Cheyne-Stokes and Abnormal Patterns of Respiration

Cheyne-Stokes respiration

Cheyne-Stokes respiration is also known as periodic respiration, with cycles of respiration that are increasingly deeper then shallower with possible periods of apnoea. Although 50% of patients with moderate-to-severe congestive heart failure are affected by significant Cheyne-Stokes respiration, its exact pathophysiology remains unclear.\(^1\) Typically, over a period of one minute, a 10- to 20-second episode of apnoea or hypopnoea occurs followed by respirations of increasing depth and frequency. The cycle then repeats itself.

- Patients with Cheyne-Stokes respiration usually present with the symptoms of orthopnoea, paroxysmal nocturnal dyspnoea, excessive daytime sleepiness and witnessed apnoeas in the setting of congestive heart failure.\(^2\)
- Cheyne-Stokes respiration is a poor prognostic sign, most often seen in terminal care. However, it may also be present as a normal finding in children, in healthy adults following fast ascending to great altitudes, or in sleep.
- Causes include:
  - Brainstem lesions: cerebrovascular event.
  - Encephalitis.
  - Raised intracranial pressure.
  - Heart failure.\(^3\)
  - Chronic pulmonary oedema.
  - Altitude sickness.

- Management includes medical therapy directed at congestive heart failure, continuous positive airway pressure (CPAP) and/or supplemental oxygen.\(^4\)

Paroxysmal nocturnal dyspnoea

- Acute dyspnoea causing the patient to awake from sleep and then sit upright or stand out of bed for relief.
- Associated with pulmonary oedema due to left ventricular failure (eg, due to mitral stenosis, aortic insufficiency or hypertension) but nocturnal attacks of bronchial asthma may be difficult to differentiate.
- Paroxysmal nocturnal dyspnoea results from increased left ventricular filling pressures due to nocturnal fluid redistribution and enhanced renal reabsorption and therefore has a greater sensitivity and predictive value than dyspnoea.

Kussmaul's respiration

This breathing is deep sighing respiration associated with metabolic acidosis - eg, diabetic ketoacidosis, chronic kidney disease.

Air hunger

- Acute dyspnoea occurring in terminal stages of exsanguinating haemorrhage.
- It is a grave sign and indicates the need for immediate transfusion.
Hyperventilation

Hyperventilation may cause abnormally low levels of carbon dioxide in the blood and lead to dizziness, light-headedness, weakness, unsteadiness, muscle spasms in the hands and feet, and tingling around the mouth and fingertips. Causes include:

- Anxiety.
- Head injury.
- Cerebrovascular event (pontine lesions); breathing is noisy.
- Inappropriate use of stimulant drugs; excessive intake of aspirin.

Hypoventilation

Hypoventilation is breathing that is not adequate to meet the needs of the body (too shallow or too slow).

Hypoventilation causes an increase in blood carbon dioxide level and a decrease in oxygen level.

Causes include:

- Central nervous system - eg, drugs (central nervous system depressants), cerebrovascular events, trauma, neoplasms.
- Obesity.
- Obstructive sleep apnoea.
- Severe chest wall deformities - eg, kyphoscoliosis.
- Neuromuscular diseases - eg, myasthenia gravis, amyotrophic lateral sclerosis, Guillain-Barré syndrome, muscular dystrophy.
- Severe chronic obstructive pulmonary disease.
- Congenital Central Hypoventilation Syndrome is a rare cause of hypoventilation in children and is present from birth. [6]

Obstructive sleep apnoea

- Obstructive sleep apnoea is caused by intermittent and repeated upper airway collapse during sleep.
- This results in irregular breathing at night, and excessive sleepiness during the day.

Further reading & references


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