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 hematologic cancers. 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 affecting immature blood cells. These cells grow out of control in the bone marrow before they are fully developed, crowding out mature functional cells.

In 2017, about 62,000 people will develop leukemia and 24,500 people will die from the disease in the United States, according to the National Cancer Institute. It is the seventh leading cause of cancer death. Although most people who develop leukemia are over age 55, it is also one of the most common cancers in children.

Leukemia is classified according to the type of cells affected and whether it is acute (sudden onset and fast-growing) or chronic (slow-growing):

- Acute lymphoblastic leukemia (ALL)
- Acute myeloid leukemia (AML)
- Chronic lymphocytic leukemia (CLL)
- Chronic myeloid leukemia (CML)

Lymphoblastic leukemia affects immature precursor cells that develop into lymphocytes (B cells and T cells) and natural killer cells. Myeloid (also called myelogenous or myeloblastic) leukemia affects blood stem cells that give rise to some types of white blood cells, red blood cells and platelets.

Lymphoma

Lymphoma begins in the lymphatic system but can spread throughout the body. There are two types, Hodgkin lymphoma and non-Hodgkin lymphoma, each of which has multiple subtypes.

About 72,000 people will develop non-Hodgkin lymphoma and about 20,000 people will die from it in the United States in 2017. It is the eighth leading cause of cancer death. Hodgkin lymphoma is less common and tends to affect younger people.

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 or natural killer cells. Abnormal cells may accumulate in the lymph nodes, thymus or spleen. It may be either aggressive (fast-growing) or indolent (slow-growing). 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.

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.

What are the risk factors for blood cancers?

Risk factors for hematologic cancers include 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. Some blood cancers are linked to genetic disorders.

What are the symptoms of blood cancers?

Uncontrolled growth of immature blood cells can crowd out normal mature 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 can cause a variety of symptoms:

- Fever and night sweats
- Frequent infections
- Fatigue or weakness

- Shortness of breath
- Easy bruising or bleeding
- Loss of appetite or unexplained weight loss
- Pain, especially in the bones, chest or abdomen
- Swollen lymph nodes

How are blood cancers diagnosed?

A blood test known as a complete blood count takes an inventory of the different types of blood cells. Blood, bone marrow or lymph node biopsy samples may be examined under a microscope to look for abnormal cells. Blood cells may also be tested for biomarkers and genetic mutations. Once cancer is diagnosed, imaging scans may be done to see if the cancer 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 particular type of disease, whether cancer cells have spread and previous treatment history. Cancer that did not respond to prior therapy or has relapsed is less likely to respond to a new treatment. Treatment involves some combination of the following:

Surgery: Some localized lymphoma or multiple myeloma tumors can be surgically 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. The risk with this type of treatment is that it can trigger excessive immune responses against healthy tissue as well.

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. Here, too, there is a risk of overstimulating the immune system, causing inflammation of healthy tissue.

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 and 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 about cancer, please visit our sister site Cancer Health.

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