

## Southern Derbyshire Shared Care Pathology Guidelines

### Hyponatraemia in Adults

#### Purpose of Guideline

The investigation and management of adult patients with newly diagnosed hyponatraemia.

**Hyponatraemia is defined as a plasma sodium greater than 146 mmol/L. The clinical significance of hyponatraemia depends on its severity, speed of onset and underlying cause. It is usually due to a deficiency of water, rather than an excess of sodium.**



The laboratory will telephone new sodium results above 150 mmol/L during GP practice opening hours, and 155 mmol/L or above to Derbyshire Health United out of hours.

#### Symptoms

Primarily neurological and reflect changes in brain volume (shrinkage). They range in severity and include:

- Headache
- Confusion
- Nausea and vomiting
- Lethargy
- Irritability
- Seizures
- Nystagmus
- Myoclonic jerks
- Loss of consciousness
- Coma

There is no specific concentration at which they may occur and hyponatraemia developing over days to weeks may be relatively asymptomatic, even with Na >160 mmol/L. There may be additional symptoms which reflect the underlying cause.

Even mild hypernatraemia is an extremely potent stimulus of thirst, although this diminishes over time. Therefore it usually only develops if there is restricted access to fluids or an inability to express thirst.

Orthostatic hypotension and other signs of hypovolaemia may also be present, although are late signs, due to the fact that free water losses are primarily from the intracellular fluid space. The intravascular fluid volume is relatively protected until Na reaches around 170 mmol/L.

### **Risk factors for Hypernatraemia**

- Age >65
- Dementia, other mental or physical disability
- Residential care settings

### **What are the main causes of hypernatraemia?**

Hypernatraemia is almost always due to excess water loss or inability to replace normal insensible loss by drinking.

Excessive intake of sodium is an uncommon cause, but may be suggested by a non-elevated urea, and could raise the possibility of deliberate self harm or abuse. This is difficult to diagnose, but if suspected it is useful to check serial weights and paired blood and random urine samples.

### **There are three common causes for hypernatraemia**

#### *Low fluid intake*

Anything which impairs thirst, swallowing or access to water. Fluid losses will be exacerbated by fever, high ambient temperature or thyrotoxicosis.

#### *Diabetes insipidus (DI)*

This may be central (pituitary), due to lack of ADH secretion, or nephrogenic, due to renal resistance to ADH. Polyuria and polydipsia are the main symptoms. The commonest cause is treatment with lithium which causes nephrogenic DI. Any history of current or previous lithium use is relevant: even if levels have always been within the therapeutic range. Central DI may result from head injury or pituitary disease.

#### *Hyperosmolar hyperglycaemic state (HHS), previously called Hyperosmolar non-ketotic state ("HONK")*

This is a decompensated form of type 2 diabetes. Severe, prolonged hyperglycaemia causes osmotic diuresis with a net loss of free water. Plasma sodium tends to be diluted by the osmotic pull of water from the intracellular to the extracellular space, thus the "true" sodium is higher still.

### **Other causes**

Endocrine disorders causing excess adrenal steroid secretion, ie Cushing's and Conn's syndromes rarely cause severe hypernatraemia, but sodium may be at or just above the upper limit of normal (146 mmol/L). There are usually other clinical features present, eg hypertension, signs of Cushing's.

### **What other information are needed in the hypernatraemic patient?**

- Symptoms and signs of neurological disturbance
- Presence or absence of thirst
- Fluid balance information: is the patient drinking? Is there polyuria/polydipsia?
- Blood pressure
- Volume status: hypovolaemia, euvolaemia or oedema
- Medical and drug history

### **What other investigations are needed in the hypernatraemic patient?**

- U&E
- Glucose
- Osmolality
- Urine Na and osmolality

### **Urine osmolality (on a random sample) is the single most important test**

When lack of water intake is the cause, the urine will be maximally concentrated, ie osmolality  $>750$  mmol/kg. In diabetes insipidus the urine is inappropriately dilute, ie less than this and usually lower than the plasma osmolality. In HHS/HONK the urine and plasma osmolalities are similar to each other, ie around 350-450 mmol/kg.

### **Which patients should be referred?**

Indications for urgent admission to hospital are:

- Na  $>155$  mmol/L
- Na 146-155 mmol/L with neurological disturbance or an inability to drink adequately
- Presence of HHS, ie hypernatraemia plus hyperglycaemia  $>20$  mmol/L

### **Treatment**

Hypernatraemia indicates that water intake is insufficient. If the cause of this cannot be rectified admission for intravenous fluids will be necessary. If oral fluids can be increased and plasma sodium is  $<155$  mmol/L it may be possible to manage without admission but daily review and U&E testing will be required. Excessively rapid reduction in plasma Na may cause acute cerebral oedema.

**Contacts**

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