

Neonatal Hypoglycemia

A newborn's blood sugar can drop too low in the first hours and days — feed early, check the level, and give sugar through a vein if the baby is sick or the number stays under 47.

THE ONE-LINE TRUTH

A newborn's blood sugar below 47 mg/dL after the first hour of life is dangerously low and the brain can be hurt if it stays low.

The chain — how it unfolds

1. Blood sugar drops below 47 mg/dL in the first hours after birth — why: The liver cannot release enough glucose (because glycogen stores are empty or the enzymes are missing), or insulin is too high and keeps shoving glucose out of the blood into cells, or the baby is burning sugar faster than the body can replace it (from infection, cold, or breathing trouble). No matter the cause, the blood glucose level falls and the brain's fuel tank starts to run dry.
2. The adrenal glands pour out epinephrine (adrenaline) and the baby gets jittery, sweaty, irritable, and hungry — why: Epinephrine is the body's alarm hormone — it tells the liver to dump glucose, the heart to speed up, and the baby to wake up and cry for food. The jitteriness (fine trembling of the hands and jaw), sweating, fast heart rate, and fussiness are all signs that the body knows sugar is low and is trying to fix it. This is the early warning — if we feed the baby or give sugar now, the brain stays safe.
3. If the blood sugar stays low, the brain runs out of fuel and neurons start to misfire — the baby gets lethargic (very sleepy, hard to wake), floppy (low muscle tone, like a rag doll), stops sucking, or stares blankly — why: Brain cells (neurons) need glucose to make ATP (the energy molecule that powers every electrical signal). When glucose runs out, the neurons slow down or stop firing. The baby looks calm and quiet, but this is not sleep — it is the brain shutting down nonessential functions to save the last bit of energy for the heart and lungs. The floppy muscles happen because the motor cortex (the part of the brain that tells muscles to move) cannot send signals, and the weak suck happens because the brainstem (the part that controls sucking and swallowing) is starving.

4. The brain's electrical system breaks down completely — the baby has a seizure (jerking or stiffening of the arms and legs, eyes rolling back, not breathing for seconds), pauses in breathing (apnea) (stops breathing for more than 20 seconds), or loses consciousness (cannot be woken up) — why: When neurons have no fuel, they either fire all at once in a chaotic storm (seizure) or stop firing completely (apnea, coma). Seizures happen because the cerebral cortex (the outer layer of the brain that controls movement and thought) loses its normal rhythm and fires randomly. Pauses in breathing (Apnea) happens because the brainstem's breathing center shuts off. Both are life-threatening emergencies — the brain is dying from lack of fuel.
5. If the low blood sugar lasts for hours or keeps happening over days without treatment, brain cells die and the baby can have permanent injury — cerebral palsy (trouble controlling muscles), intellectual disability, vision problems, or seizures that come back later in life — why: Neurons can survive a few minutes without glucose, but after 1–2 hours of severe low blood sugar (hypoglycemia) (below 25–30 mg/dL) or repeated episodes of moderate low blood sugar (below 47 mg/dL), cells in the hippocampus (the memory center), occipital cortex (the vision center), and motor cortex start to die. This damage is permanent because brain cells do not grow back. This is why we screen every at-risk newborn, treat fast, and keep checking until the levels stay safe.
6. The moment we give the baby a feeding (breast milk, formula, or sugar water by mouth) or a bolus of dextrose (sugar solution) through an IV, the blood glucose rises, the brain gets fuel again, and the scary signs reverse — why: Glucose enters the blood, crosses into the brain within seconds, and neurons start firing normally again. The jitteriness stops, the baby wakes up, muscle tone comes back, the sucking reflex returns, and if there was a seizure or pauses in breathing (apnea), it stops. This is why early feeding or IV dextrose is life-saving — it fixes the one broken step (low blood glucose) and stops the domino chain before permanent damage happens.

Spot it — what you see, and why

- Jitteriness or trembling: The brain runs almost entirely on sugar (glucose). When blood sugar drops too low, the nervous system misfires, causing shaky, jerky movements—like a car engine sputtering when it runs out of gas.
- Poor feeding or weak sucking: Low blood sugar drains energy from muscles, including the tongue and jaw. The baby doesn't have enough fuel to suck strongly or stay awake long enough to finish a feeding.
- Irritability or high-pitched cry: The brain's neurons (nerve cells) become irritable when they lack glucose. This triggers crying that sounds sharper or more frantic than usual—the baby's way of signaling distress.

- Lethargy or floppiness (hypotonia): When the brain doesn't get enough sugar for too long, it slows down to conserve energy. The baby becomes unusually sleepy, hard to wake, or limp—like a phone in low-power mode shutting off non-essential functions.
- Breathing problems (apnea, fast breathing, or grunting): The brainstem (the lower part of the brain that controls automatic breathing) needs steady glucose. Low sugar disrupts its rhythm, causing pauses in breathing (apnea), shallow breaths, or grunting as the baby works harder to get oxygen.
- Sweating or pale, cool skin: When blood sugar drops, the adrenal glands (small glands above the kidneys) release epinephrine (a hormone that preps the body for emergencies). Epinephrine makes blood vessels tighten and sweat glands open, so the skin turns pale, clammy, and cool to the touch.

Red flags — act now

- Seizures (stiffening, jerking, or blank staring spells)—sign of severe brain fuel shortage
- Lethargy that won't improve with feeding or the baby is too floppy to wake or suck
- Pauses in breathing (Apnea) (pauses in breathing longer than 20 seconds) or blue skin (cyanosis)—the brainstem is struggling
- Blood sugar that stays low (under 50 mg/dL) despite feeding or IV glucose—suggests a deeper metabolic or hormone problem
- No symptoms even though blood sugar is very low—the baby may not be able to signal distress, raising the risk of silent brain injury

Treat it — in this order

1. Feed baby within one hour of birth (breast milk or formula) → Eating triggers the baby's own gut to absorb sugar and the liver to release stored glucose (glycogen) into the blood. Feeding early fills the fuel tank before it runs dry. This prevents low blood sugar (hypoglycemia) in most healthy babies.
2. Check blood sugar at 30 minutes after birth, then before feeds for the first 24 hours → Knowing the actual number tells you if feeding alone is keeping blood sugar safe, or if the baby needs dextrose gel or IV sugar right now. Checking catches dangerous drops before the baby seizes or stops breathing.
3. Apply dextrose gel 200 mg/kg (0.5 mL/kg of 40% gel) to the inside of the cheek, then feed → Sugar soaks through the thin skin inside the mouth (buccal mucosa) straight into the bloodstream, raising blood sugar in 10 to 15 minutes without needing a needle. The gel buys time while you feed the baby so the gut can take over.

4. Start IV dextrose 10% at 5 to 8 mg/kg/min (about 80 mL/kg/day) for babies who stay low after gel and feeding, or who are too sick to eat → Sugar goes straight into the vein, bypassing the mouth and gut, so it works even if the baby cannot swallow or absorb food. IV dextrose raises blood sugar in minutes and keeps it steady while you hunt for the root cause.
5. Give diazoxide 5 to 15 mg/kg/day by mouth (split into 2 or 3 doses) for babies with hyperinsulinism → Diazoxide opens potassium channels in the pancreas beta cells (the cells that make insulin), which tells them to stop releasing insulin. With less insulin, the liver can release stored sugar and fat breakdown can start again, so blood sugar climbs and stays up.

Your top priorities at the bedside

1. Check blood sugar with heel-stick glucose test at 30 minutes of life, then at 1 hour, 2 hours, 4 hours, and before every feed for the first 24 hours in at-risk babies — why: The brain needs constant glucose to work and early detection catches low blood sugar (hypoglycemia) before seizures or brain damage happen because newborn glucose drops fastest in the first 2 hours after the cord is cut
2. Feed the baby within the first hour of birth either by breastfeeding or giving formula, then every 2 to 3 hours around the clock — why: Feeding delivers glucose directly into the bloodstream through digestion and stimulates the baby's own glucose production from the liver which prevents and treats mild low blood sugar (hypoglycemia) without medicines
3. Apply 200 mg per kilogram of 40% dextrose gel to the inside of the baby's cheek and rub it in gently when blood sugar is under 47 mg/dL in a baby who looks well and can suck — why: Buccal dextrose gel absorbs directly through the mucous membranes (wet lining of the mouth) into tiny blood vessels and raises sugar in 10 to 15 minutes without needing an IV stick