Hypernatremia

Hypernatremia is characterized by a serum sodium level above the normal range of 145 mEq/L. Hypernatremia is a increase in osmolarity of the extracellular fluid volume (ECF). This may be attributed to an actual sodium excess in the ECF like hyperaldosteronism or a relative sodium excess which is caused by a decrease of free water in the ECF like dehydration. High serum sodium levels causes a fluid shift from the intracellular fluid volume (ICF) to the ECF. This causes cellular shrinking. Hypernatremia should be assessed along with fluid balance as it often is associated with a fluid excess or deficit.



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Assessment

> 145 mEq/L Na+
Greater-than 145 Salt-shaker
Greater than 145mEq/L is considered above normal. The normal range is 135-145 mEq/L in a normal adult.

Change in LOC
Delta Halo
Often an early sign in sodium excess is a change in the level of consciousness of the patient. This often manifests as agitation, restlessness, short attention span, and confusion. Initially, the increased sodium excessively stimulates cells but as fluid volume shifts to the ECF, the cells dehydrate and are unable to respond to any stimuli.

Extreme Thirst
Thirsty in Water-mirage
One of the most common signs of hypernatremia is the activation the neural pathway in the brain which results in extreme thirst.

Orthostatic Hypotension
Oar Hippo-BP
The decrease in fluid volume renders the body unable to compensate for cardiac output requirements when changing from a lying position to a standing position. This often causes a transient drop in blood pressure upon standing. Patients may often have syncope if standing quickly.

Dry Flushed Skin
Flashlight on Flushed and Dry skin
As fluid volume shifts from the interstitium to the ECF, the cells in the skin, the largest organ, are dehydrated. This causes a characteristic dry, flushed skin. Skin that is not adequately hydrated is also unable to cool the body appropriately in high temperatures.

Muscle Twitching
Muscle-man Twitching
Often due to excess sodium stimulation of cells, patients will appear with twitching in a muscle or group of muscles. As hypernatremia progresses the cells become dehydrated and unable to respond to stimuli resulting in weakness and absence of deep tendon reflexes.

Seizures
Caesar
Both hyponatremia and hypernatremia may result in seizures and eventually coma, as neuromuscular synapses are unable to fire appropriately. A severe manifestation results in coma.

Priority Interventions

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Treat and Prevent Dehydration

Filling Canteen

The priority goal of care is to prevent hyponatremia and treat and prevent dehydration in the patient. Water always follows salt, so if there is increased salt in the body it will result in water getting pulled out of the cells to try and dilute the salty extracellular fluid, which then needs to be replaced. Excess salt can also be removed with loop diuretics. Monitor patients closely for dehydration. Replacing water too quickly or in large quantities however may result in hyponatremia which can be serious for the patient and even lead to brain damage. Fluid volume deficits may have severe long term effects, such as harm to the kidneys which rely on water to rid bodies of waste products. Careful monitoring of intake and output is required.

Hypotonic Solutions (0.225% or 0.45% NaCl)

Hippo-tonic

Low-volume amounts of IV hypotonic solutions such as 0.45% NaCl (one-half normal saline) or 0.225% NaCl (one-fourth normal saline) can be administered slowly to patients with hypernatremia. Be sure to remember that hypotonic solutions can cause cerebral edema, especially in infants. Patients with severe hypovolemia can be treated with isotonic fluids such as 0.9% NaCl (normal saline) initially, but should be switched to hypotonic fluids after resuscitation to correct any residual hypernatremia. It is important to monitor for hyperglycemia (e.g., if using fluids with dextrose) and for co-existing electrolyte abnormalities (e.g., hypokalemia).

Sodium Restriction

Salt-shakers with Restrictive-belts

Often patients may be placed on a dietary restriction of sodium. These are often renal patients who are unable to normally excrete sodium due to renal damage. The level of sodium restriction may vary.

Diuretics

Die-rocket

Sodium losing diuretics like the loop diuretics furosemide (Lasix) and bumetanide (Bumex) are often prescribed to reduce the overall volume of sodium. Patients on loop diuretics should be very closely monitored for dehydration.

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