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Spontaneous tumor lysis syndrome in the setting of *Candida albicans* Fungemia

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ABSTRACT

Tumor Lysis Syndrome (TLS) is a metabolic emergency seen in patients who receive cytotoxic chemotherapy and can result in significant morbidity and mortality, especially in those patients with high tumor burden. Spontaneous tumor lysis syndrome (STLS) occurs in patients without preceding chemotherapy but may occur in the setting of glucocorticoid administration. We present a case of a 75-year-old male with a history of myelodysplastic syndrome who presented with shortness of breath and developed acute renal failure due to tumor lysis syndrome, likely triggered by candidemia. To our knowledge, this is the first known case of STLS in a patient with high tumor burden who did not receive corticosteroids but likely developed this condition in the setting of infection.

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1. Introduction

Tumor lysis syndrome is an oncologic emergency that is manifested by the abrupt onset of acute kidney injury, metabolic acidosis, and electrolyte abnormalities including hyperphosphatemia, hyperkalemia, hypocalcemia, and hyperuricemia [1]. While relatively rare, tumor lysis syndrome is more likely to occur in cancers with high cell turnover, such as hematologic malignancies. TLS can be diagnosed up to seven days after the initiation of cytotoxic chemotherapeutics. Spontaneous tumor lysis syndrome (STLS) is even more rare in that it occurs in the absence of chemotherapy administration.

There have been reports of STLS occurring in patients with myelofibrosis, solid tumors, acute myeloid leukemia, Burkitt lymphoma and non-T-cell acute lymphoblastic leukemia [2-5]. Yang et al. reported a case of STLS in a patient with known myelodysplastic syndrome (MDS) after the patient received methylprednisolone for presumed autoimmune thrombocytopenia [6]. Because a stress response can cause a release of endogenous cortisol, a glucocorticoid hormone, it is conceivable that infection can lead to the development of STLS in a patient who is at risk due to tumor burden. To our knowledge, we report the first case of a patient with known MDS who developed STLS in the setting of *Candida albicans* fungemia.

Case

A 75-year-old male with a past medical history of hypertension, type II diabetes, coronary artery disease, and transfusion dependent MDS, which was diagnosed with a bone-marrow biopsy after not responding to multiple blood transfusions, presented to the emergency department (ED) with a chief complaint of shortness of breath. The patient was in his usual state of health until the day prior to presentation, when the patient's daughter noted elevated systolic blood pressures at home, despite compliance with hypertension medications, and associated fatigue, weakness, and shortness of breath at rest. Progressive shortness of breath the following morning prompted the patient's ED visit.

At triage, the patient's vitals were a pulse rate of 95 beats per minute, blood pressure of 172/81 mmHg, respiratory rate of 24 breaths per minute, and an oxygen saturation of 77% on room air. The patient was placed on 6 L nasal cannula. Despite oxygen support, he continued to have an increased work of breathing, so he was placed on BiPAP 10/5 with an FiO2 of 40%; subsequent oxygen saturations stabilized between 94 and 96%. Physical exam was remarkable for an erythematous maculopapular rash on the trunk and upper extremities, symmetric bilateral lower extremity pitting edema, and lung fields with bibasilar crackles. EKG was notable for ST depressions in the anterolateral and inferior leads. Chest x-ray demonstrated extensive interstitial and airspace opacity throughout both lungs, including a focal large airspace opacity projecting over the mid to lower right lung. The patient's temperature reached a max of 98.9 °F (37.2 °C).

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Initial labs were significant for a B-type natriuretic peptide (BNP) of 5797 pg/mL (ref ≤ 450 pg/mL), high-sensitivity troponin of 853 ng/L (ref 0–79 ng/L), serum creatinine of 2.7 mg/dL (from a baseline of 0.9 mg/dL), WBC 126.1 × 10^3/μL (ref 4–11 × 10^3/μL), absolute neutrophil count of 3600 with a blast count of 106,000. He also had a hemoglobin of 6.7 g/dL, platelets of 49 × 10^3/μL, uric acid 9.6 mg/dL (ref 3.5–7.2 mg/dL), and lactate dehydrogenase 1596 U/L (ref 84–246 U/L). The patient had blood cultures drawn and was started on broad spectrum antibiotics, including intravenous vancomycin and piperacillin/tazobactam.

The patient was transferred to the intensive care unit (ICU) for closer monitoring. Labs in the ICU revealed a potassium of 4.2 mmol/L, phosphorus 7.2 mg/dL, LDH 1856 units/L, uric acid o 11.7 mg/dL, and serum creatinine 3.09 mg/dL. He received a dose of rasburicase for tumor lysis syndrome; however, due to progressive respiratory failure and anuric renal failure, the patient was intubated and started on continuous veno-venous hemofiltration (CVVH). Both his initial blood cultures returned with *Candida albicans*, for which the patient completed a 14-day course of micafungin. He received hydroxyurea for hyperleukocytosis without improvement, and then received two sessions of leukapheresis. He eventually underwent a bone marrow biopsy which confirmed a diagnosis of acute myeloid leukemia with monocytic differentiation.

2. Discussion

We report a case of a patient with known MDS who had conversion to AML and developed STLS in the setting of candidemia. To our knowledge, this is the first known case of STLS in a patient with high tumor burden who did not receive corticosteroids. Three previous cases of STLS occurred after corticosteroid administration in patients with non-Hodgkins lymphoma [7-9]. STLS mirrors that of TLS that occurs in the setting of administration of cytotoxic pharmacotherapy.

Tumor lysis syndrome is most commonly diagnosed using the Cairo-Bishop definition in which patients with neoplasms have two or more laboratory changes including uric acid ≥476 μmol/L (8 mg/dL), potassium ≥6.0 mmol/L (or 6 mEq/L), phosphorus ≥1.45 mmol/L (4.5 mg/dL), or ≤calcium 1.75 mmol/L (7 mg/dL) along with at least one clinical complication including cardiac arrhythmia, seizure, or rise in serum creatinine, indicating acute kidney injury or renal failure. Management of TLS or STLS is the same—intravenous hydration and a uric acid lowering agent including allopurinol or rasburicase. Life-threatening electrolyte abnormalities, including hyperkalemia should be treated, if clinically warranted.

Infection, leading to endogenous release of glucocorticoids, may have triggered STLS in our patient. Because Emergency Medicine clinicians treat a wide variety of conditions, including those with neoplastic diseases, STLS should be one of the differential diagnoses in a patient who presents with TLS in the absence of receiving chemotherapy and should prompt a broad infectious workup.

CRediT authorship contribution statement

Anthony Acosta: Writing – review & editing, Writing – original draft. **Samantha Venkatesh:** Writing – review & editing, Writing – original draft. **Zane Elfessi:** Writing – review & editing, Writing – original draft.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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