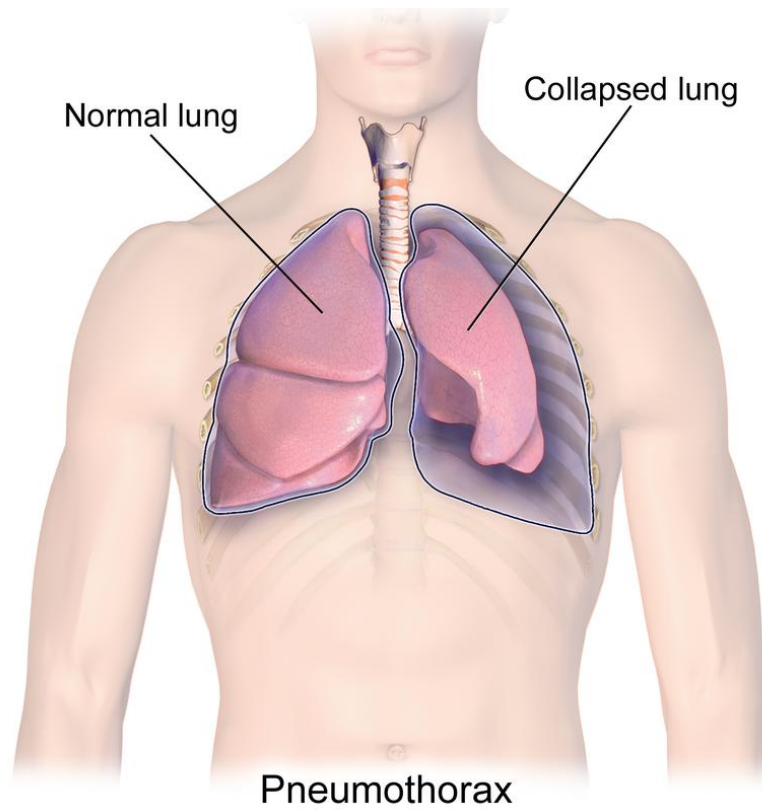


Figure 02: Pneumothorax

Causes

- Chest injuries
- Mechanical ventilation
- Lung diseases
- Ruptured bullae

Symptoms

- Dyspnea
- Cough
- Chest pain

Investigations

- Chest X ray
- Sometimes CT scans are also done

Treatment

- Chest tube insertion
- Surgical intervention to close the air leak

What are the Similarities between Atelectasis and Pneumothorax

- Both conditions are pulmonary disorders creating an imbalance in the pressure inside and outside the lung tissues.
- The affected lung collapses either completely or partially in both occasions.

What is the difference between Atelectasis and Pneumothorax?

Atelectasis vs Pneumothorax	
A complete or partial collapse of a lung or lobe of a lung is defined as atelectasis.	The presence of air inside the pleural cavity is defined as pneumothorax.
Causes	
Atelectasis can be due to numerous causes.	Pneumothorax can cause atelectasis, but atelectasis cannot cause pneumothorax.
Air in Pleural Cavity	
Pleural cavity does not contain air unless the cause of atelectasis is pneumothorax.	Pleural cavity contains air.
Pressure	
A negative pressure builds up inside the alveoli.	A positive pressure builds up inside the pleural cavity.

Summary – Atelectasis vs Pneumothorax

Pneumothorax is the presence of air inside the pleural cavity whereas atelectasis is the complete or partial collapse of a lung or lobe of a lung. The difference between atelectasis and pneumothorax is the presence or absence of air inside the pleural cavity. These are serious conditions which are sometimes considered as medical emergencies. Clinicians should have the practice and the necessary skills to diagnose and manage the patients presenting with these diseases within the least possible duration. Failure to do so puts the patient's life in danger.

References:

1. Snell, Richard S. Snell's Clinical Anatomy by Regions. 9th ed., Lippincott Williams & Wilkins.
2. Hall, John E. Guyton and Hall textbook of medical physiology. 12th ed., Philadelphia, Elsevier, 2010.

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2. "Blausen 0742 Pneumothorax" By "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. – Own work (CC BY 3.0) via [Commons Wikimedia](#)

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