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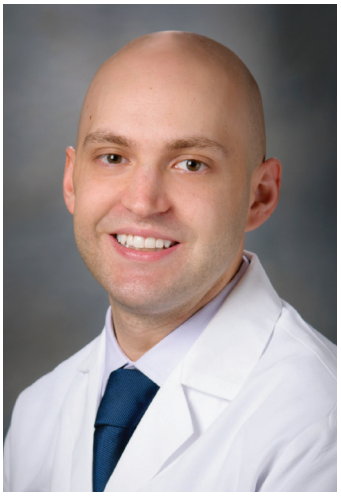
A Tumor Lysis Syndrome Risk Assessment and Its Impact on Patients

In an interview with Journal of Clinical Pathways*, Nicholas Short, MD, assistant professor, department of leukemia at The University of Texas MD Anderson Cancer Center in Houston, TX, shares objectives on the design and benefits of MD Anderson's Tumor Lysis Syndrome (TLS) clinical assessment for patient risk and impact on patient care. This interview has been edited for clarity.*

JCP: How do physicians at MD Anderson identify and monitor patients with cancer who are at risk of developing TLS?



Dr Short: TLS is a combination of metabolic disturbances that can occur in patients with cancer, either spontaneously or in response to treatment. These metabolic disturbances are due to the death of rapidly dividing cells, which leads to a variety of electrolyte abnormalities which can eventually lead to renal failure or other major complications.

Patients with hematologic malignancies—particularly acute leukemias or aggressive lymphomas—are at heightened risk for TLS. We consider the underlying cancer type and examine standard biochemical markers, including potassium, phosphorus, calcium, uric acid, and lactate dehydrogenase. We also look at renal function, as patients with impaired renal function have a higher likelihood of complications from TLS. Finally, we consider the treatment the patient is planned to receive. All these factors influence an individual's risk for TLS and inform how a patient should be monitored and managed.

JCP: How did you and your colleagues identify the need for a TLS risk assessment?

Dr Short: TLS is a specific oncological emergency commonly encountered in cancer patients which can have significant consequences, including a risk of death. At our institution, we have algorithms in place for many clinical scenarios. Institutional guidance helps foster consistency of treatment across different practitioners.

Because of the significant morbidity and mortality associated with TLS, it is crucial to have an algorithm in place to ensure we can identify patients at high risk, provide appropriate prophylaxis, and treat appropriately.

JCP: Could you walk us through the algorithm protocol? What does it look like?

Dr Short: When faced with a clinical scenario such as TLS, the algorithm guides the practitioner through the appropriate steps relative to factors associated with the development of TLS (**Figure 1**).

The general structure of the TLS algorithm begins with identifying the patient's risk which is determined by several factors, the most important of which is underlying malignancy. There are certain malignancies that are known to be more highly associated with TLS, such as acute leukemias with high white blood cell counts, or aggressive rapidly dividing lymphomas. In some instances, specific therapies increase the risk of TLS. If the patient already has evidence of renal dysfunction at baseline, that also impacts their risk assessment. Based on these factors, patients are divided into low-, intermediate-, or high-risk for TLS.

Next, the algorithm will prompt: "How should we be monitoring these patients and what is the appropriate prevention for TLS?" For low-risk patients, there may not be any necessary interventions aside from monitoring labs for evidence of TLS. Intermediate risk patients require hydration, an agent to prevent uric acid build up, and close lab monitoring. For high-risk patients, we may need to be more aggressive with IV fluids and additional agents to decrease uric acid levels may be indicated. Patients who are at high risk will require even more frequent lab monitoring. We often consider pre-emptively consulting nephrology in case those patients develop a clinical TLS and have a need for urgent dialysis.

As far as use of the uric acid-lowering agents, we have specific criteria. These were discussed among our pharmacists, disease experts, and nephrologists. We also included our formulary group to make sure that our algorithm was in accordance with existing restrictions for some of these agents.

Despite our best efforts to prevent TLS, some high-risk patients still develop clinical TLS, and the algorithm provides guidance for the management of these metabolic arrangements. For example, what do you do for a high potassium that might occur because of TLS? Or a high phosphorus? What do you do if the patient develops renal failure? The algorithm guides through these different possible scenarios.

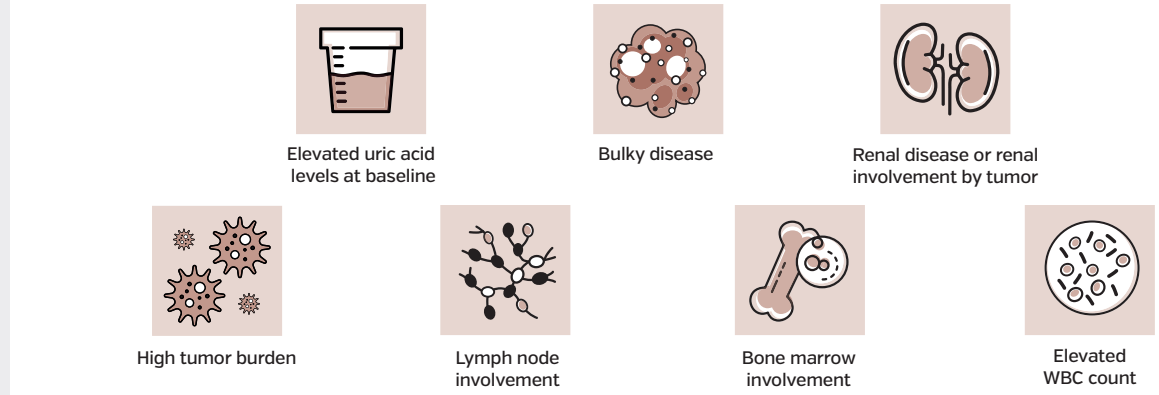


Figure 1. A wide range of patient and tumor-specific factors can increase the risk of tumor lysis syndrome (TLS) and hyperuricemia.[1-3]

JCP: How has the use of this algorithm impacted patient care, physicians, and the care team as a whole?

Dr Short: Establishing structure to manage common clinical scenarios is extremely important, especially in a large academic hospital where there are many different physicians and practitioners who may be involved across specialties.

Having an algorithm in place ensures patients are receiving an appropriate standard of care, regardless of the treating physician. It also helps physicians treat in accordance with institutional practice. If they are not as familiar with a particular disease entity, the algorithm provides well-thought-out guidance from experts. This algorithm is also available to trainees, nurse practitioners, and physician assistants—streamlining and standardizing the best care, regardless of familiarity or level of training.

JCP: Do you have any best practice tips or recommendations for institutions that are looking to develop something like this?

Dr Short: An interdisciplinary approach is extremely important, particularly for a disease process like TLS. For example, it was important that we harmonized the practices in my own leukemia department with those of the lymphoma department. Another key factor was involving our nephrology colleagues, who come from a different perspective. They do not treat the cancer itself, but they are experts at management of electrolyte derangements. They were able to contribute a lot of important nuances to the management of TLS, such as providing important feedback on patients who may be at highest risk for requiring dialysis. We are all experts in our own areas, and the algorithm is a distillation of all our areas of expertise.

Specific members of our committee supervise the development of these algorithms to ensure we are instituting evidence-based medicine whenever possible, and they help to facilitate a final product—which represents a consensus across the different experts that treat this entity.

JCP: How do you think the other institutions could benefit from implementing this algorithm or what would you want their takeaway to be after learning about your tool?

Dr Short: Algorithms like this help ensure a consistent standard of care at an institution regardless of the provider. I hope that our algorithm, which was developed with experts from across disciplines, could serve as a guide that could be used at other institutions for management of this specific clinical scenario.

Ultimately, I believe what we have created is consistent with the data and literature, including expert opinions on the prevention and management of TLS. It provides a good starting point for any institution that wants to develop their own algorithm and modify as needed for their own institution. ◆

References

1. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma. V.1.2021. ©National Comprehensive Cancer Network, Inc. 2020. All rights reserved. Accessed September 28, 2020. To view the most recent and complete version of the guideline, go online to NCCN.org. NCCN makes no warranties of any kind whatsoever regarding their content, use or application and disclaims any responsibility for their application or use in any way.
2. Wilson FP, Berns JS. Onco-nephrology: tumor lysis syndrome. Clin J Am Soc Nephrol. 2012;7(10):1730-1739.
3. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for B-Cell Lymphomas. V.4.2020. ©National Comprehensive Cancer Network, Inc. 2020. All rights reserved. Accessed August 26, 2020. To view the most recent and complete version of the guideline, go online to NCCN.org. NCCN makes no warranties of any kind whatsoever regarding their content, use or application and disclaims any responsibility for their application or use in any way.