

Acute Kidney Injury

Acute-angle Kidney-injured

Catabolism of nucleic acids released from the dying tumor cells results in uric acid buildup in the blood. This travels to the kidneys and may result in urate crystal deposition in the renal tubules which can impair urine flow and glomerular filtration rate. Acute kidney injury can also occur from phosphate buildup in the blood as it binds with free calcium to precipitate calcium phosphate crystals.

Lab Findings

Hyperkalemia

Hiker-banana

Hyperkalemia remains the most dangerous component of TLS because it can cause sudden death due to cardiac arrhythmia. Patients should limit potassium and phosphorus intake during the risk period for TLS.

Hyperphosphatemia

Hiker-phosphate-P

Hyperphosphatemia can cause secondary hypocalcemia, leading to neuromuscular irritability (tetany), dysrhythmia, and seizure, and can also precipitate as calcium phosphate crystals in the kidneys, where these crystals can cause acute kidney injury.

Hyperuricemia

Hiker-unicorn

Hyperuricemia occurs as a result of release of nucleic acids from dying tumor cells. The nucleic acids are catabolized to uric acid.

Hypocalcemia

Hippo-calcified-cow

Signs and symptoms of hypocalcemia include neuromuscular irritability, nephrolithiasis, and seizures. Although calcium is released from dying tumor cells, it is not substantial and the released phosphate actually binds free calcium ions in the blood, lowering serum calcium levels.

Management

Aggressive Hydration

Aggressive Water-bottle

Hydration is the most effective preventative measure for tumor lysis syndrome.

Electrolyte Correction

Electric-lights

Electrolytes should be monitored and corrected. Hyperkalemia can be corrected with glucose and insulin while hyperphosphatemia can be corrected with PO phosphate binders/chelators like sevelamer. Hypocalcemia should only be treated if symptomatic. Calcium gluconate is a common option in these cases.

Allopurinol

Aloe-piranha

Allopurinol should be used in patients who are at low to intermediate risk for tumor lysis syndrome. Allopurinol works by blocking xanthine oxidase, thus lowering production of uric acid.

Rasburicase

Raspberry-case

Rasburicase is a recombinant version of urate oxidase that aids in decreasing the levels of uric acid in the blood system. Rasburicase should be used in individuals who are at high risk of developing tumor lysis syndrome and in patients whose baseline uric acid is higher than 7.5 mg/dL.