Metabolic Alkalosis Interventions

The management of metabolic alkalosis depends primarily on the etiology of the condition. Patients can develop this metabolic disturbance due to numerous causes, such a vomiting, antacid use, and excessive diuretic use. Treatment begins with addressing the underlying cause and possibly replacing diuretics with spironolactone, which is potassium-sparing. Acetazolamide can be used to excrete bicarbonate, and other treatments include administering sodium chloride and replacing potassium. It is important to monitor the patient's respiratory rate, heart rate, and enact seizure precautions.

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Interventions

Treat Underlying Cause

Treating Underlying Attacker

Due to the numerous causes for metabolic alkalosis, it is important to address the underlying cause of this metabolic disorder.

Stop Potassium (K+) Wasting Diuretics

Stop-sign with Banana leaking Die-rocket

Metabolic alkalosis can develop due to overuse of potassium-wasting diuretics, like loop and thiazide diuretics. These should be discontinued, and can be replaced with spironolactone (a potassium-sparing diuretic) if needed.

Spironolactone

Spiral-of-milk

Spironolactone is a potassium-sparing diuretic, which can be used to replace pharmacologic diuretic therapy in patients who have developed or are at risk of developing metabolic alkalosis.

Acetazolamide

A Cheetah-Zorro

Acetazolamide is a medication that works by inhibiting carbonic anhydrase. Inhibition of this enzyme leads to bicarbonate excretion. Excreting bicarbonate makes the blood become acidic, causing compensatory hyperventilation, increasing levels of oxygen and decreasing levels of carbon dioxide in the blood. This effectively helps counteract the alkaline pH disturbance caused by metabolic alkalosis.

IV Fluids

IV Fluid

Patients with metabolic alkalosis are given 0.9% normal saline, which helps treat chloride-responsive metabolic alkalosis (due to the saline's NaCl). The infusion rate is typically 50 to 100 mL/h greater than urinary and other sensible and insensible fluid losses until urinary chloride rises to > 25 mEq/L and urinary pH normalizes after an initial rise from bicarbonaturia.

Sodium Chloride

NaCl Salt-shaker

Sodium chloride can be given in many forms, such as high-salt foods, oral tablets, or within IV saline solutions. Correcting sodium, water, and chloride defects may be all that is needed to permit kidneys to excrete bicarbonate and correct alkalosis, but must be used with caution in patients with heart

failure (HF) or renal insufficiency. Chloride is needed so the kidney can absorb sodium with chloride, leading to enhanced excretion of bicarbonate, and helping to normalize the alkalotic state.

Replace Potassium (K+)

Replace Banana

Metabolic alkalosis can occur due to hypokalemic states, so it is important to replace the patient's potassium. This can be done with diuretic therapy modification, as well as dietary interventions and IV potassium administration.

Considerations

Monitor Respiratory Rate

Monitor and Lungs

Patients with metabolic alkalosis can compensate for this state by increasing their serum $PaCO_2$, which manifests as them decreasing their respiratory rate. This decrease in respiratory rate can lead to hypoxia in the patient, however, leading to hypoxic injury to the brain and other organs in the body.

Monitor Heart Rate

Monitor and Heart

There are numerous etiologies of metabolic alkalosis, some of which include electrolyte disturbances. These electrolyte abnormalities can cause atrial and ventricular ectopic beats, along with tachyarrhythmias.

Seizure Precautions

Caesar Precaution-sign

Patients with metabolic alkalosis and its associated electrolyte issues are at risk of developing seizures. Changes in mentation and CNS or neuromuscular hyperirritability may result in patient harm, especially if tetany or convulsions occur.