Sodium
 Sodium and Sodium Imbalances K pp 61-74 C pp. 36-39

Objectives

- Upon completion of this lecture the learner should be able to :
- Discuss the functions, physiology, and pathophysiology of sodium .
- Discuss the incidence, morbidity, and mortality of sodium emergencies .
- Identify etiologies and risk factors predisposing to sodium emergencies.

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Objectives continued

- Identify abnormal signs, symptoms, and clinical features of sodium emergencies.
- Discuss why rapid intervention is contraindicated in a patient with a sodium emergencies.
- Discuss what prehospital managements are appropriate in sodium emergencies.

Sodium - Distribution • Extracellular - ~ 98% ECF (intravascular, third space, bone) - Na* is the most abundant extracellular cation • Intracellular - 2% ICF • Normal ECF (serum) Na* 135 – 145 mEq/L • Normal intracellular Na* 10-14 mEq/L

Sodium - Function

- Na K Pump
 - Na⁺ in (depolarization) / Na⁺ out (repolarization)
 - Neuromuscular conduction
 - Smooth and skeletal
- Cardiac
 - Conduction
 - Contraction
- Cellular
 - Acid-base buffering



Hyponatremia

- The most common inpatient electrolyte abnormality
- Mortality
 - High: quoted at 33-86% in various studies
- Etiologies
 - Dilutional
 - Sodium loss



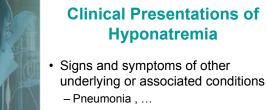
Hyponatremia - causes

- Dilutional:
 - Trauma
 - Sepsis
 - CHF
 - Cirrhosis
 - Renal failure
 - Water intoxication
 - · Psychogenic polydipsia
 - · Tap water enema
 - · Infants given free water



Hyponatremia - Causes

- Sodium Loss (a sodium loss that is in excess of the water loss)
- · GI losses nausea, vomiting, diarrhea
- Sweating (especially if loss is replaced with free $\rm H_2O$)
- Renal loss
 - Diuretics (most common cause in the elderly)
 - Adrenal insufficiency
- SIADH (low Na, low tonicity)
 - Drugs : diuretics (thiazides), narcotics
 - Adrenal insufficiency
 - Chronic illnesses: TB, cancer
 - Trauma
 - Stroke



- CNS symptoms
 - ALOC
 - Headache
 - Seizures
 - Weakness, hemiparesis, ataxia



Treatment of Hyponatremia

- CO₂M₃BIG
- Treat the underlying condition
 - Ccorrecting at the rate at which they developed



Hypernatremia - Causes

- Decreased water intake (opposite of dilutional)
- Water loss in excess of na⁺ loss
 - Insensible loss
 - Thyroid storm
- Excess salt intake
 - Seawater
 - Salt tablets
 - NaHCO₃



Clinical Presentations of Hypernatremia

- Signs and symptoms of underlying or associated condition
 - Pneumonia , ...
- CNS symptoms
 - ALOC
 - Headache
 - Seizures
 - Depression, irritability



Treatment of Hypernatremia

- CO₂M₃BIG
- Treat the underlying condition
 - Correcting at the rate at which they developed

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Summary

- have discussed :
 - he functions and homeostasis of sodium a⁺
 - ome of the regulators of Na+ balance
 - athophysiology and causes of Na+ bnormalities
 - linical presentations and associations of a⁺ abnormalities
 - reatment of associated conditions ypovolemia)
 - ne prehospital managements appropriate sodium emergencies .

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