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. [5]

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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