

# Hyperleukocytosis in Acute Myeloid Leukemia: Considerations for Inpatient Diagnosis and Management

Tia T. Wheatley, DNP, RN, AOCNS®, AGACNP-BC®, Haley Foster Castiglione, MSN, RN, NP, ACNP, Kenneth Phong, DNP, RN, FNP-C, and Monica Yoon, MSN, RN, NP, AGACNP-BC®, ACCNS-AG®

Hyperleukocytosis, a white blood cell count greater than 100,000/mcl, can be associated with the following three primary oncologic emergencies: leukostasis, disseminated intravascular coagulation, and tumor lysis syndrome. These complications significantly increase a patient's risk of morbidity and mortality. Therefore, timely evidence-based interventions ensure patient safety. This article provides clinical evidence and guidelines for advanced practice nurses working in hematology-oncology to support diagnostic workup and management of hyperleukocytosis in patients with acute myeloid leukemia. A patient case study demonstrates key concepts.

## AT A GLANCE

- Hyperleukocytosis can lead to several oncologic emergencies for patients with newly diagnosed acute myeloid leukemia.
- Prompt recognition and management of leukostasis can prevent early complications.
- Advanced practice nurses can use evidence-based strategies for ongoing monitoring and intervention to preserve patient safety.

## KEYWORDS

hyperleukocytosis; leukostasis; acute myeloid leukemia; tumor lysis syndrome

## DIGITAL OBJECT IDENTIFIER

10.1188/23.CJON.589-593

**H**yperleukocytosis is defined as a white blood cell (WBC) count greater than 100,000/mcl (Macaron et al., 2022). Nearly 20% of patients newly diagnosed with acute myeloid leukemia (AML) can experience hyperleukocytosis on initial presentation (Bewersdorf & Zeidan, 2020). Hyperleukocytosis occurs because of increased leukemic blast cell proliferation and can be associated with the following primary complications: leukostasis, disseminated intravascular coagulation (DIC), and tumor lysis syndrome (TLS). These complications significantly increase a patient's risk of morbidity and early death if not properly recognized and treated (Bewersdorf & Zeidan, 2020). Therefore, timely and evidence-based interventions support patient safety. This article provides current evidence and clinical practice guidelines for hematology-oncology advanced practice nurses (APNs) to support diagnostic workup and medical management of hyperleukocytosis in patients with AML.

## Leukostasis

Leukostasis occurs when the number of circulating leukemic blasts increases in the peripheral vasculature. Leukemia blasts are larger and more rigid than normal blood cells, and their increased presence can cause the peripheral blood to become more viscous. Blast cells also release cytokines, which increase their affinity to adhere to endothelial cells in the intravascular space, leading to cell clumping and accumulation and increasing the risk of local tissue ischemia and multi-organ system failure (Macaron et al., 2022). Table 1 describes the clinical manifestations of leukostasis.

Because of its potential to cause ischemia to vital organs, leukostasis is considered to be a medical emergency (Macaron et al., 2022). APNs can use the Probability of Leukostasis Syndrome Grading System (Novotny et al., 2005) to recognize and grade the severity of leukostasis in patients. Based on pulmonary, neurologic, or other organ system manifestations, this four-point grading system categorizes leukostasis as not present (grade 0), possible (grade 1), probable (grade 2), or highly probable (grade 3). Patients who present with grade 2 (probable) or grade 3 (highly probable) leukostasis may benefit from admission to the critical care unit for better management of