# Hyponatraemia Protocol 2020

## Definition

Plasma sodium < 135mmol/L

This reflects the concentration of Na in plasma water and tells us NOTHING about the patient's volume state.

## Causes

1. Volume depletion hyponatremia
    - *Diuretics*
    - *GIT losses*
    - *Mineralcorticoid deficiency*

2. Euvolemic hyponatremia
    - SIADH
    - Post-operative water retention
    - Hypothyroidism
    - Glucocorticoid deficiency
    - Psychogenic polydipsia (water intoxication)

3. Volume overload hyponatremia
    - CCF
    - Cirrhosis
    - Nephrotic syndrome
    - Chronic Kidney Disease

4. Pseudohyponatremia (normal or increased plasma osmolality) eg. marked hyperglycaemia, hyperlipidemia, myeloma. These are rare with modern analysers.

## Clinical Features

Symptoms of cerebral oedema

- Most are asymptomatic
- Mild to Moderate
    - Lethargy
    - Nausea
    - Headache
    - Gait abnormalities
    - Muscle cramps
    - Milder forms of neurocognitive impairment

- Severe
    - Confusion
    - Seizures
    - Coma

## Evaluation and diagnosis

- **Assess volume status –** examination of fluid status, fluid balance charts, GI losses, medications
- **Assess clinical significance**
    - Look for severe manifestations
    - Hyponatraemia with mild or no symptoms can be managed less aggressively
- **Biochemistry**
    - Plasma and urine osmolality
        - Once plasma osmolality falls to ≤270mosm/kg urine should be maximally dilute (< 100mosm/kg) as with water intoxication. A value higher than this suggests SIADH, thiazide, volume depletion.
    - Urinary Na and K
- **Plasma cortisol and thyroid function if diagnosis unclear**

## Management

Treat the cause

*Severe and symptomatic hyponatremia* (Na<120mmol), should be managed in resus bay or in the ICU, as there is a risk of cerebral complications and DEATH.

***Always discuss this with the Consultant***

**Must monitor patient and serum sodium closely**

**Targets for correction**

- 4-6mmol/L increase in Na sufficient to reverse the most serious manifestations of acute hyponatraemia
- Do not correct>10mmol/L in 24hours, of >18mmol/L in 48hours, due to risk of osmotic demyelination
- Do not correct >8mmol/L in 24hours in patient who have alcoholism, advanced liver disease, malnutrition, hypokalaemia or Na<105mmol/L (high risk osmotic demyelination)

**<u>Volume depletion hyponatremia</u>**

Rehydration with 0.9% saline is sufficient for hyponatremia associated with volume depletion

- Fluid resuscitation to stabilise blood pressure
- Patient must be in ICU
- In haemodynamically stable patients, give 0.9% saline (normal saline) 1L over 6hours, then REPEAT serum Na.

- Monitor serum Na every 6hours until Na>125mmol/L

**Euvolemic hyponatremia**

Water restriction (begin 800 ml/day)

Hypertonic saline (3% NAC1 510mmol/L) may be used in severe and/or symptomatic hyponatremia and requires great care not to correct hyponatremia quickly. This formulation can be found in the ICU (usually keep 1-3 bags at a time).

- **Must discuss with consultant first**
- **Patient must be in ICU**
- Start infusion of 3% saline at body weight (in kg) → in ml/hour
  - 70kg patient: infusion at 70ml/hour
  - Expect this to increase Na by 1mmol/L/hr BUT this is only a rough guide. Treatment should be focused on monitoring rather than calculated sodium deficit.
- Measure serum Na every 4hours until Na stable > 125mmol/L. STOP 3% saline infusion once Na has risen by 6mmol

**Volume overload hyponatraemia**

Restrict salt intake. Restrict water intake to 1L/day initially. Frusemide starting at 40mg or 20mg iv bolus. Monitor Na, K and Cr

***Key Points***

- ALWAYS measure serum Na every 4 hours during the initial 24 hours if initial Na<120mmol
- ALWAYS seek consultant advice
- Hypertonic saline should only be used in ICU or resus areas.

**Reference**

Verbalis et al Diagnosis, Evalution, and Treatment of Hyponatremia: Expert Panel Recommendations. Am J Med 2013; 126:S1-S41