



WELLNESS INITIATIVE NOW

To promote personal well-being, fitness and nutrition for all TDCJ employees.

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Leukemia is a cancer of the bone marrow and blood. It is characterized by the uncontrolled accumulation of blood cells. There are four major types of leukemia:

- Acute Myelogenous Leukemia (AML)
- Acute Lymphocytic Leukemia (ALL)
- Chronic Myelogenous Leukemia (CML)
- Chronic Lymphocytic Leukemia (CLL)

The term lymphocytic indicates the cancerous change takes place in a type of marrow cell that forms lymphocytes. The term myelogenous indicates the cell change takes place in a type of marrow cell that normally goes on to form red cells, some types of white cells and platelets. Acute lymphocytic leukemia and acute myelogenous leukemia are each composed of blast cells, known as lymphoblasts or myeloblasts. Acute leukemias have few or no blast cells. Chronic lymphatic leukemia and chronic myelogenous leukemia progress slowly compared to acute leukemias.

How does leukemia develop?

The four types of leukemia each begin in a cell in the bone marrow. The cell undergoes a leukemic change and it multiplies into many cells. Leukemia cells survive better than normal cells. As they grow, over time, they crowd out normal cells. Normal stem cells in the marrow form three main cell-types: red cells, platelets and white cells. There are two major types of white cells: germ-ingesting cells and lymphocytes, which are part of the body's immune system and helps fight infection. The rate at which leukemia progresses and how the cells replace the normal blood and marrow cells are different with each type of leukemia.

Acute leukemia

In acute myelogenous leukemia (AML) and acute lymphocytic leukemia (ALL), the original acute leukemia cells form about a trillion more leukemia cells. These cells are described as "nonfunctional" because they do not work like normal cells. They also crowd out the normal cells in the marrow. This can lead to anemia, which is caused by a low red cell count. The inability to fight infection is due to the lack of normal white cells. Bruising and easy bleeding are the results of a platelet shortage.

Chronic leukemia

In chronic myelogenous leukemia (CML), the leukemia cell that starts the disease makes blood cells (red cells, white cells and platelets) function almost like normal cells. The number

of red cells is usually less than normal, resulting in anemia; however, many white cells and platelets are still made. Even though the white cells are nearly normal in how they work, their counts are high and will continue to rise. This can cause serious problems if the patient does not receive treatment. If untreated, the white cell count can rise so high that blood flow slows down and anemia becomes severe.

In chronic lymphocytic leukemia (CLL), the leukemia cell that starts the disease makes too many lymphocytes that do not function. These cells replace normal cells in the marrow and lymph nodes. They interfere with the work of normal lymphocytes, which weakens the patient's immune response. The high number of leukemia cells in the marrow can lead to anemia by crowding out normal blood-forming cells. A very high number of leukemia cells can cause low neutrophil and platelet counts. Unlike the other three types of leukemia, CLL may not progress for a long time in some patients. Patients have such slight changes that they remain in good health and do not need treatment for long periods of time. Most patients require treatment at the time of diagnosis or soon after.

Risk Factors

Individuals can develop leukemia at any age. In 2008, about 44,270 adults and 4,220 children were expected to be diagnosed with leukemia. It is most common in adults over age 60. The most common types in adults are AML and CLL. ALL is the most common form of leukemia in children.

For most types of leukemia, the risk factors and possible causes are not known. Most people who have any of the specific risk factors, that have been identified, do not get leukemia, and most people with leukemia do not have these risk factors.

Some risk factors for AML are:

- Certain chemotherapies used for lymphoma or other types of cancer.
- Down Syndrome and some other genetic diseases.
- Chronic exposure to benzene (such as in the workplace) that exceeds federally approved safety limits.
- Radiation used to treat other types of cancer.
- Tobacco smoke.

Exposure to high doses of radiation therapy is also a risk factor for ALL and CML. Other possible risk factors for the four types of leukemia are continually under study.

One important fact to remember is leukemia is not contagious.

Signs and Symptoms

Some signs or symptoms of leukemia are similar to those more common, less severe illnesses. Specific blood test and bone marrow test are needed to make a diagnosis. Signs and symptoms vary based on the type of leukemia. For acute leukemia, they include:

- Tiredness or no energy
- Shortness of breath during physical activity
- Pale skin
- Mild fever or night sweats
- Slow healing of cuts or excess bleeding
- Bruises for no clear reason
- Pinhead-size red spots under the skin
- Aches in bones or joints (for example, knees, hips or shoulders)
- Low white cell counts especially monocytes or neutrophils

Individuals with CLL or CML may not have any symptoms. Some patients learn they have CLL or CML after a blood test as part of a regular check up. Sometimes, a person with CLL may notice enlarged lymph nodes in the neck, armpit or groin area. The individual may feel tired or short breath (from anemia) or have frequent infections if CLL is more severe. In these cases, a blood test may show an increase in the lymphocyte count. CML signs and symptoms tend to develop slowly. People with CML may feel tired and short of breath while doing everyday activities. They may also have an enlarged spleen (leading to a “dragging” feeling on the upper left side of the belly) night sweats and weight loss.

Each type of leukemia may have other symptoms or signs that prompt an individual to receive a medical checkup.

The best advice for any person troubled by symptoms such as a lasting, low-grade fever, unexplained weight loss, tiredness or shortness of breath is to see a healthcare provider.

Diagnosis

A complete blood count (CBC) is used to diagnose leukemia. This blood test may show high or low levels of white cells and show leukemic cells in the blood. Sometimes, platelet counts and red cells are low. Bone marrow test are often done to confirm the diagnosis and to look for chromosome abnormalities. These tests identify the leukemia cell-type.

A complete blood exam and a number of other tests are used to diagnose the type of leukemia. These tests can be repeated after treatment begins to measure how well it is working.

Treatment

The ways in which patients are affected and how patients are treated are different for each type of leukemia. Each main type of leukemia has different subtypes. A patient’s age, general health and subtypes may play a role in determining the best treatment plan. Blood test and bone marrow test are used to identify AML, ALL, CML or CLL subtypes.

Patients with acute leukemia need to start treatment right away. Usually, they begin induction therapy with chemotherapy in the hospital. More intensive treatment is usually needed even after a patient is in remission. This is called consolidation therapy or post induction therapy. This part of treatment may include chemotherapy with or without allogeneic stem cell transplantation (sometimes called “bone marrow transplantation”). Allogeneic stem cell transplantation is the only treatment that can cure CML at this time. This treatment is mostly successful in younger patients. However, patients up to 60 years of age who have a matched donor may be considered for this treatment. Some CLL patients do not need treatment for long periods of time after diagnosis. Patients who need treatment may receive chemotherapy or monoclonal antibody therapy alone or in combination. Allogeneic stem cell transplantation is a treatment option for certain patients.

Follow Up

AML, ALL, CML, and CLL patients who are in remission need to see their doctors regularly for exams and blood test. Bone marrow test may be needed from time to time. The doctor may recommend longer periods of time between follow up visits if a patient continues to be disease free.

Patients and caregivers should talk to their healthcare providers about long-term and late effects of cancer treatment. Cancer-related fatigue is one common long-term effect.

Get Support

After diagnosis, many people with leukemia do survive and live many good, quality years. Knowing more about the disease and its treatment may make it easier to cope. It may be helpful to write down questions to ask your doctor and to write down his/her answers to review later. You may want to bring a family member or friend with you to the doctor. This person can listen, take notes and offer support.