

Tumor Lysis Syndrome

A plain-English guide for you and your family

WHAT IS HAPPENING

Tumor lysis syndrome happens when cancer treatment works so well that it kills millions of cancer cells at once. Normally, when a few cells die, the kidneys quietly clean up the potassium, phosphate, and uric acid that leak out. But when bulky cancers like Burkitt lymphoma or acute leukemia get hit with chemotherapy, steroids, or targeted drugs like rituximab, so many cells burst open at the same time that the kidneys cannot keep up. Potassium floods the blood and stops the heart's rhythm. Phosphate grabs onto calcium and hides it, leaving muscles twitchy and the brain at risk for seizures. Uric acid crystallizes in the kidney tubes and clogs them like sand in a drain, shutting down the kidneys. All these problems — bad heart rhythm, muscle shaking, kidney failure — come from the same upstream event: too many cells dying too fast. Prevention is the key: IV fluids to flush the kidneys, allopurinol or rasburicase to block uric acid, and close lab monitoring before and after chemo can stop the syndrome before it starts. Once it happens, dialysis may be needed to save the kidneys and the heart.

What you might feel

- Fast or skipping heartbeat (arrhythmia)
- Muscle stiffness, cramps, or twitching (tetany)
- Seizures
- Peeing very little or not at all (acute kidney injury)
- Nausea, vomiting, or diarrhea
- Feeling very tired and weak
- Confusion or feeling 'out of it'
- Flank pain (pain in the sides of the back, near the kidneys)

Call the doctor right away if...

- Heart rhythm suddenly becomes very slow, very fast, or stops (from dangerously high potassium)

- Urine output drops to almost nothing within hours of starting cancer treatment
- Seizure or severe muscle spasms (tetany) that won't stop

What the care team will do

- Place patient on continuous cardiac monitoring and check potassium level immediately if any arrhythmia appears
- Measure intake and output every hour and notify the provider if urine output drops below 100 mL per hour or 2 mL per kilogram per hour in children
- Run IV normal saline at the ordered rate of 3 liters per square meter per day (usually 200 to 250 mL per hour in adults) without stopping for bathroom breaks
- Check basic metabolic panel (electrolytes, creatinine, calcium, phosphate) and uric acid level every 4 to 6 hours during the first 48 hours after chemotherapy
- Hold all potassium-containing IV fluids and medications and remove high-potassium foods from the meal tray
- Administer rasburicase (or allopurinol) exactly as ordered and do not delay doses
- Do not give calcium replacement unless the patient has tetany or seizures and only after notifying provider, because phosphate level must be lowered first
- Prepare for emergency hemodialysis by checking if a temporary dialysis catheter is in place and notifying nephrology if potassium is above 6 mEq per liter despite treatment

Medicines you may be given — and why

Normal saline (IV fluids)

Floods the blood and kidneys with clean water and salt to dilute the dangerous chemicals that spill out when cancer cells die, then flushes them out through the urine before they can clog the kidney filters or cause heart problems.

Allopurinol

Blocks the enzyme (xanthine oxidase) that turns purines – the DNA building blocks released from dying cancer cells – into uric acid, so uric acid never forms in the first place.

Rasburicase

Directly breaks down uric acid that is already in the blood into allantoin, a harmless waste product that dissolves easily in water and leaves the body through urine within minutes.

Phosphate binders (sevelamer, lanthanum, calcium acetate)

Stick to phosphate in the stomach and intestines so the phosphate leaves the body in stool instead of being absorbed into the blood, lowering blood phosphate levels when the kidneys cannot clear it fast enough.

Insulin with dextrose (glucose)

Insulin opens doors on cell surfaces and shoves potassium from the blood back into cells temporarily, and the dextrose is given at the same time to prevent blood sugar from dropping dangerously low.

Sodium polystyrene sulfonate (Kayexalate) or patiromer or sodium zirconium cyclosilicate

Trade sodium (or other cations) for potassium in the intestines, trapping potassium so it leaves the body in stool instead of being reabsorbed into the blood.

Calcium gluconate (IV)

Does not lower potassium, but raises the threshold at which the heart's electrical cells fire, protecting the heart from dangerous rhythms caused by high potassium – like turning up the volume knob so a loud noise does not blow the speaker.

Hemodialysis or continuous renal replacement therapy (CRRT)

Physically removes potassium, phosphate, and uric acid from the blood by pumping it outside the body through a filter (artificial kidney) that separates waste chemicals and extra fluid, then returns the cleaned blood – the fastest and most complete way to clear tumor lysis waste when kidneys fail or chemicals rise dangerously high.

Where this information comes from

- British Society for Haematology (BSH) 2015 TLS guideline
- Cairo-Bishop TLS classification (Journal of Clinical Oncology 2004, updated consensus)
- National Cancer Institute (NCI) PDQ Tumor Lysis Syndrome
- American Society of Clinical Oncology (ASCO) supportive care guidelines

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