Centre for Clinical Haematology
cfch.com.sg

Mount Elizabeth Novena Specialist Centre
38 Irrawaddy Road, #09-47,48,57,
Singapore 329563
+65 6256 8836

Gleneagles Hospital Annexe Block
6A Napier Rd, #02-39/40,
Singapore 258500
+65 6261 3898

What is Acute Lymphoblastic Leukaemia (ALL)?

ALL is the most common type of cancer in children and accounts for 20% of blood cancers in adults. It is a type of blood cancer which leads to the overproduction of abnormal white blood cells called lymphoblasts. These lymphoblasts circulate in the bloodstream and infiltrate the bone marrow, lymph glands and other organs in the body. As a result, the normal function of the bone marrow is affected leading to poor production of red cells, normal white cells and platelets. If left untreated, it is usually fatal within 3 months of diagnosis.

What causes ALL?

The development of ALL is related to the genetic damage that happens in the blood stem cells within the bone marrow or lymph nodes. The exact cause of the damage is not clear, but there are certain factors that increase your risk of developing ALL:

1. **Sex.** Men are slightly more likely to develop ALL than women.
2. **Exposure to radiation in high doses.** High levels of radiation, such as in nuclear reactor accidents, can increase the risk of leukaemia
3. **Exposure to certain chemicals.** Some chemicals such as Benzene can increase the chances of developing ALL. However strict regulations in most countries limit the exposure of such chemicals which means they play a very small part in causing ALL.
4. **Smoking.** Smoking is associated with more than 15 types of cancers including leukaemia, as cigarettes contain many substances which are harmful to the body. There are also reports on an increased risk of leukaemia in children of parents who smoke.
5. **Genetics.** Certain conditions have an increased risk of acute leukaemia eg. Down syndrome.

6. **Previous cancer treatment.** People who have previously received certain types of chemotherapy or radiotherapy have an increased risk of ALL.

What are the Signs & Symptoms of ALL?

1. **Fever.** This can be caused by the disease itself or an underlying infection.
2. **Fatigue.** This is a symptom of anaemia which is due to the lack of red blood cells.
3. **Bleeding symptoms.** Such symptoms include easy bruising, prolonged gum bleeding after brushing teeth, recurrent nosebleeds or heavy periods. This is due to low platelets.
4. **Pale Skin.** This is another symptom of anaemia.
5. **Weight Loss.**
6. Lymph Node Swelling. Swelling of the lymph nodes is caused by infiltration of leukaemia cells. It may result in swellings over the neck, armpits and groin.
7. **Enlarged Abdomen.** This may be caused by an enlargement of the spleen, liver and/or lymph nodes within the abdomen.
8. **Neurological Impairment.** This is very rare. Patients may experience double vision, numbness or weakness. This is due to leukaemia cells affecting the nervous system.

How is ALL diagnosed?

Often patients initially present to the doctor with non-specific symptoms such as tiredness, bruising, recurrent fevers or swelling over the neck, groin or armpit. On other occasions, patients may be referred for investigations after having an abnormal blood test.

Blood Tests

Your doctor will most likely order a blood test called a Full blood Count (FBC), which will raise the suspicion of leukaemia. The FBC may show a high white blood cell count, a low haemoglobin level and low platelet count. An urgent referral to a Haematologist for further evaluation and treatment is required.

Bone Marrow Test

A **bone marrow test** is an important investigation to establish the diagnosis of acute leukaemia. Bone marrow is the soft tissue inside your bone which is responsible for making your blood cells. The bone marrow test involves inserting a small needle into your hip bone and withdrawing a sample of bone marrow. This is normally done under local anaesthetic. The sample is sent to the laboratory for various tests which help to determine the diagnosis and help the doctor develop the most suitable treatment regime.

Radiology Tests

X-rays, ultrasound or CT scans may be done to determine if other areas of the body are affected.

Lumbar Puncture

As ALL may affect the nervous system, a **lumbar puncture** may be performed to determine if there are any leukaemia cells in the nervous system. This is done by passing a fine needle into the spine to withdraw a small amount of the cerebral spinal fluid (CSF) which surrounds the spine and brain.

How is ALL treated?

The management of ALL can be complex and there are often many factors to consider (such as the patient age, physical fitness, and disease status) when deciding the actual treatment pathway required. At CFCH, our experienced team of medical professionals will counsel and assist you in tailoring the optimal treatment plan.

Treatment plans for ALL commonly include one or more of the following:

Chemotherapy

Chemotherapy is the use of drugs to kill cancer cells. Chemotherapy will also damage some normal cells, which means that there are side effects. Chemotherapy drugs are usually given in combination. Steroid drugs such as dexamethasone or prednisolone have also been found to be effective in treating ALL.

Targeted Therapy

Targeted therapy as the name describes, is a type of treatment where drugs attack specific abnormalities which are known to be found on the cancer cells. For example, some patients with ALL have a genetic abnormality called the Philadelphia chromosome and for these patients, targeted drugs can effectively be used to attack cells which contain this genetic abnormality.

Immunotherapy

Immunotherapy uses the body's own immune system to destroy cancer cells. Such drugs work by targeting and attaching to specific proteins on the surface of cancer cells. They then stimulate the body's own immune system to destroy these cells.

CNS Treatment

As ALL may affect the Central Nervous System, treatment requires injections of drugs into the CSF by lumbar puncture. This is called intrathecal (IT) chemotherapy and is a very important component in ALL treatment. Radiation therapy may also be required if disease has spread to the nervous system.

Bone Marrow Transplantation

This is also known as a **stem cell transplant** and is offered to suitable patients with high risk ALL. The procedure involves using high dose chemotherapy or radiation to destroy the bone marrow of the patient and replacing it with healthy bone marrow from a compatible donor.