

Hypokalemia

A plain-English guide for you and your family

WHAT IS HAPPENING

Potassium is a mineral with a positive charge that lives mostly inside your cells — it is the main positively charged particle in there. A tiny pump in every cell wall (called the sodium-potassium pump) works all the time to keep potassium high inside and sodium high outside; this creates an electrical difference across the wall that lets nerves fire and muscles squeeze. When potassium in your blood drops too low, that difference gets bigger, so cells become jumpy at first — then they get tired and stop working right. You can lose potassium through your kidneys (water pills, vomiting that triggers the kidneys to dump potassium, too much aldosterone hormone, certain kidney diseases, or low magnesium), through your gut (diarrhea or laxative overuse), or potassium can shift from your blood into your cells all at once (insulin, asthma medicines like albuterol, suddenly eating again after starving, or your blood becoming too alkaline). Not eating enough potassium by itself almost never causes this. When potassium drops, your muscles get weak, your gut slows down and can even stop moving (called a stalled gut (ileus)), and in the worst cases muscle can break down (rhabdomyolysis). Your heart is especially sensitive: the electrical signal that resets it between beats stretches out, so the T wave on the heart monitor flattens, a new bump called a U wave appears, and the QT interval (the time from squeeze to reset) gets long. A long QT sets up a dangerous spinning heart rhythm called torsades de pointes, which can stop your heart — this is even more likely if you are taking a medicine that also stretches the QT or if your magnesium is low too. Low potassium also makes digoxin (a heart medicine) much more toxic. The key is to catch and fix low potassium before the heart tips into a rhythm you cannot come back from.

What you might feel

- Muscle weakness, especially in the legs and arms
- Muscle cramps and twitches
- Peeing a lot and feeling very thirsty
- Constipation and bloating
- Abnormal heart rhythm seen on ECG monitor (flattened T waves, U waves, ST depression)
- Feeling your heart skip, race, or flutter (palpitations)

- Complete muscle paralysis, especially if potassium drops very low suddenly
- Trouble breathing or shallow breaths

Call the doctor right away if...

- Potassium below 2.5 mEq/L — high risk of life-threatening heart rhythms
- New irregular or very fast heartbeat, chest pain, or feeling faint
- Sudden severe muscle weakness or paralysis, especially trouble breathing
- Confusion, extreme fatigue, or passing out
- Taking digoxin (a heart medicine) — even mild low potassium can cause dangerous toxicity

What the care team will do

- Place patient on continuous telemetry monitor and watch for peaked T-waves becoming flat, U-waves appearing, ST depression, or wide QRS complex
- Start IV potassium chloride replacement through a pump at no more than 10 milliequivalents per hour through a peripheral arm vein, or 20 milliequivalents per hour if using a central line
- Check magnesium level and give magnesium sulfate IV or magnesium oxide by mouth if magnesium is low
- Assess muscle strength by asking patient to squeeze your fingers, lift legs against resistance, and take a deep breath
- Check blood sugar and give insulin carefully if ordered, because insulin drives potassium from blood into cells and can drop the level more
- Listen to bowel sounds in all four quadrants and ask about last bowel movement
- Hold or call provider about diuretic doses, and review medication list for other potassium-wasting drugs
- Recheck potassium level 2 to 4 hours after IV replacement starts and after each 40 milliequivalents given

Medicines you may be given — and why

Magnesium sulfate or magnesium oxide (if magnesium is low)

Magnesium is needed to keep potassium inside cells. When magnesium is low, the tiny pumps in your cell walls that hold potassium in place stop working right, so potassium leaks out no matter how much you give. Replacing magnesium first fixes the pump so potassium can stay where it belongs.

Potassium chloride (KCl) - oral

This is potassium in pill or liquid form. You swallow it, it dissolves in your stomach, and your gut absorbs it into your blood. Your kidneys and cells then move it where it is needed. Oral potassium is safe and works well when the shortage is mild to moderate and the person has no serious symptoms.

Potassium chloride (KCl) - intravenous (IV)

This is potassium given directly into a vein through an IV line. It skips the gut and raises blood potassium quickly. Use IV potassium when the level is very low (under 2.5 mEq/L), the person has dangerous symptoms (muscle weakness, dangerous heart rhythms), or they cannot swallow.

Spironolactone

Spironolactone blocks aldosterone, a hormone made by the adrenal glands (two small glands on top of your kidneys). Aldosterone tells the kidney to dump potassium into the urine and hold onto sodium. By blocking aldosterone, spironolactone stops the kidney from wasting potassium, so levels stay up without needing constant replacement.

Eplerenone

Eplerenone works just like spironolactone—it blocks aldosterone so the kidney stops wasting potassium. It is more selective, meaning it targets aldosterone receptors more precisely and causes fewer hormone-related side effects (like breast tenderness). Use it when high aldosterone is driving potassium loss and you want to avoid spironolactone's side effects.

Stop or reduce the medication causing potassium loss

Many common drugs force the kidney to throw away potassium. Loop diuretics (furosemide, bumetanide) and thiazide diuretics (hydrochlorothiazide) make you urinate more and dump potassium in the process. Beta-agonists (albuterol inhalers for asthma) push potassium from blood into cells, making the blood level look low. Stopping or lowering the dose of these drugs stops the potassium drain.

Where this information comes from

- KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease
- UpToDate: Hypokalemia — Clinical Features and Treatment
- American Heart Association (AHA) — Electrolyte Disorders and Arrhythmias
- National Kidney Foundation — Potassium and Chronic Kidney Disease

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