

Respiratory Acidosis

Respiratory acidosis is a medical condition characterized by decreased ventilation, which causes increased levels of carbon dioxide in the blood ($\text{PaCO}_2 > 45$) leading to a decrease in blood pH. Carbon dioxide is constantly produced via metabolic reactions in the body that is efficiently expelled through the lungs during alveolar ventilation. Common causes of decreased alveolar ventilation include depression of the central respiratory center by sedatives like barbiturates or opioids, airway obstruction including asthma or COPD exacerbations, or neuromuscular disorders that cause respiratory muscle weakness or paralysis.



PLAY PICMONIC

Hypoventilation

Hippo-vent

Hypoventilation occurs when there is inadequate ventilation to perform gas exchange. This leads to increased levels of carbon dioxide in the blood and respiratory acidosis.

Increased $\text{PaCO}_2 > 45$

Smoke-chimneys Releasing CO₂

Primary respiratory acidosis is defined as carbon dioxide levels above 45 in the blood.

Barbiturates Depress Central Respiratory Center of Brain

Barbara-doll

Barbiturates are drugs that depress the central nervous system by increasing the duration of chloride channel opening and thus decreasing neuron firing. These drugs can depress the central respiratory center of the brain leading to alveolar hypoventilation and respiratory acidosis.

Opioids Depress Central Respiratory Center of the Brain

Poppy-droid

Opioids can depress the central respiratory center of the brain leading to alveolar hypoventilation and respiratory acidosis.

Airway Obstruction

Obstructed Airway

Airway obstruction can disrupt gas exchange, leading to increased levels of carbon dioxide in the blood. Obstructive disorders like asthma and COPD are associated with respiratory acidosis. Hypoventilation in COPD involves several mechanism including ventilation-perfusion mismatching which leads to increased dead space ventilation.

Respiratory Muscle Weakness/Paralysis

Rib Muscle in Weakness-wheelchair

Neuromuscular disorders such as amyotrophic lateral sclerosis and Guillain Barre can decrease the ability of the lungs to perform gas exchange, leading to buildup of carbon dioxide in the blood.