Hyperkalemia

Hyperkalemia is the condition in which a person's serum potassium level is higher than normal. It can result from a number of causes, such as severe tissue trauma, untreated Addison's disease, acute acidosis, adverse effects of potassium-sparing diuretics, or overdose with IV potassium. Hyperkalemia can be diagnosed when serum potassium is greater than 5. It leads to abdominal cramps, muscle weakness, and diarrhea. Furthermore, arrhythmias may occur, and EKG findings such as tall, peaked T waves may occur. Interventions include IV calcium, infusion of glucose and insulin, loop or thiazide diuretics, kayexalate, dialysis, and prevention education.



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Assessment

> 5.0 mEq/L K+
Greater than (5) Hand
Hyperkalemia is defined as a serum potassium level higher than 5.0 mEq/L. Serum potassium levels higher than 7.0 mEq/L may cause life-threatening arrhythmias and require immediate treatment.

Abdominal Cramps
Abdominal Clamps
Abdominal cramps occur as a result of hyperactivity of smooth muscle within the peritoneal cavity.

Muscle Weakness
Weak-drooping-muscle
Muscle weakness may occur as a result of increased potassium outside of the cell.

Diarrhea
Toilet
Like abdominal cramping, diarrhea can occur due to the effect of high potassium on smooth muscle, which causes an increase in peristalsis.

Arrhythmia
Broken Arrhythmia-drum
Cellular excitability as a result of hyperkalemia causes a decrease in cardiac depolarization, which affects cardiac conduction. This can result in a variety of cardiac arrhythmias, including ventricular fibrillation or asystole.

Tall, Peaked T Waves
Tall-Mr. T on Peaked-wave
Due to the faster depolarization of the cardiac action potential from the ventricles, the QT interval is shortened resulting in a narrow and peaked T wave.

Interventions

IV Calcium
IV Calcium-cow
IV calcium is indicated in patients with a hyperkalemic emergency as it directly antagonizes the action of potassium on cell membranes, most importantly those of the heart. This is a rapidly acting, short-lasting treatment that should be used for initial stabilization of patients. Calcium can be infused as calcium gluconate or calcium chloride, with gluconate largely preferred due to tolerability.

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Infusion of Glucose and Insulin

Infusing Glue-bottle and Insect-syringe

Patients with hyperkalemia are given infusions of glucose and insulin to drive potassium into cells and thereby decreasing extracellular potassium levels. Insulin is the main driver of potassium in this solution, with glucose added to prevent hypoglycemia.

Loop or Thiazide Diuretics

Loop-hen and Tarzan on Die-rocket

In mild cases of hyperkalemia and when the kidneys are functioning properly, loop or thiazide diuretics can be given to increase the excretion of potassium from the circulatory system.

Kayexalate

Kayak

Kayexalate is a gastrointestinal cation exchanger, a type of drug that eliminates potassium in the GI tract by exchanging it for other cations. Kayexalate is the prototypal drug of its class and is not often used today as it may increase the chance of colonic necrosis. Newer agents such as patiromer or zirconium cyclosilicate are preferred.

Dialysis

Dial-machine

Dialysis is indicated for patients with severe hyperkalemia and kidney impairment. As renal elimination of potassium through loop or thiazide diuretics may be ineffective, hemodialysis is indicated to quickly remove large amounts of potassium from the blood.

Prevention Education

Prevention Educator

Preventing recurrence of hyperkalemia involves educating the patient to reduce dietary potassium, removing an offending medication, or the addition of a diuretic.

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