

Myxedema Coma

A plain-English guide for you and your family

WHAT IS HAPPENING

Your thyroid gland sits in the front of your neck and makes thyroid hormone — the fuel switch for your whole body. That hormone tells every cell how fast to burn energy. It keeps you warm, makes your heart beat strong and steady, drives you to breathe, and keeps your brain sharp. The adrenal glands (two small glands sitting on top of your kidneys) make cortisol, the main stress hormone that helps you handle big challenges like infection or surgery. Normally these systems hum along together. But sometimes the thyroid fails badly — usually because it has been sick for a long time, or because someone with low thyroid stopped taking their daily levothyroxine pill, or because a big stressor hit (like pneumonia, a heart attack, cold exposure, surgery, or sedating drugs like opioids). When that happens, thyroid hormone drops to almost nothing, and the body's furnace shuts down. Your temperature falls because cells burn fuel so slowly they barely make heat. Your heart slows and pumps weakly because thyroid hormone normally speeds the heart's pacemaker and strengthens the muscle. Your breathing drive drops and carbon dioxide builds up in your blood because the brain's breathing center depends on thyroid hormone to stay alert. Your thinking gets foggy or you become deeply confused because your brain is getting less blood flow and oxygen, and brain cells cannot work right without thyroid hormone. Sodium in your blood falls because swelling inside cells traps water and pulls sodium out of the bloodstream, and your sluggish kidneys cannot fix it fast enough. At the same time, your adrenal glands often fail to make enough cortisol to handle the stress, so blood pressure drops and does not respond well to IV fluids. None of this is random — each weird finding points back to the same broken part: not enough thyroid hormone to run the body. If caught early and treated with thyroid hormone (levothyroxine given through an IV) plus cortisol (hydrocortisone), the body can recover. But if it is missed, the patient can stop breathing, develop dangerous heart rhythms, or die. That is why myxedema coma is a true emergency.

What you might feel

- Very low body temperature (often below 95°F)
- Extremely slow or confused thinking, sometimes completely unresponsive

- Very slow heart rate and low blood pressure
- Breathing is slow and shallow
- Skin looks puffy, thick, and smooth, especially around the eyes and hands
- Hair is dry, coarse, and brittle; outer third of eyebrows may be thin or missing
- Tongue looks thick and voice sounds hoarse or deep
- Unable to urinate much or at all, belly may feel swollen

Call the doctor right away if...

- Body temperature below 95°F (hypothermia)
- Breathing becomes very slow or stops (respiratory failure)
- Completely unresponsive or unable to wake up (coma)
- Heart rate under 50 beats per minute with dangerously low blood pressure (shock)
- Recent infection, surgery, cold exposure, or suddenly stopped taking thyroid medicine

What the care team will do

- Check core body temperature with a low-reading thermometer that goes below 94 degrees Fahrenheit, and recheck every 2 hours
- Start passive rewarming with warm blankets and raise room temperature, but never use heating blankets, hot water, or warming devices directly on the skin
- Monitor respirations every hour and watch for slow breathing rate below 10 breaths per minute or shallow breathing
- Check blood sodium level and monitor strict intake and output every hour; if giving IV fluids, use normal saline and infuse slowly
- Monitor blood pressure and heart rate every 15 to 30 minutes; keep the patient lying flat and raise legs if blood pressure drops below 90 systolic
- Check blood sugar (glucose) every 2 to 4 hours and treat any reading below 70 mg/dL immediately with IV dextrose
- Protect the airway by keeping the head of bed at 30 to 45 degrees if the patient is very sleepy, and keep suction ready at bedside
- Watch for signs of adrenal crisis including sudden worsening confusion, vomiting, severe low blood pressure, or abdominal pain, especially in the first 24 hours of treatment

Medicines you may be given — and why

Levothyroxine (IV)

Levothyroxine is synthetic T4, the same thyroid hormone your thyroid gland normally makes. It replaces the missing hormone immediately through the vein, so every cell in your body gets the fuel it needs to make energy, keep you warm, and wake up your brain and heart. The IV route is used because a patient in myxedema coma cannot absorb pills reliably from their gut, which is sluggish and swollen.

Liothyronine (IV T3)

Liothyronine is synthetic T3, the active form of thyroid hormone that cells use directly. It works faster than levothyroxine (T4) because it does not need to be converted first. Some doctors add a small dose of IV T3 to IV T4 in the sickest patients to speed up recovery, though guidelines vary and many centers use T4 alone.

Hydrocortisone (IV)

Hydrocortisone is synthetic cortisol, the stress hormone your adrenal glands normally release to help your body handle illness, injury, or low blood sugar. In myxedema coma, the adrenal glands may also be weak (about 5–10% of patients have both low thyroid and low adrenal function, called secondary adrenal insufficiency). Giving thyroid hormone without cortisol can speed up metabolism so fast that the adrenals cannot keep up, triggering a life-threatening adrenal crisis (shock, dangerously low blood pressure, and collapse). Hydrocortisone is given first or at the same time as thyroid hormone to prevent this.

Normal saline (IV, 0.9% sodium chloride)

Normal saline is sterile salt water that matches the salt concentration in your blood. In myxedema coma, patients are often dehydrated (from not drinking) and have low sodium (from the kidneys holding onto too much water and losing sodium). IV saline slowly replaces lost fluid and raises sodium back to a safe level, which helps the brain, heart, and kidneys work properly.

Antibiotics (empiric broad-spectrum, e.g. ceftriaxone + azithromycin or vancomycin + piperacillin-tazobactam)

Infection (pneumonia, urinary tract infection, skin infection) is the most common trigger of myxedema coma. Antibiotics kill or stop the growth of bacteria, treating the infection that pushed the patient into crisis. Broad-spectrum antibiotics are started immediately (before culture results are back) to cover the most likely bacteria, then narrowed once the specific bug is identified.

Passive warming (blankets, warm room air)

Patients in myxedema coma cannot make enough body heat because their metabolism is so slow. Passive warming uses blankets and a warm room (around 75–80°F) to stop further heat loss and let the body slowly warm itself as thyroid hormone begins to work. Active warming (heating blankets, warm IV fluids) is avoided because it dilates blood vessels too fast, dropping blood pressure dangerously before the heart is strong enough to compensate.

Where this information comes from

- American Thyroid Association (ATA) Guidelines on Hypothyroidism
- Endocrine Society Clinical Practice Guideline on Hypothyroidism
- UpToDate Clinical Overview on Myxedema Coma
- Journal of Clinical Endocrinology & Metabolism

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