SODIUM and hyponatraemia

Aim: To underscore the importance of Sodium management to students and junior nurses. For senior nurses to have a refresher on sodium handling and pathophysiology

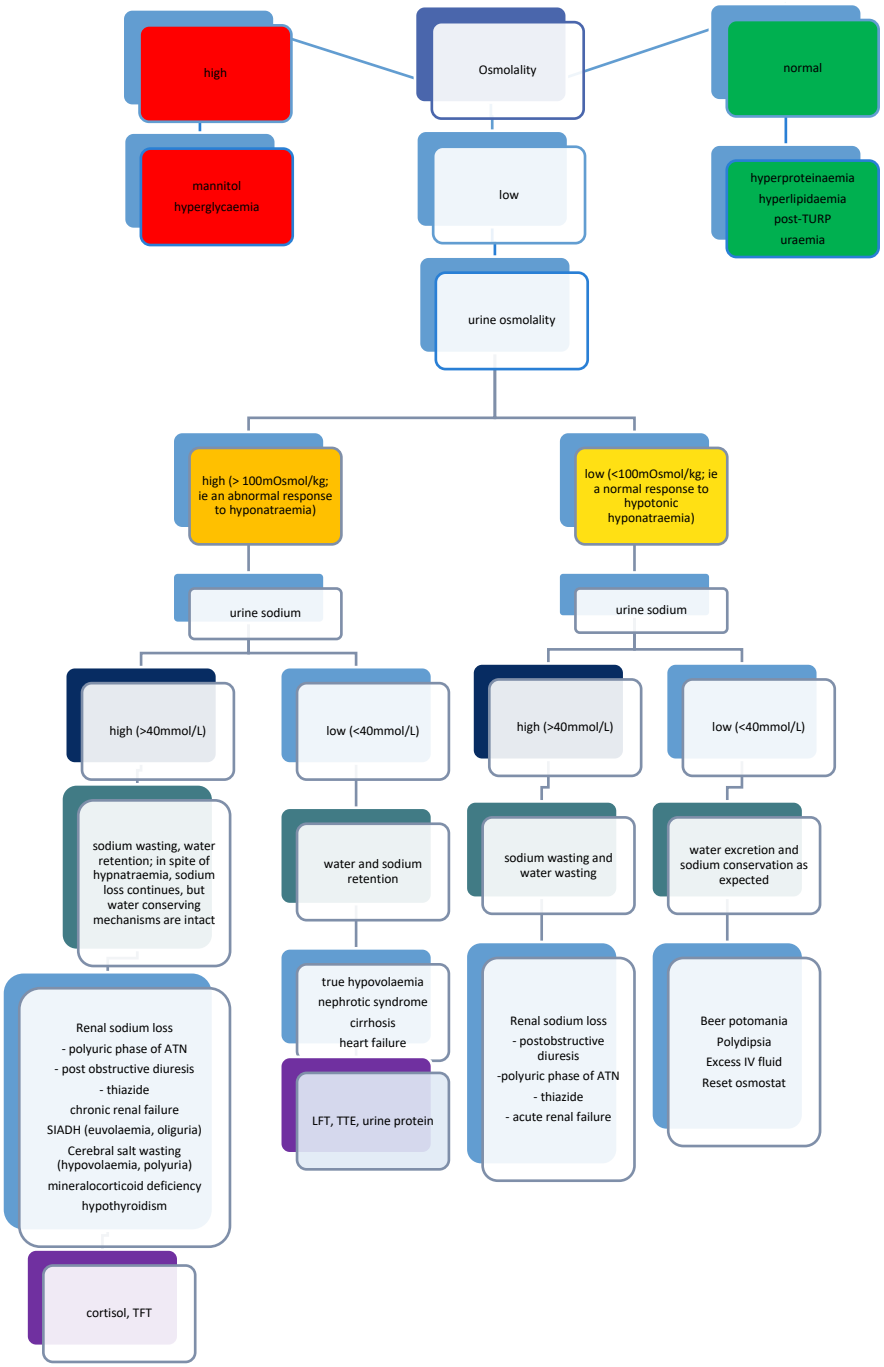
Structure:
Introductory spiel. I usually point out that sodium is one of the most abundant elements on Earth (2.6% of earth's crust). It is one of the lower atomic mass elements generated in stellar fusion reactions, hence its relative abundance. Sodium is the main monovalent cation in the body, and the main one that controls osmotic balance between ECF and ICF. Hence abnormal sodium handling has deep implications. This session will explain how we diagnose sodium disturbances and why we prescribe the therapy that we do.

Content:
Intro – whatever you like
Osmosis

- Explain a little bit about thermodynamics, entropy and osmosis
- Demonstrate the importance of sodium
    - Can be illustrated by pointing out that it is the only cation in the calculated osmolality equation
    - Mention some other important molecules

Hyponatraemia

- Explain concerns about chronicity and plasma tonicity
- I recommend reproducing the following structure


Osmolality
high
mannitol
hyperglycaemia
low
urine osmolality
normal
hyperproteinaemia
hyperlipidaemia
post-TURP
uraemia
high (> 100mOsmol/kg; ie an abnormal response to hyponatraemia)
urine sodium
high (>40mmol/L)
sodium wasting, water retention; in spite of hypnatraemia, sodium loss continues, but water conserving mechanisms are intact
Renal sodium loss
- polyuric phase of ATN
- post obstructive diuresis
- thiazide
chronic renal failure
SIADH (euvolaemia, oliguria)
Cerebral salt wasting (hypovolaemia, polyuria)
mineralocorticoid deficiency
hypothyroidism
cortisol, TFT
low (<40mmol/L)
water and sodium retention
true hypovolaemia
nephrotic syndrome
cirrhosis
heart failure
LFT, TTE, urine protein
low (<100mOsmol/kg; ie a normal response to hypotonic hyponatraemia)
urine sodium
high (>40mmol/L)
sodium wasting and water wasting
Renal sodium loss
- postobstructive diuresis
-polyuric phase of ATN
- thiazide
- acute renal failure
low (<40mmol/L)
water excretion and sodium conservation as expected
Beer potomania
Polydipsia
Excess IV fluid
Reset osmostat

By the end of the talk the nurses should have an idea of the complexity of diagnosing cause of hyponatraemia, and the implications of wrong treatment. It's always good to finish off with a case – usually someone in NSICU!