Calderdale and Huddersfield NHS Foundation Trust

ED Case of the week 8

Learning points

- Causes of hyponatraemia
- Correction guidelines and targets

The Case:

- 54M with history of alcohol dependence was found collapsed at home by his Mum
- In ED - confused, no recollection of events, vomiting ++
- A - maintaining but vomiting ++, B - Sats 82% on 15L O2, RR 40, Coarse crackles bilaterally, C - CRT 5s peripherally, 3s centrally, HR 95, BP 228/105, GCS 14, Abdomen distended but BS present. Looked very unwell.
- Blood gas - pH 7.31, Na+ 102, K+ 4.1, Glucose 12, Lactate 8, Bicarb 17
- Working diagnosis: Aspiration pneumonia, hyponatraemia

Initial thoughts:

- Super sick!
- Potential airway at risk with vomiting, high oxygen requirement, hypertensive (Possibly a clue for cerebral oedema), very very low sodium

Hyponatraemia - low sodium

Normal is >135 mmol/L, Mild 130-135, Mod 125-129, Severe <125

So 102 is very severe!

What are the issues? Why do we worry about low sodium?

- Confusion, vomiting, seizures
- In severe cases such as this - cerebral oedema which is life threatening

Causes? Well, a lot…

Most of the time it will be medications, failures (heart / liver / renal) or dehydration.

This article covers everything hyponatraemia and has an excellent flow chart diagram… but it's a bit MAU rather than Emergency Medicine.

The emergency bit… when do we need to act in ED?

- Guidelines generally suggest hypertonic saline when there are 'moderate or severe symptoms'
- Society for Endocrinology guidance suggests:
  - Persistent vomiting
  - Cardiac arrest (fair enough! Sounds quite severe)
  - Seizures
  - Reduced GCS or 'confusion'

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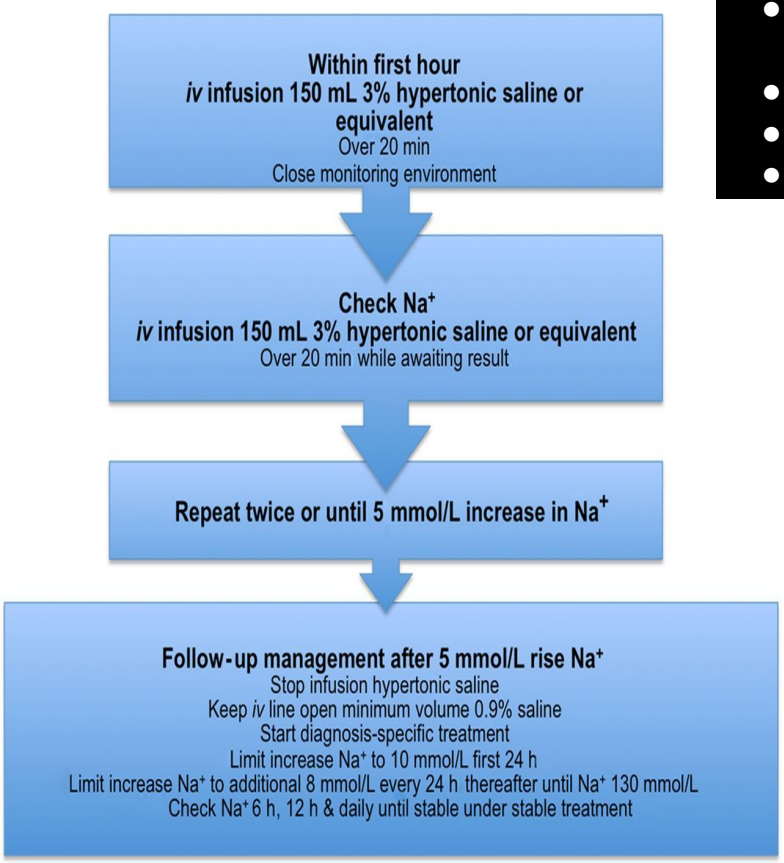
Back to the Case:

- Started on airvo, given Abx, given **hypertonic saline**, Catheter and NG tube inserted, surgical and critical care reviews planned.
- Then had PEA arrest for 10 mins before ROSC
- Intubated and taken to ICU after ROSC and stabilisation in ED
- CT Head / Thorax / Abdomen / Pelvis:
  - Bilateral pneumonia
  - Brain parenchymal swelling with impending herniation
- Remains an inpatient in ICU currently

Cerebral oedema - note squashed ventricles

Management of severe hyponatraemia

- Severe hyponatraemia, as well as addressing underlying causes, is treated with hypertonic saline (either 2.7% or 3%, whichever is stocked)
- Guidelines for replacement all suggest very similar regimes, CHFT uses the Society of Endocrinology guideline (below). Found on EMBeds.
- It's a difficult balance between replacing the sodium to stop seizures / cerebral oedema but not too quickly that it causes Central Pontine Myelinolysis which can lead to Locked-in syndrome. Evidence is mostly aimed at stable patients



Targets

- An initial rise of 5mmol/L (then stop hypertonic saline)
- No more than 10mmol/L in the first 24 hours
- Or 8mmol/L / 24 hours after this
- Sodium needs to be re checked regularly

And if we over shoot it? Options are:

- Hypotonic solutions e.g. Glucose 10ml/Kg
- NG Water if absorbed (so not this case)
- Desmopressin
- Diuretics
- (Guided by clinicians with experience in managing these complicated patients)

Key takeaway points

- Indications for hypertonic saline
- Correction targets
- What to do if over corrected
- These patients should be managed in a critical care environment