CONDITION

Chronic lymphocytic leukemia

Learn how chronic lymphocytic leukemia affects the blood and immune system, including its symptoms, diagnosis, treatment options, and follow-up care.

WHAT IT IS
Cancer of B lymphocytes

BODY SYSTEM
Blood and immune system

MAIN SYMPTOMS
Swollen lymph nodes, tiredness, frequent infections, easy bruising or bleeding

WHAT CAUSES IT
Usually unknown, acquired DNA changes

HOW IT IS DIAGNOSED
Blood counts and flow cytometry

MAIN TREATMENT
Active surveillance or targeted cancer therapy

CAN IT BE CURED?
No, treatment can control the disease

IS IT AN EMERGENCY?
Sometimes, with severe breathing difficulty or uncontrolled bleeding

LONG-TERM OUTLOOK
Often slow-growing, but progression varies

Overview

Chronic lymphocytic leukemia, or CLL, is a cancer of white blood cells called B lymphocytes. These cells normally help fight infection by making antibodies. In CLL, abnormal B lymphocytes build up in the blood, bone marrow, lymph nodes, and sometimes the spleen.

CLL usually develops slowly. Some people live for years without symptoms or treatment, while others have disease that progresses more quickly. Its course depends on the leukemia cells' features, overall health, and changes over time.

CLL and small lymphocytic lymphoma, or SLL, are forms of the same disease. CLL mainly affects the blood and bone marrow; SLL mainly involves lymph nodes and other lymph tissues, with fewer abnormal cells in the blood.

Abnormal cells may eventually crowd out healthy blood-forming cells and weaken immune function, causing anemia, infections, bleeding, or enlarged lymph nodes. However, a CLL diagnosis does not always require immediate treatment. People without active or troublesome disease are often monitored closely.

CLL is not contagious.

Symptoms

CLL is often found through a routine blood test before symptoms develop. Possible symptoms include:

A high lymphocyte count may be the only sign, but the count alone does not determine whether treatment is needed.

Contact the cancer care team promptly for a new fever, worsening infection symptoms, rapidly enlarging lymph nodes, new bleeding, or a major change in breathing or energy. People receiving treatment should follow their team's instructions about the temperature that requires an urgent call.

Call emergency services for severe breathing difficulty, chest pain, fainting, confusion, uncontrolled bleeding, or stroke signs such as sudden weakness or difficulty speaking.

- Painless swollen lymph nodes, often in the neck, armpits, or groin
- Unusual tiredness or reduced exercise tolerance
- Frequent, severe, or slow-to-clear infections
- Shortness of breath, dizziness, or pale skin from anemia
- Easy bruising, pinpoint red or purple spots, or unusual bleeding
- Fullness or discomfort under the left ribs from an enlarged spleen
- Fever without a clear infection
- Drenching night sweats
- Unintentional weight loss
- Reduced appetite or feeling full quickly

Causes and risk factors

CLL begins when acquired DNA changes allow a B lymphocyte and its descendants to survive

and accumulate. The exact cause is usually unknown. Most changes develop during life rather than being inherited, and CLL is not caused by diet, stress, exercise habits, or another personal choice.

Factors associated with a higher chance of CLL include:

Routine CLL screening is not generally recommended for people without symptoms or abnormal blood counts.

- Older age: Most people diagnosed are older adults.
- Sex: CLL is diagnosed more often in men.
- Family history: A close blood relative with CLL or another lymphoid cancer may increase risk, although most relatives never develop it.
- Monoclonal B-cell lymphocytosis: This condition involves a small number of CLL-like cells without enough cells or other findings for a CLL diagnosis. It may remain stable or progress gradually.

Diagnosis

An abnormal complete blood count, or CBC, often starts the evaluation. It measures lymphocytes, red blood cells, platelets, and other cells. Because infections and other conditions can raise lymphocyte counts, a high count alone does not confirm CLL.

Evaluation may include a symptom and medical history, physical examination for enlarged lymph nodes or organs, blood-count trends, and the following tests:

CLL is generally diagnosed when blood contains at least 5 billion clonal B lymphocytes per liter for at least three months. A lower count without enlarged lymph tissue may be monoclonal B-cell lymphocytosis. A lower blood count with involved lymph nodes or other tissue may be SLL.

Tests that help predict disease behavior and guide treatment include FISH testing for chromosome changes such as deletion 17p, TP53 testing, and IGHV mutation testing. Some should be repeated before new treatment because CLL cells can change.

The Rai or Binet staging system considers enlarged lymph tissues, anemia, and low platelets. Treatment decisions also account for symptoms, disease activity, genetic results, other health conditions, and patient preferences.

- Flow cytometry: Identifies proteins on lymphocytes and determines whether they form a single abnormal clone. This is a key diagnostic blood test.

- Blood smear: Allows specialists to examine cells under a microscope. "Smudge cells" may appear in CLL but do not establish the diagnosis by themselves.
- Bone marrow biopsy: Removes marrow, usually from the back of the hip. It is not always required but may help explain low blood counts or assess disease before or during treatment.
- Imaging: CT or other scans are not always needed. They may be used for symptoms, internal lymph-node enlargement, suspected complications, or treatment planning.

Treatment and management

People with early CLL and no active-disease symptoms are often managed with active surveillance , or watchful waiting. This involves regular visits and blood tests without cancer medicine. Treating inactive, early-stage CLL has not been shown to improve outcomes, and waiting avoids unnecessary side effects.

Treatment may become appropriate for:

A high lymphocyte count alone usually does not require treatment.

Treatment selection depends on genetic findings, previous therapy, heart and kidney health, other medicines, preferred treatment duration, and personal goals. Options include:

Treatment can reduce healthy blood cells and infection defenses. The team may adjust therapy or provide treatment for infections, anemia, low platelets, or autoimmune complications. Tell clinicians about all prescriptions, over-the-counter medicines, vitamins, and supplements because interactions may affect safety.

Vaccination is important, although CLL may weaken vaccine responses. Ask about influenza, COVID-19, pneumococcal, and other vaccines. Live vaccines may be unsafe, particularly during certain treatments, and should not be given without approval from the cancer care team.

Stem cell transplantation is now uncommon but may be considered for a small group with high-risk disease that has not responded to other therapies.

- Worsening anemia or low platelets caused by marrow involvement
- Enlarging, uncomfortable lymph nodes or spleen
- Persistent fever, drenching night sweats, significant weight loss, or marked CLL-related fatigue
- A rapid, sustained increase in lymphocytes
- Autoimmune blood-cell destruction that does not respond to initial care

- Organ involvement or other significant symptoms
- BTK inhibitors: Oral targeted drugs that interrupt a survival signal in CLL cells. Potential concerns include bleeding, infection, high blood pressure, and abnormal heart rhythms.
- BCL-2 inhibition: Venetoclax helps leukemia cells die and may be combined with an antibody for a planned treatment period. It is started gradually with blood tests, fluids, and sometimes preventive medicine because rapid cell breakdown can cause tumor lysis syndrome.
- Anti-CD20 antibodies: Infused or injected medicines that attach to B cells. They may cause administration reactions. Hepatitis B screening is important because treatment can reactivate a previous infection.
- Chemoimmunotherapy: Chemotherapy combined with an antibody is used less often but may suit selected patients.

Complications

CLL and its treatment can weaken immunity, so infections may be frequent or severe even when the total white blood cell count is high. CLL may also cause anemia, low platelets, or autoimmune destruction of red cells or platelets.

A small number of people develop Richter transformation , in which CLL becomes a faster-growing lymphoma. Warning signs include rapidly enlarging lymph nodes, unexplained fever, drenching night sweats, weight loss, or sudden deterioration. These require prompt assessment but do not necessarily mean transformation has occurred.

People with CLL have an increased risk of some other cancers, including skin cancer. Sun protection, skin checks, and age-appropriate cancer screening remain important.

Tumor lysis syndrome may occur when treatment destroys many cancer cells quickly, releasing their contents into the blood and potentially harming the kidneys or heart. For higher-risk treatments, clinicians use careful dose increases, blood tests, fluids, and preventive medicines.

Follow up

Follow-up is needed during both active surveillance and treatment. Frequency depends on symptoms, blood-count trends, therapy, and disease stability. Visits may include:

Routine scans are not always necessary when CLL is stable and there are no new symptoms.

Trends and the overall clinical picture are more useful than one blood result.

Ask which changes require an earlier appointment. Contact the team urgently for fever or infection symptoms, rapidly increasing swelling, new shortness of breath, unusual bleeding, or sudden weakness. Seek emergency care for severe breathing difficulty, chest pain, fainting, confusion, stroke symptoms, or bleeding that will not stop.

Living with a leukemia that may not require immediate treatment can cause uncertainty. Cancer social workers, counselors, support groups, and patient organizations can provide emotional and practical support.

- Review of fatigue, infection, bleeding, weight change, and treatment effects
- Examination of lymph nodes, liver, and spleen
- CBC and blood chemistry tests
- Review of medicines, interactions, and vaccination needs
- Skin checks and age-appropriate cancer screening

Sources

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