

Tumor Lysis Syndrome

Tumor Lysis Syndrome comprises a number of electrolyte abnormalities which result from breakdown of tumor cells, either spontaneously or due to anti-cancer therapy (chemotherapy, corticosteroids, radiotherapy).

Incidence: It is mainly seen with hematological malignancies, like acute leukemia, and lymphomas (especially with bulky disease). Rarely seen with solid tumors. Usually seen after chemotherapy but may occur after corticosteroid therapy or even spontaneously.

Risk factors: (1) Bulky disease (lymphadenopathy or hepatosplenomegaly)
(2) High pre-treatment serum LDH/ uric acid
(3) Compromised renal function

Timing: Within few hours upto 5 days after treatment

Components:

- (1) Hyperuricemia $> 7\text{mg}\%$
- (2) Hyperphosphatemia $> 5.5\text{ mg}\%$
- (3) Hyperkalemia $> 5\text{ mEq/L}$
- (4) Hypocalcemia

Symptoms:

- (1) Hyperuricemia \rightarrow Acute renal failure (oliguria, oedema)
- (2) Hyperkalemia \rightarrow mild= muscle cramps, weakness
Severe= ventricular arrhythmias, cardiac arrest
- (3) Hyperphosphatemia \rightarrow Acute renal failure
Symptoms of hypocalcemia
- (4) Hypocalcemia \rightarrow Tetany, seizures, cardiac arrhythmias, cardiac arrest

Effects: Acute renal failure (due to uric acid precipitation in the kidneys) due to hyperuricemia.

Acute renal failure (due to calcium phosphate precipitation in the kidneys) & hypocalcemia due to hyperphosphatemia.

Lactic acidosis due to severe hyperkalemia.

Cardiac arrest due to severe hyperkalemia or hypocalcemia.

Prevention:

Prevention is the main management of tumor lysis syndrome as once it occurs, may be difficult to treat.

The important points in prevention are:

- (1) Hydration of the patient starting from at least 1 day prior to therapy, with at least 3 litres/sq. m/ day.
- (2) Allopurinol 300-600 mg/day PO to start at least 1 day prior to therapy.

Investigations:

- (1) Serum electrolytes (Na⁺, K⁺, HCO₃⁻, Cl⁻, corrected Ca⁺⁺)
- (2) Serum urea, creatinine, uric acid
- (3) Arterial blood gases-pO₂, pCO₂, pH

Treatment:

- (1) Hyperuricemia → Hydration (to maintain urine output > 2L/ day), Allopurinol /Rasburicase, alkalinisation of urine (with sodium bicarbonate or acetazolamide). Hemodialysis in severe cases/ renal failure
- (2) Hyperkalemia → Calcium gluconate IV/ glucose-insulin infusion/ potassium-binding resins (oral/via NG tube)/ Beta-adrenergic agonists IV or nebulised, hemodialysis (renal failure/ serum potassium > 6.5 mEq/L),
- (3) Hypocalcemia → Calcium gluconate IV (for tetany) [dose=10 ml of 10% calcium gluconate over 2-3 minutes] followed by oral calcium supplementation
- (4) Hyperphosphatemia → Hydration, Oral phosphate binders, Hemodialysis.
- (5) Lactic acidosis → Hydration, vasopressors, Sodium bicarbonate IV (for severe metabolic acidosis with pH < 7.1)