

Hypernatremia

Definition:

- Serum Na >135 mmol/L. Chronic means > 48 hours. Acute means < 48hrs.

Etiology:

Renal water loss (U osm <700-800)

- loop diuretics
- Osmotic diuresis (hyperglycemia, mannitol, urea)
- Diabetes Insipidus: Central (trauma/post-surgical, pituitary lesions, sheehan's syndrome) vs Nephrogenic (congenital, sickle cell, hypercalcemia, severe hypokalemia, drugs: lithium, amphotericin)

Extra-renal water loss (U osm >700-800)

- GI loss: vomiting, NGT, osmotic diarrhea, lactulose, malabsorption
- Insensible loss: fever, burns, exercise
- hypertonic intake: hypertonic saline, excess salt intake, hypertonic sodium bicarb pushes

Evaluation: U osm, U Na, volume status

- Causes is often apparent from history and review of medications, nutrition, and intake/output
- Determine if there is inappropriate renal free water loss
- In DI, urine will be inappropriately dilute (<300 mOsm/L). Water deprivation test will result in rising serum Na and persistently dilute urine. Desmopression response after deprivation can differentiate nephrogenic (no response) vs central (concentrated urine)

Management

Step 1: calculate free water deficit. Can also use MD Calc

- $$\text{water deficit} = \% \text{ body water} \times \text{mass (kg)} \times \left(\frac{\text{current Na} - \text{ideal Na}}{\text{ideal Na}} \right)$$

- % body water for 0.6 for male and 0.5 for female. If elderly use 0.5 for male and 0.45 for female
- Give free water deficit enterally
- Do not forget to correct Na if hyperglycemia also present

Step 2: Rate of correction

- Divide free water deficit by 24hrs and give accordingly. Check serum Na every 6-12hrs to adjust correction rate and follow urine output
- Rate of correction depends on acuity of onset and risk:
 - chronic (>48hrs): 12 mEq/d appears safe w/o risk of cerebral edema
 - acute (<48hrs): may decrease Na by 2 mEq/L/h until Na 145
 - hyperacute (min-hrs) & life threatening (ICH, seizure): rapidly infuse D5W plus minus emergent HD

Diagnosis and Management of Disorders of Body Tonicity-Hyponatremia and Hypernatremia

Rate of correcting of hypernatremia

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