About Acute Myeloid Leukemia

Acute myeloid leukemia (AML) is a type of leukemia that starts in the bone marrow but moves quickly into the blood, sometimes spreading to other parts of the body. Unlike in normal blood cell development, in AML, the rapid build up of abnormal white blood cells in the bone marrow may interfere with the production of normal blood cells, resulting in decreased healthy white blood cells, red blood cells and platelets.[1,2]

AML is a complex, diverse disease associated with multiple genetic mutations.[3]

Frequency

- It is estimated that by the end of 2019 there will be over 20,000 new cases of AML in the U.S.[1]
- AML is the most common type of leukemia in adults.[4]
- AML is most common in older people – the average age of a patient in the U.S. when they are first diagnosed with AML is 68.[1]
- AML is slightly more common among men than among women.[1]

Causes and Risk Factors

Today, researchers understand a lot more about what may cause AML. DNA mutations, which may result from exposure to radiation, cancer-causing chemicals or the aging process, are commonly found in AML cells.[1]

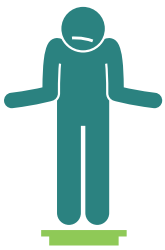
Signs and Symptoms

At first, patients with AML often have non-specific symptoms usually associated with more common ailments such as the flu. Often, signs and symptoms result from a shortage of normal blood cells, which happens when the leukemia cells crowd out the normal blood-making cells in the bone marrow.[1,2]

Fever

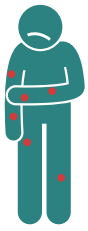
Easy bruising or bleeding

Shortness of breath



Weight loss or loss of appetite

Weakness or feeling tired



Petechiae
[red or purple pinpoint spots on the skin]

Prognosis

In general, prognosis for AML patients is poor.

- Although some patients can be cured, only 28.3% of people with AML in the U.S. survived five years following diagnosis (based on data from SEER 2009-2015).[5]
- Prognosis is influenced by patient age, AML subtype, and other factors.[1]
- About 40-50% of older patients and 60-80% of younger patients respond to initial treatment.[6]
- The prognosis of patients with relapsed/refractory AML is especially poor, with an average survival of 6 months or less.[7]
- There is no standard of care for patients with relapsed/refractory AML, and treatment options are limited. Whenever possible, clinical trials are recommended.[8]

Treatment

AML can progress quickly, so it is important that patients start treatment as soon as possible after diagnosis.[1] Standard types of treatment for AML include:

- **Chemotherapy,** which may be given in two phases[1]
  - Induction therapy to eliminate as many leukemia cells as possible in the blood and bone marrow with the goal of achieving remission
  - Consolidation to destroy all remaining leukemia cells and help prevent relapse after remission
- **Stem cell/bone marrow transplant** is typically used in younger, generally healthy patients when a donor is available[1]
- **Hypomethylating agents** are typically used in older patients who are ineligible for intensive treatment[8]

Research has also shown that the presence or absence of specific gene mutations—including in isocitrate dehydrogenase (IDH), CEBPA, NPM1 and FLT3—can inform prognosis and guide treatment decisions in AML.[8]

- Studies suggest IDH mutations (mIDH) occur in about 20% of patients with AML[9] and NPM1, FLT3 and CEBPA mutations occur in about 33%, 18% and 19% of patients, respectively.[10]
- Innovative, **targeted therapies** directed against mutations are in development and should broaden the treatment landscape[9]

Because patient outcomes are still less than optimal, researchers continue to develop and test new approaches to treatment.[9]

[1] American Cancer Society. Leukemia – Acute Myeloid (Myelogenous). 2014. http://www.cancer.org/acs/groups/cid/documents/webcontent/003110-pdf.pdf. Accessed November 2019.

[2] National Cancer Institute: PDQ® Adult Acute Myeloid Leukemia Treatment. 2017. https://www.cancer.gov/types/leukemia/patient/adult-aml-treatment-pdq. Accessed November 2019.

[3] Arber DA, Orazi A, Hasserjian R, et al. The 2016 revision to the World Health Organization classification of myeloid neoplasms and acute leukemia. *Blood.* 2016;127:2391-2405. Accessed November 2019.

[4] Rodriguez-Abreu D, Bordoni A, Zucca E. Epidemiology of hematological malignancies. *Ann Oncol.* 2007;18:i3-i8. Accessed November 2019.

[5] National Cancer Institute: SEER Stat Fact Sheets: Acute Myeloid Leukemia (AML). http://seer.cancer.gov/statfacts/html/amyl.html. Accessed November 2019.

[6] Mangan J and Luger S. Salvage therapy for relapsed or refractory acute myeloid leukemia. *Ther Adv Hematol.* 2011;2(2):73-82.Accessed November 2019.

[7] Ferrara, F, et al. Current therapeutic results and treatment options for older patients with relapsed acute myeloid leukemia. *Cancers.* 2019;11(2): 224. Accessed November 2019.

[8] National Comprehensive Cancer Network (NCCN). *NCCN Clinical Practice Guidelines in Oncology. Acute Myeloid Leukemia Version 2.2020*. 2019. Available at https://www.nccn.org/store/login/login.aspx?ReturnURL=https://www.nccn.org/professionals/physician_gls/pdf/aml.pdf. Accessed November 2019.

[9] Medeiros B, et al. Isocitrate dehydrogenase mutations in myeloid malignancies. *Leukemia.* 2017;31:272–281. Accessed November 2019.

[10] Niparuck, P, et al. Cytogenetics and FLT3-ITD mutation predict clinical outcomes in non transplant patients with acute myeloid leukemia. Experimental Hematology & Oncology. Available at: https://ehoonline.biomedcentral.com/articles/10.1186/s40164-019-0127-z. Accessed November 2019.