CONDITION

Acute myeloid leukemia - adult

Learn about adult acute myeloid leukemia, including symptoms, diagnosis, treatment options, complications, and follow-up care.

WHAT IT IS
Cancer of the blood and bone marrow

BODY SYSTEM
Blood and bone marrow

MAIN SYMPTOMS
Fatigue, fever, repeated infections, unusual bleeding

WHAT CAUSES IT
Acquired DNA changes, usually unknown

HOW IT IS DIAGNOSED
Bone marrow aspiration and biopsy

MAIN TREATMENT
Chemotherapy, targeted therapy, stem cell transplant

CAN IT BE CURED?
Sometimes - treatment can achieve remission

IS IT AN EMERGENCY?
Sometimes - uncontrolled bleeding

LONG-TERM OUTLOOK
Remission is possible, but AML may return

Overview

Acute myeloid leukemia, or AML, is a cancer of the blood and bone marrow, the soft tissue inside certain bones where blood cells are made.

AML begins when an immature blood-forming cell develops genetic changes that disrupt normal growth. Abnormal cells, called leukemia cells or blasts, multiply quickly and do not mature into healthy blood cells. As they build up, they interfere with the production of red blood cells, infection-fighting white blood cells, and platelets.

Shortages of healthy blood cells can cause anemia, infections, and bleeding. AML may also spread into the blood and, less commonly, other tissues. It is not usually described using stages. Instead, doctors classify it by cell features, chromosome and gene changes, and whether it is newly diagnosed, in remission, or has returned.

AML can progress quickly without treatment, so prompt assessment by a hematologist-oncologist is important. Treatment depends on the AML subtype, test results, symptoms, and overall health.

Acute promyelocytic leukemia, or APL, is a distinct AML subtype that can cause serious bleeding or abnormal clotting. It requires urgent recognition and different treatment from most other forms of AML.

Symptoms

AML symptoms often develop over days or weeks because of low numbers of healthy blood cells. They can also have noncancerous causes.

Anemia caused by too few red blood cells may lead to fatigue, weakness, dizziness, shortness of breath, or pale skin. Low numbers of healthy white blood cells may cause fever, chills, recurring infections, or infections that do not improve. Even when the total white blood cell count is high, many cells may be abnormal blasts that cannot fight infection effectively.

Low platelet levels may cause:

Other possible symptoms include unexplained weight loss, reduced appetite, bone or joint discomfort, abdominal fullness from an enlarged liver or spleen, swollen gums, or skin lumps or rashes.

Seek prompt medical advice for persistent fever, unexplained bleeding or bruising, worsening fatigue, or repeated infections.

Call emergency services for severe trouble breathing, chest pain, confusion, fainting, uncontrolled bleeding, vomiting blood, or signs of a stroke such as sudden weakness, difficulty speaking, or a severe new headache. These symptoms do not always indicate AML, but they require immediate assessment.

- Easy bruising
- Frequent nosebleeds or bleeding gums
- Heavier menstrual bleeding
- Small red or purple spots under the skin, called petechiae

Causes and risk factors

AML develops because of acquired DNA changes in blood-forming cells. In most people, no

single cause can be identified. Most AML-related changes occur during a person's lifetime rather than being inherited, and AML is not contagious.

Risk increases with age, although younger adults can develop AML. Associated factors include:

Having a risk factor does not mean someone will develop AML, and many people have no clear preventable risk factor.

Family members usually do not need testing. Genetic counseling may be recommended when age, family history, physical findings, or leukemia results suggest an inherited predisposition. Inherited genetic testing differs from testing performed only on leukemia cells.

- A previous bone marrow disorder, such as myelodysplastic syndrome
- Earlier treatment with certain chemotherapy medicines or radiation
- Long-term exposure to high levels of benzene
- Cigarette smoking
- Certain uncommon inherited disorders affecting blood formation or DNA repair
- Some inherited cancer syndromes

Diagnosis

AML may be suspected when a complete blood count, or CBC, shows abnormal numbers of white blood cells, red blood cells, or platelets. A blood smear allows a laboratory specialist to examine the cells for blasts and other unusual features.

Diagnosis usually requires a bone marrow aspiration and biopsy. A clinician removes liquid marrow and a small core of bone, usually from the back of the hip. Local anesthetic is used to numb the area. The samples show how the marrow cells look and how many blasts are present.

Other tests include:

AML is often diagnosed when blasts make up a substantial proportion of blood or bone marrow cells. Certain defining genetic abnormalities can establish the diagnosis even at a lower blast percentage.

Imaging does not usually diagnose AML but may help investigate symptoms or infection. A lumbar puncture is not routine for every adult. It may be used if symptoms or disease features suggest involvement of the brain or spinal cord.

- Flow cytometry to identify proteins on or inside leukemia cells
- Cytogenetic testing to examine chromosome changes

- Molecular testing to find gene mutations or fusions that may guide treatment and estimate relapse risk
- Blood chemistry tests to assess organ function, electrolytes, and substances released as cells break down
- Clotting tests , especially when APL is possible

Treatment and management

Treatment planning begins soon after diagnosis, preferably with a team experienced in AML. Some people need hospital care during initial treatment, while selected therapies may be given partly as an outpatient.

The team considers the AML subtype and genetic findings, previous blood disorders or cancer treatment, organ function, daily functioning, personal goals, and whether the disease is newly diagnosed or has returned. Age alone does not determine treatment.

Medically fit adults may receive intensive chemotherapy to achieve remission. Remission means blood counts are recovering, the marrow has fewer blasts, and leukemia is not detectable by standard examination. It does not necessarily mean every leukemia cell is gone.

Traditional intensive induction therapy commonly combines cytarabine with an anthracycline. Other chemotherapy or targeted medicines may be added based on the leukemia's features. Targeted therapies act on particular proteins or genetic changes.

Adults unlikely to tolerate intensive chemotherapy may receive lower-intensity treatment, such as azacitidine or decitabine combined with venetoclax. These treatments can still cause severe low blood counts, infections, and medication interactions, so close monitoring is essential.

After remission, consolidation or post-remission treatment is usually needed to reduce relapse risk. It may involve more chemotherapy, targeted treatment, or an allogeneic stem cell transplant.

An allogeneic transplant replaces diseased blood-forming cells with donor stem cells. It can produce a powerful immune effect against leukemia but may cause serious infection, organ injury, or graft-versus-host disease. Decisions depend on relapse risk, treatment response, donor availability, health, and patient preferences.

APL is treated differently, commonly with all-trans retinoic acid and arsenic trioxide, sometimes with other medicines. Because APL can severely disrupt clotting, specialists may begin treatment as soon as they strongly suspect it, before all confirmatory results are

available.

Supportive care may include blood or platelet transfusions, medicines to prevent or treat infection, nausea treatment, and prevention or management of tumor lysis syndrome. This syndrome occurs when many cancer cells break down rapidly, releasing substances that can damage the kidneys, heart, and other organs.

Clinical trials may offer new drug combinations, targeted therapies, or transplant approaches. Participation is optional, and the care team should explain potential benefits, risks, and alternatives.

Complications

AML and its treatment can cause serious complications. Low neutrophils increase infection risk, low platelets raise bleeding risk, and anemia can cause severe fatigue, breathlessness, or strain on the heart.

A very high leukemia cell count may interfere with blood flow. This is called leukostasis and can affect breathing, vision, or brain function. It requires urgent treatment.

Other complications include tumor lysis syndrome, transfusion reactions, blood clots, organ damage, and fertility changes. Some treatments may affect the heart or other organs, so testing may be needed before and during therapy.

AML may not respond fully to treatment or may return after remission. For relapsed or refractory AML, further genetic testing may identify treatment targets. Options can include different chemotherapy, targeted therapy, transplant, or a clinical trial.

Contact the oncology team urgently for a fever at or above the threshold they provided, shaking chills, new bleeding, rapidly increasing bruising, severe vomiting or diarrhea, inability to take medicines, or sudden worsening of symptoms. Do not wait for a routine appointment.

Follow up

Follow-up continues during treatment, after remission, and after transplant when applicable. Visits usually include symptom review, physical examination, and blood counts. Bone marrow testing may be repeated to assess response or investigate abnormal results.

Some centers test for measurable residual disease, or MRD. MRD means small numbers of leukemia cells remain even though standard tests suggest remission. Results may help estimate relapse risk, but their meaning depends on the AML subtype, test method, and

treatment stage.

Follow-up is generally more frequent soon after treatment and may become less frequent over time. Care also addresses infection prevention, vaccines, nutrition, physical recovery, emotional health, fertility, and long-term treatment effects. Stem cell transplant recipients require specialized monitoring for infection, graft-versus-host disease, and immune recovery.

Between visits, promptly report fever, bleeding, unusual bruising, worsening fatigue, shortness of breath, or repeated infections. Persistent sleep problems, poor appetite, anxiety, or difficulty returning to daily activities should also be discussed with the care team.

Sources

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