Emphysema

Emphysema is a form of chronic obstructive lung disease characterized by destruction of alveolar walls. There are two main forms of emphysema. Centriacinar emphysema is the most common form and associated with many years of smoking. Panacinar emphysema is less common and associated with individuals with an alpha-1 antitrypsin deficiency. Overall, emphysema is characterized by increased elastase activity, increased lung compliance, enlargement of air spaces and decreased recoil of the lungs. Individuals with emphysema are commonly called pink puffers and have increased anteroposterior diameter of the chest, often referred to as a barrel chest. They also commonly exhale through pursed lips which help keep their airways open during exhalation.



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Clinical Features

Pink Puffer
Pink-zebra Puffing
Patients with emphysema are often referred to as “pink puffers.” This is because individuals with emphysema must compensate for poor gas exchange by hyperventilation (the puffer part) and often have a pink complexion. Eventually, people afflicted with this disease often develop weight loss and muscle wasting due to low cardiac output.

Exhale through Pursed Lips
Exhaling Purse with Lips
Individuals with emphysema often exhale through pursed lips, which helps keep their airways open during exhalation.

Barrel Chest
Barrel
Collapse of the small airways during exhalation leads to air trapping in the lungs. This can lead to increased anteroposterior diameter of the chest, also referred to as a barrel chest.

Pathophysiology

Obstructive Lung Disease
Zebra Choking Lungs
Emphysema is a form of obstructive lung disease with airways closing prematurely at high lung volumes, resulting in increased residual volume and decreased functional vital capacity. Patients with obstructive lung disease have decreased FEV1/FVC ratio.

Increased Lung Compliance
Up-arrow Lungs with Compliant-pocket
Destruction of the alveolar walls and increased elastase activity leads to increased lung compliance. Other effects of elastic fiber loss include decreased recoil and enlarged air spaces. Lung compliance is calculated by the change in volume over the change in pleural pressure.

Types

Centriacinar
Center-ace
Centriacinar emphysema is characterized by damage to the respiratory bronchiole, including the proximal and central part of the acinus, while the distal acinus or alveoli are relatively unchanged. Centriacinar emphysema is more commonly associated with a history of cigarette smoking and more commonly affects the upper lungs.

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Panacinar

Pan-ace

Panacinar emphysema is characterized by expansion of the entire respiratory lobule from the respiratory bronchiole to alveoli. It is associated with alpha-1 antitrypsin deficiency and more commonly affects the lower lungs, and can lead to hepatic cirrhosis.

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