

Hyponatremia

A plain-English guide for you and your family

WHAT IS HAPPENING

Your blood needs the right mix of water and sodium (salt) so that cells can work. A hormone called ADH (made by the pituitary gland at the base of your brain) tells your kidneys how much water to keep or pee out. When your blood gets too salty, ADH goes up and your kidneys hold water to dilute it back down. When your blood gets too watery, ADH should drop so your kidneys dump the extra water. Low sodium (Hyponatremia) happens when that balance breaks: either ADH stays high when it should be low (from things like certain medicines, lung infections, brain problems, nausea, or low thyroid), or your body is holding water because it thinks it is dehydrated even though it is not (like in heart failure or liver failure), or you lost sodium faster than water (from vomiting, diarrhea, or water pills called thiazides), or you drank way too much plain water (beer, tea, or psychogenic excessive thirst (polydipsia)). When sodium in the blood drops, water rushes into brain cells to balance the salt, and the cells swell. If sodium drops in hours, the swelling happens fast and causes headache, confusion, seizures, or even coma. If sodium drops over days, your brain has time to pump out tiny particles (organic osmolytes) to shrink itself back down, so you may feel fine. The danger comes if sodium is raised back up too fast—your brain has not had time to pull those particles back in, so it shrinks too much and the coating around nerve fibers (myelin) gets damaged, causing osmotic demyelination syndrome, which can leave you paralyzed or locked in. That is why doctors fix chronic low sodium slowly and carefully.

What you might feel

- Headache
- Nausea and vomiting
- Confusion or trouble thinking clearly
- Muscle cramps or weakness
- Seizures (sudden shaking or blackout spells)
- Lethargy or extreme sleepiness
- Coma (unresponsive, cannot be woken)

- Dry skin and low blood pressure (hypovolemic signs)
- Swollen legs, belly, or face (hypervolemic signs)
- Normal skin turgor and blood pressure (euvolemic signs)

Call the doctor right away if...

- Seizures or sudden shaking spells
- Coma or cannot be woken up
- Sodium below 120 mEq/L or dropped more than 10 mEq/L in 24 hours
- Severe confusion or inability to speak clearly
- Trouble breathing or very slow heart rate

What the care team will do

- Check mental status every 1 to 2 hours and watch for new confusion, sleepiness, or seizure activity
- Start seizure precautions: pad the bed rails, keep suction at bedside, and have 3% hypertonic saline ready at the bedside
- Measure and record every milliliter of fluid the patient drinks and every milliliter of urine output each shift
- Check sodium level 2 to 4 hours after giving hypertonic saline or starting treatment, then every 6 hours until stable
- Hold all diuretics, NSAIDs, SSRIs, and carbamazepine until the doctor reviews the medication list
- Restrict oral and IV fluids to 500 to 1000 milliliters total per day if SIADH or heart failure is the cause
- Check orthostatic vital signs (blood pressure and heart rate lying down, then standing) if the patient looks dry or reports thirst
- Send urine sodium, urine osmolality, and serum osmolality to the lab before starting treatment

Medicines you may be given — and why

Hypertonic saline 3%

Floods the blood with extra sodium so the blood's salt level rises quickly, pulling water out of swollen brain cells and stopping seizures or confusion.

Normal saline 0.9% (intravenous)

Refills the blood volume with salt water that matches your blood's normal concentration, raising sodium when the real problem is that you are dehydrated and have lost both water AND salt.

Fluid restriction

Limits how much you drink each day so your kidneys can slowly pee out the extra water without adding more, allowing your blood sodium to concentrate back to normal.

Oral salt tablets (sodium chloride)

Adds extra salt directly into your stomach and blood, raising the blood's sodium level when you are losing salt (diuretics, salt-wasting kidney disease, adrenal failure) or cannot concentrate your urine enough.

Tolvaptan (Samsca)

Blocks ADH's grip on the kidneys so you pee out pure water without losing sodium or potassium, slowly concentrating your blood sodium back to normal.

Desmopressin (DDAVP)

Mimics ADH to make your kidneys hold onto water and STOP peeing, used as a rescue to re-lower sodium if hypertonic saline or tolvaptan raised it too fast and you are at risk for brain damage.

Urea (powder or capsules)

Pulls water into the kidney tubules by osmosis and blocks ADH's ability to suck it back, so you pee out free water and raise your blood sodium — often better tolerated long-term than tolvaptan.

Hydrocortisone (or prednisone)

Replaces missing cortisol (the adrenal gland's main stress hormone) when adrenal insufficiency is causing low sodium (hyponatremia), shutting off the inappropriate ADH release and letting your kidneys pee out the extra water.

Levothyroxine (Synthroid)

Replaces missing thyroid hormone when severe hypothyroidism (very low thyroid function) is causing low sodium (hyponatremia) by slowing your metabolism, dropping your blood pressure, and triggering ADH release; restoring thyroid levels lets your kidneys excrete water normally again.

Where this information comes from

- European Society of Intensive Care Medicine hyponatremia guideline 2014
- American Society of Nephrology expert panel on hyponatremia
- UpToDate clinical reference (Nephrology)
- New England Journal of Medicine clinical review 2015

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