ADULT ACUTE LYMPHOBLASTIC LEUKEMIA

Adult acute lymphoblastic leukemia (ALL) is a cancer of the blood and bone marrow. Bone marrow normally produces stem cells (immature cells) that develop into red blood cells, white blood cells and platelets. In ALL, too many stem cells develop into a type of white blood cell called immature lymphocytes or lymphoblasts. There are three types of normal lymphocytes: B lymphocytes make antibodies to help fight infection; T lymphocytes help B lymphocytes make antibodies; and, Natural killer cells that attack cancer cells and viruses. In ALL, lymphoblasts lose the ability to mature into normal lymphocytes and fight infections. They also build up in the bone marrow and blood so there is less room for other healthy blood cells. Leukemia cells can spread outside the blood to other parts of the body, including the central nervous system, skin and gums. ALL is also called acute lymphocytic leukemia and usually gets worse quickly if it is not treated.

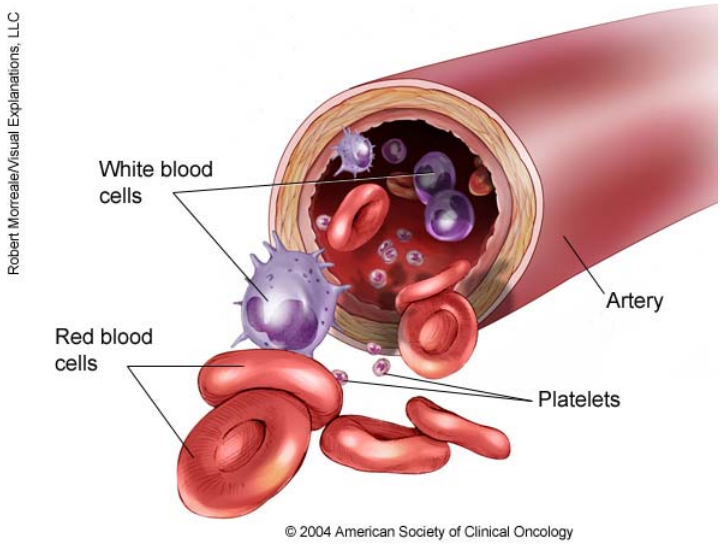
RISK FACTORS include:

*Being male *Being white *Being older than age 70
*Having had chemotherapy or radiation therapy treatments in the past
*Being exposed to atomic bomb radiation
*Having certain genetic disorders such as Down syndrome

SYMPTOMS TO REPORT to a care provider:

*Fever *Shortness of breath
*Easy bruising or bleeding *Weakness or feeling tired
*Weight loss *Loss of appetite
*Stomach or bone pains *Pain or feeling of fullness below the ribs
*Painless lumps in the neck, underarm, stomach, or groin
*Petechiae (flat, pinpoint spots under the skin)

Early signs of ALL may be like those caused by the flu or other common diseases.



DIAGNOSING ACUTE LYMPHOBLASTIC LEUKEMIA may include the following tests and procedures:

* **Physical exam** of entire body, including health habits and past illnesses and treatments
* **Blood tests** of complete blood count and blood chemistry studies
* **Peripheral Blood Smear** to look for blast cells, the number and kind of white blood cells, the number of platelets, and changes in the shape of blood cells
* **Bone Marrow Aspiration and Biopsy** is the removal of a small piece of bone and bone marrow through a needle inserted usually in the hipbone to look for signs of leukemia
* **Cytogenetic Analysis** to look for changes in the chromosomes in the leukemic cells
* **Immunophenotyping** to determine the subtype of ALL by examining the types of antigens or markers on the surface of the cell

More tests and procedures are used to find out if the leukemia has spread from the blood and bone marrow:

*__X-rays__ with a high energy beam that goes through body onto film to make pictures of areas inside the body

*__Lumbar puncture__ to collect cerebrospinal fluid from the spinal column

*__Ultrasound exam__ uses high-energy sound waves to bounce off internal tissues or organs in the abdomen and make echoes. The echoes form a picture called a sonogram.

* __CT-scan,__ or Computed tomography, is an x-ray machine linked to a computer that takes a series of detailed pictures of areas inside the body. Injected dye enhances the contrast for tumors to show up on the CT scan.

TREATMENT OPTIONS

There is no standard staging system for adult ALL. The disease is described as untreated, in remission, or recurrent. Treatment options and the chance of recovery depend on:

*The patient's age
*Whether the ALL started from a T cell or B cell
*Whether the cancer has spread to the brain or spinal cord
*Whether the Philadelphia chromosome is present
*Whether the cancer has been treated before or recurred, or come back

Treatment of ALL usually has two phases. The first phase is **Remission Induction Therapy.** The purpose is to kill the leukemia cells in the blood and bone marrow. This puts the leukemia into remission. The second phase is **Maintenance Therapy** and begins after the leukemia is in remission. The purpose is to kill any remaining leukemia cells that may not be active but could begin to regrow and cause a relapse. It is also called Remission Continuation Therapy.

STANDARD TREATMENTS

Chemotherapy uses drugs to kill cancer cells or stop the cells from dividing and spreading. It is called systemic chemotherapy when it is given by mouth or injected into a vein or muscle. It is called intrathecal or regional chemotherapy when it is placed directly into the spinal column or organ or abdominal cavity. The way the chemotherapy is given depends on the subtype of cancer and whether it has spread to the brain and spinal cord. Chemotherapy can use one or a combination of drugs.

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells. External radiation therapy uses a machine outside the body to send radiation towards the cancer. The way the radiation is given depends on the type and phase of leukemia.

Central nervous system (CNS) sanctuary therapy is usually given during each phase of therapy. Chemotherapy given by mouth or through a vein may not reach leukemia cells in the brain or spinal cord (CNS). Leukemia cells are able to hide in the CNS, or find sanctuary. Intrathecal chemotherapy and radiation therapy to the brain and the spine are able to reach leukemia cell in the CNS. They are given to kill the leukemia cells and prevent the cancer from recurring. Using chemotherapy or radiation to prevent leukemic spread to the CNS is also called CNS prophylaxis.

Stem cell transplant is a method of giving chemotherapy and replacing blood-forming cells that are abnormal or destroyed by the cancer treatment. Stem cells are immature blood cells that are removed from the blood or bone marrow of the patient or donor and then frozen or stored. The stem cells are thawed and given back to the patient through an infusion after the high-dose chemotherapy and radiation therapy are completed. The reinfused stem cells grow into and restore the body's blood cells.

New types of treatment are being tested in clinical trials. Biologic therapy is a treatment that uses the patient's own immune system to fight cancer. This is also called biotherapy or immunotherapy. Substances made by the body or made in a laboratory are used to boost, direct, or restore the body's natural defenses against cancer.

adapted from National Cancer Institute (NCI)
and People Living with Cancer, December, 2006