Tumor lysis syndrome

Definition: Tumor lysis syndrome (TLS) is an oncologic emergency that is caused by massive tumor cell lysis and the release of large amounts of potassium, phosphate, and uric acid into the systemic circulation. Deposition of uric acid and/or calcium phosphate crystals in the renal tubules can result in acute kidney injury, which results in oliguria or anuria

TLS is observed most frequently in patients with aggressive and highly aggressive lymphomas (particularly the Burkitt subtype) and T-cell acute lymphoblastic leukemia (ALL) following the initiation of cytotoxic therapy, although it may also occur spontaneously and/or in other tumor types with a high proliferative rate, large tumor burden, or high sensitivity to cytotoxic therapy

Tumor-related and patient-related factors can be used to estimate the risk of TLS in individual patients

Rx: The best treatment is prevention. Our recommendations for prevention and management are based upon a disease-specific estimated risk of TLS

Tumor lysis syndrome (TLS) prophylaxis recommendations based on TLS risk

Low risk disease (LRD)	Intermediate risk disease (IRD)	High risk disease (HRD)
Most solid tumors	Rare, highly chemotherapy-sensitive solid tumors (eg, neuroblastoma, germ cell tumor, small-cell lung cancer) with bulky or advanced stage disease	N/A
MM	Plasma cell leukemia	N/A
CML	N/A	N/A
Indolent NHL	N/A	N/A
HL	N/A	N/A
CLL and WBC <50 x 10^9/L treated only with alkylating agents	CLL treated with fludarabine, rituximab, or lenalidomide, or venetoclax and lymph node ≥5 cm **or** absolute lymphocyte count ≥25 x 10^9/L, and/or those with high WBC ≥50 x 10^9/L	CLL treated with venetoclax and lymph node ≥10 cm, **or** lymph node ≥5 cm **and** absolute lymphocyte count ≥25 x 10^9/L and elevated baseline uric acid.
AML and WBC <25 x 10^9/L and LDH <2 x ULN	AML with WBC 25 to 100 x 10^9/L	AML and WBC ≥100 x 10^9/L
	AML and WBC <25 x 10^9/L and LDH ≥2 x ULN	
Adult intermediate grade NHL and LDH within normal limits	Adult T cell leukemia/lymphoma, diffuse large B-cell, transformed, and mantle cell lymphomas with LDH > ULN, non-bulky	Adult T cell leukemia/lymphoma, diffuse large B-cell, transformed, and mantle cell lymphomas with bulky disease and LDH ≥2 x ULN
Adult ALCL	Childhood ALCL stage III/IV	N/A
N/A	Childhood intermediate grade NHL stage III/IV with LDH <2 x ULN	Stage III/IV childhood diffuse large B-cell lymphoma with LDH ≥2 x ULN
N/A	ALL and WBC <100 x 10^9/L and LDH <2 x ULN	Burkitt's leukemia
		Other ALL and WBC ≥100 x 10^9/L and/or LDH ≥2 x ULN
N/A	Burkitt lymphoma and LDH <2 x ULN	Burkitt lymphoma stage III/IV and/or LDH ≥2 x ULN
N/A	Lymphoblastic lymphoma stage I/II and LDH <2 x ULN	Lymphoblastic lymphoma stage III/IV and/or LDH ≥2 x ULN
N/A	N/A	Intermediate risk disease with renal dysfunction and/or renal involvement
		Intermediate risk disease with uric acid, potassium, and/or phosphate > ULN
Prophylaxis recommendations		
Monitoring	Monitoring	Monitoring
Hydration	Hydration	Hydration
±Allopurinol	Allopurinol	Rasburicase*

N/A: not applicable; MM: multiple myeloma; CML: chronic myeloid leukemia; NHL: non-Hodgkin lymphoma; HL: Hodgkin lymphoma; CLL: chronic lymphoid leukemia; WBC: white blood cell count; AML: acute myeloid leukemia; LDH: lactate dehydrogenase; ULN: upper limit of normal; ALCL: anaplastic large cell lymphoma; ALL: acute lymphoblastic leukemia.
* Contraindicated in patients with a history consistent with glucose-6 phosphate dehydrogenase. In these patients, rasburicase should be substituted with allopurinol.

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Question:

In a patient with intermediate risk for tumor lysis syndrome the best approach is to:

a. Use a loop diuretic
b. Alkalinize the urine
c. Fluid hydration
d. Allopurinol

Answer: C - For all patients at high or intermediate risk of TLS, we recommend aggressive fluid hydration (2 to 3 L/m^2 daily) to achieve a urine output of at least 80 to 100 mL/m^2 per hour