

Hyperkalemia

A plain-English guide for you and your family

WHAT IS HAPPENING

Potassium is a tiny charged particle that lives mostly inside your cells. Your heart cells keep a big difference between the high potassium inside and the low potassium outside — this voltage gap is what lets the heart reset after every beat. Every day you eat potassium in food, and your kidneys filter almost all of it out in your urine. A hormone called aldosterone (made by glands on top of your kidneys) and the flow of blood through your kidneys control how much potassium leaves. When your kidneys fail, or when certain medicines block aldosterone, or when cells burst open and spill their potassium into the blood, potassium builds up faster than your kidneys can remove it. That rising potassium in the blood shrinks the voltage gap across the heart muscle membrane. At first the EKG (the heart rhythm tracing) shows tall pointy T waves because the heart recovers faster. As potassium climbs higher, the heartbeat starts to stutter — the P wave flattens, the PR interval stretches, and the QRS (the main spike) gets wide because signals move slowly through thick, sluggish muscle. In the worst case the EKG turns into a smooth sine wave — a gentle rolling hill with no clear beats — and then the heart stops completely or quivers uselessly. This can happen in minutes if potassium spikes fast. The danger is that blood pressure and pulse can look normal right up until the heart stops, so doctors watch the EKG closely and treat the moment they see changes — giving calcium first to shield the heart, then insulin and other medicines to push potassium back into cells or out of the body.

What you might feel

- Often no symptoms at all until the level is dangerously high
- Muscle weakness (especially in the legs and arms)
- Tingling or numbness (paresthesias), especially around the mouth or in the hands and feet
- Heart palpitations (feeling your heart skip, race, or pound)
- Nausea or vomiting
- Slow heart rate (bradycardia)
- Peaked (tall, narrow, tent-shaped) T waves on the EKG

- Widening of the QRS complex on the EKG (the heartbeat spike looks stretched out)
- Flaccid paralysis (sudden limp weakness where muscles go completely soft)
- Shortness of breath or trouble breathing deeply

Call the doctor right away if...

- EKG changes (peaked T waves, wide QRS, flat P waves, or any new rhythm problem) — even if the patient feels fine
- Muscle weakness so severe the patient cannot stand or move arms and legs normally
- Heart rate below 50 or above 120, or any irregular, skipped beats
- Potassium level 6.5 mEq/L or higher (immediate treatment needed)
- Sudden chest pain, shortness of breath, or feeling faint (may signal a dangerous heart rhythm about to start)

What the care team will do

- Place the patient on continuous cardiac monitoring and obtain a 12-lead EKG immediately.
- Establish large-bore IV access and prepare calcium gluconate 1 to 2 grams for immediate IV push if EKG changes are present.
- Administer insulin 10 units IV with dextrose 25 grams IV (one ampule of D50) as ordered.
- Give albuterol 10 to 20 milligrams by nebulizer (breathing treatment) as ordered.
- Check blood glucose before and 30 minutes after giving insulin and dextrose; treat low blood sugar (hypoglycemia) immediately if glucose drops below 70.
- Hold all potassium supplements, potassium-sparing diuretics, ACE inhibitors, and ARBs (angiotensin receptor blockers) until the provider reviews them.
- Monitor urine output every hour and notify the provider immediately if output is less than 30 milliliters per hour or the patient is anuric (making no urine).
- Prepare for emergent hemodialysis if potassium is above 6.5 with EKG changes, the patient has acute kidney injury or end-stage renal disease, or medical treatments are not lowering the level.

Medicines you may be given — and why

Calcium gluconate

Calcium gluconate protects the heart RIGHT NOW. High potassium makes heart muscle cells jumpy and likely to fire at the wrong time, which can cause deadly rhythm problems. Calcium raises the trigger point — it makes each cell need MORE of a signal to fire, so the heart settles

back into a safer zone. This does NOT lower potassium at all; it just buys time while you fix the real problem.

Regular insulin (with dextrose)

Insulin pushes potassium FROM the blood INTO cells, where it is stored safely. Insulin turns on pumps in the cell membrane (called sodium-potassium ATPase pumps) that pull potassium inside. We give dextrose (sugar) at the same time so the insulin does not drop blood sugar too low.

Albuterol (inhaled)

Albuterol is a breathing medicine that also moves potassium into cells. It activates beta-2 receptors on muscle cells, which turn on the same sodium-potassium pumps that insulin uses. This gives you a second way to shift potassium quickly, and it works ALONGSIDE insulin (the effects add together).

Sodium bicarbonate

Sodium bicarbonate raises blood pH (makes the blood less acidic). When blood becomes less acidic, potassium moves from blood into cells in exchange for hydrogen ions. This works ONLY if the patient has metabolic acidosis (acid building up in the blood) (low blood pH from too much acid, NOT from lung problems). If pH is normal, bicarbonate does not help much.

Furosemide (Lasix)

Furosemide makes the kidneys dump extra potassium into the urine and flush it out of the body. It blocks a transporter in the kidney tubules (the tiny pipes that make urine) so salt, water, and potassium all leave the body together. This ONLY works if the kidneys still function — it does NOT help if kidneys are badly damaged.

Patiromer (Veltassa)

Patiromer is a powder you mix with water and swallow. It sits in the intestines and trades calcium for potassium — it grabs potassium from the gut (including potassium that the body dumps into the gut from the blood) and holds onto it, so the potassium leaves the body in stool instead of being absorbed. This is a SLOW fix for chronic (long-term) high potassium, not for emergencies.

Sodium zirconium cyclosilicate (Lokelma)

Sodium zirconium cyclosilicate is another powder you mix and swallow. It traps potassium in the intestines by pulling it into tiny pores in its structure, like a super-fine sponge. The potassium stays locked inside and leaves the body in stool. It works faster than patiromer (starts in 1 hour) but is still not fast enough for true emergencies.

Hemodialysis

Hemodialysis is a machine treatment that cleans the blood when kidneys cannot. Blood is pumped out of the body through a tube, passed alongside a special cleaning fluid (dialysate) across a filter membrane, and returned to the body. Potassium crosses from the blood (high concentration) into the dialysate (low or zero potassium), and the machine throws the dirty fluid away. This is the MOST powerful and reliable way to remove potassium.

Where this information comes from

- KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease
- AHA/ACC 2020 Guideline for the Management of Patients With Valvular Heart Disease
- American Heart Association ACLS Provider Manual
- UpToDate Clinical Guidelines

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