

HYPERNATRAEMIA

The Basics/Pathophysiology.

- Defined as serum Na > 145 mmol/L.
- Caused by ↓ TBW (or occasionally ↑ in Na)
 - Extremes of age & those w/ chronic disease (more vulnerable).
- Main defense = *THIRST!* ∴ ↑ free-H₂O intake.
- Most common cause is hypovolaemia (severe fluid loss)
- Normally; hypovolaemia leads to free-H₂O conservation.
 - UO < 20mL/hr w/ ↑ Ur-osm (exceeding 1000 mOsm/kg)
 - Poor urine output, therefore poor Na-excretion.

BOX 123-3 CAUSES OF HYPERNATREMIA

Reduced water intake
Disorders of thirst perception
Inability to obtain water
Depressed mentation
Intubated patient
Increased water loss
Gastrointestinal
Vomiting, diarrhea
Nasogastric suctioning
Third spacing
Renal
Tubular concentrating defects
Osmotic diuresis (e.g., hyperglycemia, mannitol)
Diabetes insipidus
Relief of urinary obstruction
Dermal
Excessive sweating
Severe burns
Hyperventilation
Gain of sodium
Exogenous sodium intake
Salt tablets
Sodium bicarbonate
Hypertonic saline solutions
Improper formula preparation
Salt water drowning
Hypertonic renal dialysate
Increased sodium reabsorption
Hyperaldosteronism
Cushing's disease
Exogenous corticosteroids
Congenital adrenal hyperplasia

Symptoms.

Acute symptoms are seen in Na > 158mmol/L.

- Rapid change in levels ↑'s symptoms.

Most clinical signs are secondary to volume depletion & dehydration.

Marked ↑ in mortality w/ serum osmol >350 mOsm/kg.

- Irritability & increased muscle tone
- Seizures & coma
- Death

Diabetes Insipidus.

- Characterised by failure of central (or peripheral) ADH response.
 - Central - failure to secrete ADH. Responds to desmopressin.
 - Peripheral (nephrogenic) - renal unresponsiveness to ADH (& desmopressin).
- Urine osmolality **LOW** [200-300 mOsm/kg]
- Urine sodium **HIGH** [60-100 mmol/L]

Causes of Diabetes Insipidus			
Central	Nephrogenic	Systemic Disease	Drugs
Idiopathic	Congenital disorders	Sickle cell	Amphotericin
Head trauma	Obstructive uropathy	Sarcoidosis	Phenytoin
Tumours + NeuroSx	Renal dysplasia	Amyloidosis	Lithium
ICH/SAH	Polycystic disease		Aminoglycosides
Meningoencephalitis			Methoxyflurane
Granulomatous Dz			

Management.

The cornerstone of treatment is volume repletion.

- N.Saline or Hartman's is safe (has lower [Na⁺] than serum [Na⁺])
- Most hypernatraemic patients are actually total-body Na-deplete.

Once tissue perfusion is restored, then change to hypotonic fluids (such as 0.45% saline).

The reduction of [Na⁺] should not exceed 10-15 mmol/L per day !!

- Over correction can result in *cerebral oedema* & risk of seizures.

Patients w/ central diabetes insipidus require parenteral or intranasal desmopressin (DDAVP).

- ~ 1-2 micrograms IV [repeated doses based on urine output & osmolality]
- ~ 5-30 micrograms intranasally.