Metabolic Alkalosis Assessment

Metabolic alkalosis is a metabolic state where the body's pH is elevated above the normal range (7.35-7.45) due to increased bicarbonate (above 26). Etiologies for this include a loss of hydrogen ions (Cl-) and fluid volume (contraction alkalosis), such as prolonged vomiting, where stomach acid is lost, and diarrhea. Other causes include retention of bicarbonate, and several other etiologies.



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Signs and Symptoms

Increased pH > 7.45
Up-arrow pH Greater-than 7.45
Patients with this metabolic condition display increased arterial pH values above 7.45, alkalizing the blood.

Increased HCO3 > 26
Up-arrow Bi-car-bomb Greater-than 26
In metabolic alkalosis, bicarbonate levels are increased to levels above 26. This occurs because there is a decreased hydrogen ion concentration, as acid is lost.

Excitable State
Excited-state
Patients may display signs of excitability, particularly with the nervous system. This may manifest as hyperactive reflexes, irritability, increased activity and anxiety. Etiologies for these symptoms may relate to low ionized plasma calcium in metabolic alkalosis.

Arrhythmias
Broken Arrhythmia-drum
Cardiac arrhythmias may develop with this condition, as alkalosis leads to hypokalemia. Severe alkalosis can predispose to refractory arrhythmias by reducing coronary flow as well.

Paresthesias
Paris-t-shirt with Pins-and-needles
Paresthesias, which include the sensations of prickling and tingling of the skin, can occur with metabolic alkalosis.

Muscle Cramps
Muscle Clamp
Due to muscle dysfunction and electrolyte imbalances which may occur with metabolic alkalosis, patients can display muscle cramps. Spasms may also occur from smooth muscle dysfunction.

Muscle Weakness
Weak-drooping-muscle
A sign of untreated metabolic alkalosis, seen later in the course of this disorder, is muscle weakness, which is due to skeletal muscle dysfunction. This stems from electrolyte dysfunction, such as hypokalemia, which can accompany metabolic alkalosis.

Decreased Respiratory Effort
Down-arrow Respirator
As muscle weakness progresses in patients, decreased respiratory effort may be seen in patients with prolonged metabolic alkalosis. It is important to monitor patient respiratory status and those with severe alkalosis should be considered for mechanical breathing intervention.

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