Types of Cancer

Blood Cancers

What are blood cancers?

Cancer develops when cells grow out of control. Blood or hematologic cancers affect blood cells, bone marrow or the lymphatic system. Most blood cancers involve white blood cells, but red blood cells (responsible for carrying oxygen) and platelets (responsible for blood clotting) may also be affected. Compared with many other types of cancer, blood cancers affect a wider range of ages, including children.

Leukemia, lymphoma and multiple myeloma are the major types of blood cancer. These are classified according to the type of cells involved, how fast they grow and whether they affect adults or children. The various types of blood cancer are treated differently and have different prognoses, or expected outcomes.

Leukemia

Leukemia is a cancer that affects blood-forming stem cells or blood cells, usually the white blood cells that carry out immune responses. Abnormal cells can grow out of control in the bone marrow and enter the bloodstream before they are fully developed, crowding out mature, functional blood cells. Leukemia can often be put into remission and sometimes it can be cured. But rapidly progressing acute leukemia requires prompt treatment.

The four main types of leukemia are acute lymphoblastic leukemia (ALL), chronic lymphocytic leukemia (CLL), acute myeloid leukemia (AML) and chronic myeloid leukemia (CML).

About 62,000 people develop leukemia and 24,500 people die from it each year in the United States, according to the American Cancer Society. Most types of leukemia usually develop in middle age or later, but ALL occurs more often in children.

Leukemia is classified according to the type of cells affected, whether it is acute (fast progressing) or chronic (slow-growing) and whether it affects adults or children. Lymphocytic or lymphoblastic leukemia involves precursor cells known as lymphoblasts and lymphocytes (B cells, T cells and natural killer cells). Myeloid or myelogenous leukemia involves precursor cells known as myeloblasts, which give rise to neutrophils and other granulocyte white blood cells. (See more information about Leukemia.)

Lymphoma

Lymphoma occurs when white blood cells known as lymphocytes (B cells, T cells or natural killer cells) grow out of control. Lymphoma begins in the lymphatic system—a network of lymph vessels and organs that play a role in immune function and waste removal—but it can spread throughout the body, a process known as metastasis. There are two types, Hodgkin lymphoma and non-Hodgkin lymphoma (NHL), each of which has multiple subtypes.

About 8,300 people develop Hodgkin lymphoma and 72,000 develop non-Hodgkin lymphoma annually in the United States. Some types of lymphoma mainly affect older people, but together Hodgkin lymphoma and non-Hodgkin lymphoma account for about 8 percent of childhood cancers. Men and boys are two to three times more likely to develop lymphoma than women and girls.

In Hodgkin lymphoma, large abnormal lymphocytes called Reed-Sternberg cells build up in the lymph nodes. Non-Hodgkin lymphoma usually involves B cells but can also affect T cells. NHL may be either aggressive (fast-growing) or indolent (slow-growing). Diffuse large B cell lymphoma is the most common type of aggressive C cell NHL in the United States, while follicular lymphoma is the most common indolent type.

Primary central nervous system lymphoma starts in the brain or spinal cord. AIDS-related lymphoma can develop in people with HIV who have weakened immune systems. Some types of lymphoma primarily affect the skin. (See more information about Lymphoma.)

Multiple Myeloma

Multiple myeloma affects plasma cells, a type of mature B cell that produces antibodies. Abnormal plasma cells multiply in the bone marrow and make abnormal antibodies called M proteins that can build up in the blood and organs. These abnormal plasma cells can clump together to form tumors in bones or soft tissues. Over time, the disease may damage the bones, kidneys and other organs.

About 30,000 people will develop multiple myeloma and about 12,500 people will die from it in the United States in 2017. It is the 14th leading cause of cancer death. Multiple myeloma is more common among African-Americans than other racial and ethnic groups. (See more information about Multiple Myeloma.)

What are the risk factors for blood cancers?

Risk factors for blood cancers include family history, certain genetic disorders, smoking and exposure to radiation. People treated with radiation or chemotherapy for other types of cancers are at higher risk for developing leukemia. People with HIV and those taking immune-suppressing drugs are at higher risk for lymphoma. Epstein-Barr virus (a virus in the herpes family) is associated with certain types of lymphoma.

What are the symptoms of blood cancers?

Uncontrolled growth of immature blood cells can crowd out functional blood cells that perform vital

functions such as fighting infections, carrying oxygen to the body's tissues and enabling blood to clot after an injury. Blood cancers symptoms may include:

- Fever and night sweats
- Frequent infections
- Swollen lymph nodes
- Loss of appetite or unexplained weight loss
- Fatigue or weakness
- Shortness of breath
- Easy bruising or bleeding
- Pain or pressure below the ribs

How are blood cancers diagnosed?

A blood test known as a complete blood count takes an inventory of the different types of blood cells. A sample of bone marrow or lymph node tissue (a biopsy) may be collected to examine in a lab. Cancer cells may look abnormal under a microscope and have certain genetic mutations. Once cancer is diagnosed, various types of imaging scans or other tests may be done to see whether it has metastasized, or spread to other parts of the body, including the brain and spinal cord.

How are blood cancers treated?

Treatment for blood cancers varies according to the type of disease, how much the cancer has spread and the patient's age and previous treatment history. Cancer that did not respond to prior therapy or has relapsed is less likely to respond to a new treatment.

Surgery: Some localized lymphomas or multiple myeloma tumors can be surgically removed. Some leukemia patients may need to have their spleen removed.

Radiation: Radiation is used to reduce the number of abnormal blood cells. It may be used in conjunction with other forms of treatment.

Chemotherapy: Traditional chemotherapy works by killing fast-growing cancer cells. It can also destroy rapidly dividing healthy cells, such as those in the gut or hair follicles, leading to side effects like nausea and hair loss.

Targeted Therapy: Targeted drugs work against cancers with specific characteristics without harming normal cells. For example, they may interfere with signaling pathways that regulate cell growth. Targeted treatment is often better tolerated than chemotherapy, but cancer may develop resistance over time.

Immunotherapy: This type of treatment helps the immune system fight cancer. For example, some tumors can turn off immune responses against them, and drugs known as checkpoint inhibitors can restore T cells' ability to recognize and destroy cancer cells.

Other types of immunotherapy help the immune system recognize and destroy cancer cells.

CAR-T: The newest type of treatment, chimeric antigen receptor T cell therapy, involves removing a sample of T cells, genetically reprogramming them to attack cancer cells and putting them back into the body.

Stem cell transplant: Bone marrow contains stem cells that give rise to all types of blood cells. A patient's cancerous blood cells are destroyed with radiation or chemotherapy and replaced with either preserved stem cells from the same individual or bone marrow from a donor. There is a risk that donor immune cells will attack the recipient's tissues, known as graft-versus-host disease.

Blood cancers are easier to treat than many other types of cancer that form solid tumors, and they can sometimes be put into long-term remission. New types of immunotherapy, including CAR-T, were first developed for leukemia and lymphoma, and some people respond very well to them. A large number of clinical trials are underway to test experimental therapies for blood cancers.

For more information on blood cancers, visit:

American Cancer Society

National Cancer Institute

American Society of Clinical Oncology (ASCO)

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