

Difference Between Pleural Effusion and Pneumonia

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Key Difference - Pleural Effusion vs Pneumonia

Pleural effusion and pneumonia are two conditions that affect our [respiratory system](#). **Pleural effusion is actually a complication of many illnesses that directly or indirectly exert an adverse impact on the airways and lung parenchyma whereas pneumonia is one such illness that can give rise to pleural effusion.** This is the **key difference** between these two. Medically pleural effusion can be defined as an excessive accumulation of fluid in the pleural space is known as a pleural effusion. On the other hand, pneumonia can be defined as the invasion of lung parenchyma by microorganisms.

What is Pleural Effusion?

An excessive accumulation of fluid in the pleural space is known as a pleural effusion. This condition can be identified by a chest x-ray if the fluid level is more than 300ml. But clinical identification of pleural effusion is possible only when the amount of fluid is more than 500ml.

Transudates

Pleural effusions of transudate type can be bilateral but more fluid accumulates in the right side than on the left side.

Characteristics of a Transudate Pleural Effusion

- [Protein](#) content is less than 30 g/l
- Lactic dehydrogenase level is less than 200 IU/L
- Fluid to [serum](#) LDH ratio is smaller than 0.6

Causes

- [Heart failure](#)
- Hypoproteinaemia
- Constrictive [pericarditis](#)
- [Hypothyroidism](#)

- Ovarian [tumors](#) producing right-sided pleural effusion

Exudates

These have the following hallmark features

- Protein content is more than 30 g/l
- Lactic dehydrogenase level is more than 200 IU/L

Causes

- Bacterial pneumonia
- Pulmonary infarction
- Bronchial carcinoma
- TB
- Autoimmune rheumatic disease
- Post-myocardial infarction syndrome
- Acute pancreatitis
- [Mesothelioma](#)
- [Sarcoidosis](#)

Clinical Features

- [Dyspnea](#)
- [Dry cough](#)
- Orthopnea
- Chest pain
- In case of an [infection](#), there can be other nonspecific symptoms such as fever
- Hemoptysis

Diagnosis

A chest X-ray is taken immediately when a patient presents with the tale-telling symptoms of pleural effusion. Once the X-ray confirms the clinical suspicion of a pleural effusion, an ultrasound-guided pleural aspiration is carried out.

Pleural Effusion

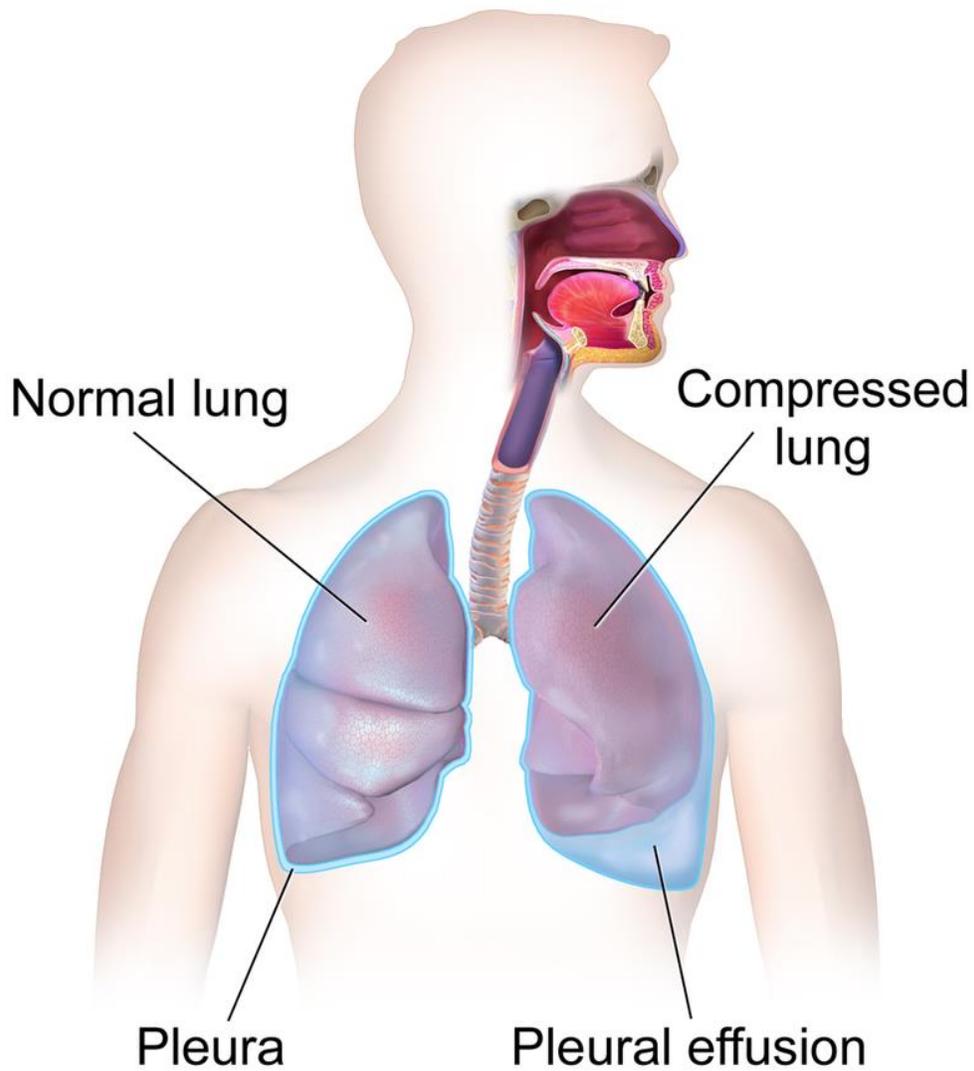


Figure 01: Pleural Effusion

Treatment

Treatment of pleural effusion varies with the underlying pathology.

What is Pneumonia?

Invasion of the lung parenchyma by a disease-causing agent (mostly [bacteria](#)) evokes exudative solidification of the (consolidation) of the pulmonary tissue known as pneumonia.

Classification of pneumonia is based on several criteria.

- According to the causative agent
 - Bacterial, viral, fungal
- According to the gross anatomic distribution of the disease
 - Lobar Pneumonia, Bronchopneumonia
- According to the place where the pneumonia is acquired
 - Community-acquired, hospital-acquired
- According to the nature of the host reaction
 - Suppurative, fibrinous

Pathogenesis

The normal lung is devoid of any disease-causing organisms or substances. The respiratory tract has several defense mechanisms aimed at preventing the entry of these disease-causing agents.

- Nasal clearance – particles deposited in the front of the airway on the non-ciliated epithelium are normally removed by sneezing or coughing. The particles deposited posteriorly are swept over and will be swallowed.
- Tracheobronchial clearance- this is accompanied by mucociliary action
- Alveolar clearance- [phagocytosis](#) by alveolar macrophages.

Pneumonia can result whenever these defenses are impaired or the host resistance is decreased. Factors such as chronic diseases, immunosuppression and use of immunosuppressive drugs, leukopenia, and viral infections affect the host resistance making the host vulnerable to get this kind of disorders.

The clearance mechanisms can be damaged in several ways,

- Suppression of the cough reflex and the sneezing reflex

Secondary to coma, [anesthesia](#) or neuromuscular diseases.

- Injury to the mucociliary apparatus

Chronic smoking is the major reason for the destruction of the mucociliary apparatus.

- Interference with the phagocytic action
- Pulmonary congestion and edema
- Accumulation of pulmonary secretions in conditions such as [cystic fibrosis](#) and bronchial obstruction.

Bronchopneumonia

- *Staphylococci, Streptococci, Pneumococci, Haemophilus, and Pseudomonasauregenosa* are the main causative agents.

Morphology

- Foci of bronchopneumonia are consolidated areas of acute suppurative inflammation. The consolidation may be patchy through one lobe but is more often multilobar and frequently bilateral.

Lobar Pneumonia

- main causative agents are *pneumococci, klebsiella, staphylococci, streptococci*

Morphology

Four stages of inflammatory response have classically been described.

- Congestion

The lung is heavy, boggy, and red. This stage is characterized by vascular engorgement, intra-alveolar fluid with few neutrophils, and often the presence of numerous bacteria.

- Red hepatization

Congestion is followed by red hepatization which is characterized by massive confluent exudation with red cells, neutrophils, and fibrin filling the alveolar spaces.

- Gray hepatization

In the gray hepatization stage because of the progressive disintegration of the red blood cells that have accumulated in the alveolar spaces, lungs assume a gray color. This grayish appearance is enhanced by the presence of the fibrinosuppurative exudate.

- Resolution

During the final stage of the pathogenesis, the consolidated exudate that has accumulated within the alveolar spaces undergoes progressive enzymatic digestion to produce a granular semi-fluid debris that is reabsorbed and ingested by macrophages or coughed up.

Complications

- Abscess – because of the [tissue](#) destruction and [necrosis](#)
- Empyema- as a result of the infection spreading into the pleural cavity
- Organization
- Dissemination into the bloodstream.

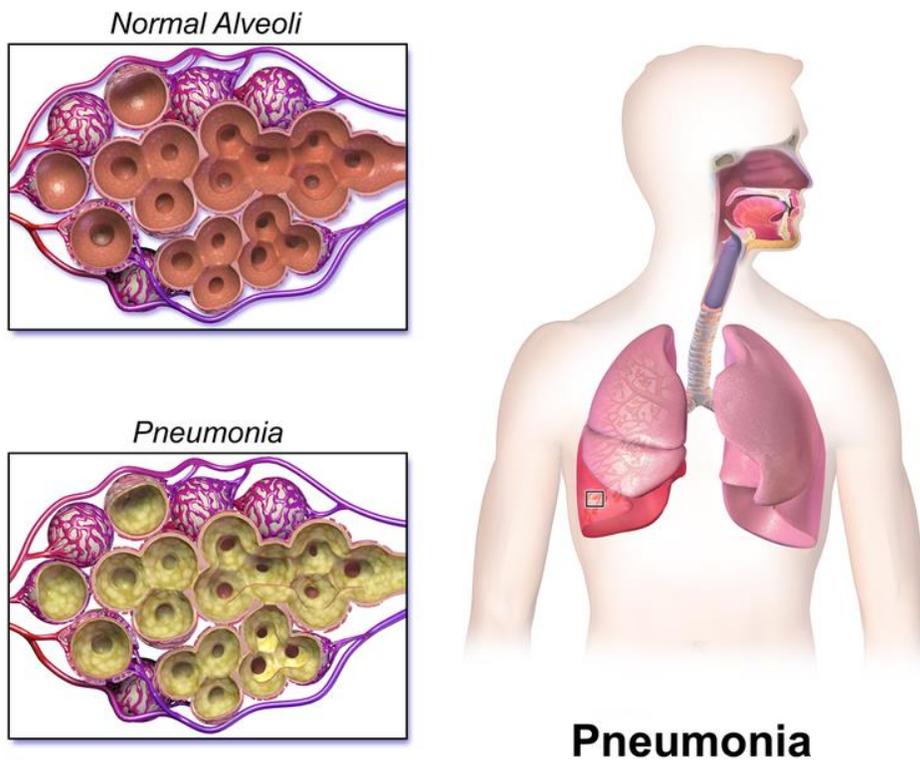


Figure 02: Pneumonia

Clinical Features

- Acute onset of fever
- Dyspnea
- Productive cough
- Chest pain
- Pleural friction rub
- Effusion

What is the Similarity Between Pleural Effusion and Pneumonia?

- Both are diseases of the respiratory system

What is the Difference Between Pleural Effusion and Pneumonia?

Pleural Effusion vs Pneumonia

An excessive accumulation of fluid in the pleural space is known as a pleural effusion.

Invasion of the lung parenchyma by a disease-causing agent (mostly bacteria) evokes exudative solidification of the (consolidation) of the pulmonary tissue known as pneumonia.

Nature

Pleural effusion is a complication of many pathological conditions.

Pneumonia can give rise to pleural effusion.

Cause

Causes of transudate type pleural effusions

- Heart failure
- Hypoproteinaemia
- Constrictive pericarditis
- Hypothyroidism
- Ovarian tumors producing right sided pleural effusion

Causes of exudate type pleural effusions

- Bacterial pneumonia
- Pulmonary infarction
- Bronchial carcinoma
- TB
- Autoimmune rheumatic disease
- Post-myocardial infarction

Pneumonia is due to the infection of lung parenchyma mainly by bacteria.

<p>syndrome</p> <ul style="list-style-type: none"> · Acute pancreatitis · Mesothelioma · Sarcoidosis 	
Clinical Features	
<p>Clinical features of pleural effusion are,</p> <ul style="list-style-type: none"> · Dyspnea · Dry cough · Orthopnea · Chest pain · In case of an infection, there can be other nonspecific symptoms such as fever · Hemoptysis 	<p>Clinical features of Pneumonia are,</p> <ul style="list-style-type: none"> · Acute onset of fever · Dyspnea · Productive cough · Chest pain · Pleural friction rub · Effusion
Identification	
<p>A chest X-ray is taken immediately when a patient presents with the tale-telling symptoms of pleural effusion. Once the X-ray confirms the clinical suspicion of a pleural effusion, an ultrasound-guided pleural aspiration is carried out.</p>	<p>The culture of sputum is used for the identification of the causative agent.</p>
Treatment	
<p>Treatment of pleural effusion varies with the underlying pathology.</p>	<p>Antibiotics are used for the treatment of bacterial pneumonia.</p>

Summary - Pleural Effusion vs Pneumonia

Invasion of the lung parenchyma by a disease-causing agent (mostly bacteria) evokes exudative solidification of the (consolidation) of the

pulmonary tissue known as pneumonia. Pneumonia can be complicated by the accumulation of fluid in the pleural space which is known as pneumonia.

Reference:

1.Kumar, Parveen J., and Michael L. Clark. Kumar & Clark clinical medicine. Edinburgh: W.B. Saunders, 2009.

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