

# In Time And With Water Everything Changes



## Abstract

Water is one element key to human existence, which enables life to use it as an essential building material.

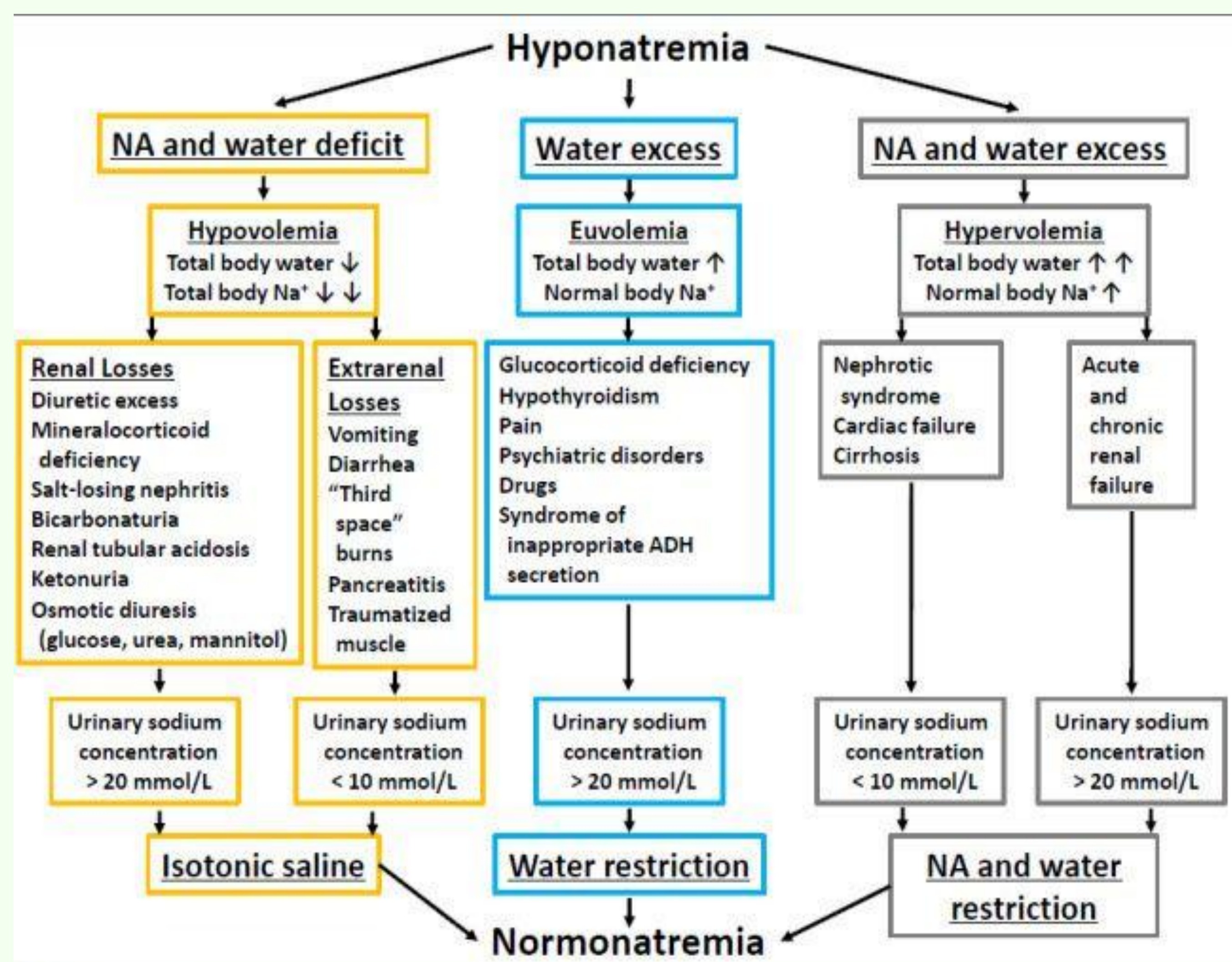
Leonardo Da Vinci observed-

"In time and with water everything changes"

Water imbalance may deleteriously impact Sodium homeostasis.

In the Emergency Department(ED), we frequently encounter hyponatremia(low sodium), especially in the elderly population wherein the cause is largely pharmacological. Hyponatremia, however, can also occur in young adults and children. Severe hyponatraemia is rare but often presents as a diagnostic conundrum.

We present the clinical course and management of a young adult female presenting to our ED in a state of coma. After extensive workup we found the single cause of coma and her emergent presentation to be hyponatremia.



A 31 years old female visitor from Orlando/USA presented to the Emergency Department with acute confusion, generalized tonic clonic seizure and a low Glasgow coma scale.

Her friend reported that patient only had a background of menorrhagia and chronic headaches.

Clinically she was cerebrally agitated, afebrile but haemodynamically stable. Her Central nervous examination showed hyperreflexia with downgoing plantars. The rest of her systemic examination was normal. There were no signs of trauma.

Her ECG showed a long QT.

Her arterial blood gas showed:

Sodium 114mmol/L, lactate 4.7, calcium 1.08 haemoglobin 10.8  
These were formally confirmed by our lab.

The initial Differential Diagnosis included Hyponatremia, Sub arachnoid bleed, SAIDH, meningitis/encephalitis, hypocalcaemia, drug/alcohol intoxication and Anaemia.

She was intubated and admitted by ITU

Her initial CT head was reported as having low signal areas in fronto-parietal lobe ? Sub - arachnoid haemorrhage. The CT head was repeated and reported as normal. Her CT Venogram including lumbar puncture was normal also.

She was treated with IV Antibiotics, hypertonic saline and DDAVP, Calcium and magnesium were replaced.

After review by Neurosurgeons it was decided that she be managed conservatively and they were of the opinion that her symptoms resulted from low sodium levels.

Her endocrine levels and steroid levels were normal as was the toxicology screen

Four days after admission and correction of her hyponatraemia she was extubated and continued to improve symptomatically. Her Sodium level was 138 on discharge

A Final diagnosis of Psychogenic polydipsia was made.

## Discussion

In most instances the Endocrine and Renal systems function actively to maintain Sodium balance, despite fluctuations in water intake and loss.

Hyponatremia can manifest as a consequence of Gastroenteritis, Excessive sweating, pancreatitis, perforation, burns, renal loss or insufficiency, drugs such as diuretics and Cerebral salt washing syndrome. Pseudohyponatremia can be seen in multiple myeloma.

Psychogenic polydipsia is usually seen in psychiatric illness and it is assumed that a central defect in thirst regulation plays a role.

Mild hyponatremia is not often associated with severe morbidity.

Moderate to Severe Hyponatremia may manifest as headache, nausea, vomiting through to seizures, neurological damage, coma and death.

However, it is generally accepted that the rate of change of Serum sodium concentration has a more significant impact on the severity of symptoms

Onset	Comments
Chronic	sodium (salt) levels drop gradually over several days or weeks and symptoms and complications are typically moderate
Acute	sodium (salt) levels drop rapidly, resulting in potentially dangerous effects, such as rapid brain swelling, which can result in coma and death

Management involves slow correction of Sodium, treatment of precipitating factors and infections.

The greatest fear for the Emergency physician(EP)is the development of Osmotic Demyelination Syndrome(ODS),involving the breakdown of neuronal myelin sheaths. This condition occurs when hyponatremia is too rapidly corrected.