

# RESPIRATORY ALKALOSIS

Increased minute ventilation is the primary cause of respiratory alkalosis, characterised by decreased PaCO<sub>2</sub> and increased pH.

## BOX 122-2 CAUSES OF RESPIRATORY ALKALOSIS

Hypoxia-mediated hyperventilation  
High altitude  
Severe anemia  
Ventilation-perfusion inequality  
CNS-mediated hyperventilation  
Voluntary, psychogenic  
Cerebrovascular accident  
Increased intracranial pressure, tumor  
Trauma  
Pharmacologic  
Salicylate, caffeine, or nicotine toxicity  
Progesterone  
Pressors, epinephrine  
Thyroxine  
Septicemia  
Pulmonary  
Pneumonia  
Pulmonary embolism  
Edema  
Mechanical hyperventilation  
Atelectasis  
Hepatic  
Encephalopathy  
Hyponatremia

Acute alkalosis:

- Normal plasma [HCO<sub>3</sub>]
- Uncompensated.

Chronic alkalosis:

- Renal compensation
- Decreased plasma [HCO<sub>3</sub>]

## Clinical Features:

Symptoms vary with the degree & chronicity of the alkalosis & associated symptoms of the underlying disorder.

A common finding is irritability of the central and peripheral nervous system & from increased resistance in the cerebral vasculature. Symptoms include;

- Paraesthesias of lips / extremities
- Lightheadedness / dizziness
- Muscle cramps
- Carpopedal spasms

## Physiologic Compensation:

In acute respiratory alkalosis:

- H<sup>+</sup> is secreted from within cells to ECF & reduce plasma HCO<sub>3</sub>.
- **Plasma HCO<sub>3</sub> is lowered 2 mmol/L for each 10mmHg decrease in CO<sub>2</sub>**

In chronic respiratory alkalosis:

- Persistently low PaCO<sub>2</sub> decreases renal H<sup>+</sup> secretion.
- Mild hypokalaemia occurs
  - H<sup>+</sup> shifts into ECF as more K<sup>+</sup> moves intracellularly.
- Renal secretion of HCO<sub>3</sub> occurs & Cl<sup>-</sup> is retained to maintain electroneutrality
- **Plasma HCO<sub>3</sub> is lowered 5 mmol/L for each 10mmHg decrease in CO<sub>2</sub>**

### **Alkaemia of Pregnancy:**

Primary respiratory in origin with pH of 7.46 - 7.50.

PaCO<sub>2</sub> of 31 - 35 mmHg is considered normal in antepartum period.

- 40mmHg in pregnant women = hypercapnia.
- Serum HCO<sub>3</sub> will drop to 18-22 mmol/L

### **Management:**

This is rarely life-threatening & treatment should be directed towards the underlying cause.