

Acute Kidney Injury

A plain-English guide for you and your family

WHAT IS HAPPENING

Your kidneys are two fist-sized organs that clean your blood every minute of the day. They pull out waste, balance salt and water, and keep dangerous chemicals like potassium from building up. In acute kidney injury—or AKI—that cleaning suddenly slows down or stops, sometimes in just a few hours. Waste starts piling up in your blood. Salt, water, and potassium slip out of balance. Your body swells because it cannot get rid of extra fluid. Most AKI happens for one of three reasons: not enough blood reaches the kidneys (because of dehydration, bleeding, or very low blood pressure), something poisons or damages the tiny filters inside the kidney (like certain drugs, dye used in scans, or a bad infection), or the tube that drains urine gets blocked (by a kidney stone or swollen prostate). The good news is that kidneys can heal if doctors find the cause quickly, fix it, and give the kidneys time to recover.

What you might feel

- Decreased urine output (oliguria < 400 mL/day or no urine output (anuria) < 100 mL/day)
- Swelling in legs, ankles, hands, or face (peripheral swelling (edema))
- Shortness of breath, wet cough, or crackles on lung exam (pulmonary swelling (edema))
- Nausea, vomiting, and loss of appetite
- Itching all over (uremic itching (pruritus))
- Confusion, drowsiness, or altered mental status (uremic encephalopathy)
- Fatigue and muscle weakness
- Full, swollen bladder you can feel in the lower belly (suprapubic fullness)
- Peaked (tall, pointy) T waves or wide QRS on EKG
- Dark or tea-colored urine

Call the doctor right away if...

- Potassium > 6.5 mEq/L or EKG changes (peaked T waves, wide QRS, sine wave)—heart can stop at any moment (cardiac arrest)

- Pulmonary edema (fluid flooding the lungs) (wet lungs, crackles, shortness of breath) not getting better with diuretics (water pills like furosemide)—dialysis needed urgently to pull fluid off
- Uremic encephalopathy (confusion, lethargy), pericarditis (chest pain with friction rub), or uremic bleeding (nose bleeds, bruising)—severe waste buildup in the blood (uremia) requiring urgent dialysis
- No urine output (Anuria) (no urine at all) plus a palpable bladder or hydronephrosis (swollen kidneys) on ultrasound—obstruction blocking urine flow; needs urgent catheter or nephrostomy tube
- Toxic ingestion (methanol, ethylene glycol, lithium, aspirin overdose)—dialyzable poison requiring emergent hemodialysis to remove it before it kills the patient

What the care team will do

- Strict I/O and daily weight
- Recognize high potassium (hyperkalemia) signs early (EKG changes, weakness)
- Hold all nephrotoxic drugs; check every medicine on the list
- Assess for retention with bladder scan when low urine output (oliguria) is new
- Renal-dose all meds and reconcile with pharmacy

Medicines you may be given — and why

Calcium gluconate (10%)

Does not lower potassium—instead it makes the heart's cell membranes less excitable (less likely to misfire) so a deadly heart rhythm does not start while other treatments move potassium into cells or remove it from the body.

Regular insulin + IV dextrose

Insulin drives potassium out of the blood and into cells within 15–30 minutes. Dextrose (sugar) is given at the same time to prevent low blood sugar (hypoglycemia) (dangerously low blood sugar).

Sodium polystyrene sulfonate (Kayexalate)

A powder or liquid given by mouth or rectally that trades sodium for potassium in the gut. As digested food moves through the intestines, the resin grabs potassium and releases sodium. The potassium is then removed from the body in stool.

Patiromer (Veltassa)

A powder mixed with water or soft food that binds potassium in the colon and removes it in stool. Works more gently and predictably than older binders. Exchanges calcium for potassium instead of sodium.

Sodium bicarbonate (IV)

Raises blood pH (makes blood less acidic). When blood becomes less acidic, potassium moves from blood into cells in exchange for hydrogen ions. Most effective when the patient has metabolic acidosis (acid building up in the blood) (too much acid in the blood) from acute kidney injury.

Albuterol (nebulized)

Activates beta-2 receptors on cell membranes, which turn on sodium-potassium ATPase pumps. These pumps pull potassium into cells. Usually used to open airways in asthma, but high doses can lower potassium.

Furosemide (Lasix)

Blocks sodium and chloride reabsorption in the loop of Henle (a part of the kidney tubule). This causes the kidney to dump sodium, chloride, water, and potassium into the urine. Only works if the kidneys still make urine.

Hemodialysis

Blood is pumped out of the body through a machine that filters waste, excess fluid, and potassium through a semi-permeable membrane (a filter with tiny holes). Clean blood is returned to the body. The fastest and most effective way to remove potassium when kidneys have failed.

Where this information comes from

- KDIGO Clinical Practice Guideline for Acute Kidney Injury 2012
- American Society of Nephrology (ASN)
- UpToDate
- National Kidney Foundation (NKF)

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