Tumour lysis syndrome

Keerat Grewal MD MSc, Elizabeth Herrity DNP RN(EC), Ivan Pasic MD PhD

■ Cite as: *CMAJ* 2023 April 11;195:E515. doi: 10.1503/cmaj.221433

1 Tumour lysis syndrome (TLS) is an emergency

Tumour lysis syndrome is caused by a rapid breakdown of malignant cells releasing cellular contents into the blood.[1] Most often, TLS occurs early after the start of chemotherapy, although it can spontaneously occur before treatment, or with radiation, steroid or targeted treatments in children and adults.[1,2] Mortality may be as high as 20%.[3–5]

2 Patients with hematological malignancies are at a higher risk than those with solid tumours[1,3]

Patients with highly proliferative hematological malignancies — characterized by elevated leukocyte count, lactate dehydrogenase levels and bulky lymphadenopathy (e.g., Burkitt lymphoma, acute lymphocytic leukemia) — and those with renal dysfunction are at an increased risk of TLS.[1,4] Incidence ranges from 3% to 40% among patients with high-risk hematological malignancies.[4] Patients at risk for TLS usually receive prophylactic strategies by their oncologist, such as hydration, allopurinol or rasburicase and frequent electrolyte monitoring.[1,2,4]

3 Clinical presentation is nonspecific

Symptoms and signs of TLS may include anorexia, nausea and vomiting, diarrhea, pain, cramps, tetany, oliguria, paresthesias, weakness, seizures and dysrhythmias.

4 Diagnosis is based on both clinical and laboratory findings

Clinicians should watch for changes in laboratory values from baseline, particularly hyperuricemia, hyperkalemia, hyperphosphatemia, hypocalcemia and an increase in creatinine.[1,2] A laboratory diagnosis of TLS is made with 2 or more of the following: elevated uric acid (≥ 476 µmol/L or 25% increase from baseline), elevated potassium (≥ 6.0 mmol/L or 25% increase), elevated phosphate (≥ 1.45 mmol/L [adults] or 25% increase) and lowered calcium (≤ 1.75 mmol/L or 25% decrease).[1,2] A clinical diagnosis requires a laboratory diagnosis of TLS with either elevated creatinine (≥ 1.5 times the upper limit of normal), seizure or arrhythmia.[1,2] Both laboratory and clinical TLS should be treated.

5 Management should involve nephrologists and oncologists

Management of TLS includes aggressive fluid hydration to improve renal function (urine output 100 mL/m^2/h),[4,5] rasburicase (oxidizes uric acid) to manage uric acid (> 450 mmol/L) and phosphate binders (e.g., aluminum hydroxide) to treat hyperphosphatemia.[5] Hyperkalemia should be treated as usual. Seizures or arrhythmias secondary to hypocalcemia should be treated with calcium.[5] Asymptomatic hypocalcemia typically does not require treatment.[2,5] Dialysis may be required.[1]

References

1. Cairo MS, Bishop M. Tumor lysis syndrome: new therapeutic strategies and classification. *Br J Haematol* 2004;127:3-11.
2. Durani U, Hogan WJ. Emergencies in haematology: tumor lysis syndrome. *Br J Haematol* 2020;188:494-500.
3. Durani U, Shah ND, Go RS. In-hospital outcomes of tumor lysis syndrome: a population-based study using the National Inpatient Sample. *Oncologist* 2017;22:1506-9.
4. Coiffier B, Altman A, Pui C-H, et al. Guidelines for the management of pediatric and adult tumor lysis syndrome: an evidence-based review. *J Clin Oncol* 2008;26:2767-78.
5. Jones GL, Will A, Jackson GH; British Committee for Standards in Haematology. Guidelines for the management of tumor lysis syndrome in adults and children with haematological malignancies on behalf of the British Committee for Standards in Haematology. *Br J Haematol* 2015;169:661-71.

Competing interests: None declared.

This article has been peer reviewed.

Affiliations: Division of Emergency Medicine (Grewal), Department of Medicine, University of Toronto; Schwartz-Reisman Emergency Medicine Institute (Grewal), Sinai Health; Hans Messner Allogeneic Transplant Program (Herrity, Pasic), Division of Medical Oncology and Hematology, Princess Margaret Hospital; Lawerence S. Bloomberg Faculty of Nursing (Herrity), University of Toronto; Department of Medicine (Pasic), University of Toronto, Toronto, Ont.

Correspondence to: Keerat Grewal, Keerat.grewal@sinaihealth.ca