Acute Lymphoblastic Leukaemia

Leukaemia is a cancer that occurs when abnormal blood stem cells (immature white blood cells) are produced in the bone marrow. Normally white cells develop, repair and reproduce in an orderly fashion. The leukaemia cells do not mature, and therefore are not able to function as immune cells, but they keep on dividing in the bone marrow.

The two most common types of leukaemia found in children are Acute Lymphoblastic Leukaemia (ALL) and Acute Myeloid Leukaemia (AML). Leukaemia accounts for about 35% of all childhood cancers.

All blood cells are made in the bone marrow which contains:

- **Red blood cells**: They carry oxygen around the body
- **White blood cells**: They help the body fight infection
- **Platelets**: They help the blood clot and control bleeding

Acute Lymphoblastic Leukaemia (ALL) which is also referred to as Acute Lymphocytic Leukaemia affects the lymphoid cells and gets worse very quickly if not caught and treated early on. ALL affects children of any age but is mostly found in children aged 1-4 years, and in more boys than girls.

The blood stem cells that are formed can either become a myeloid stem cell or lymphoid stem cells. A lymphoid cell becomes a lymphoblast cell which then becomes one of 3 types of lymphocyte or white blood cell:

- **B Lymphocytes** make antibodies to help fight infection.
- **T Lymphocytes** help the B lymphocytes make antibodies that help fight infection
- **Natural killer cells** that attack cancer cells and viruses

In a child with ALL, too many stem cells become B Lymphocytes, Lymphoblasts, or T Lymphocytes. These cancerous leukaemia cells fill the bone marrow so that healthy red blood cells and platelets can't be made and this creates an added risk of infection; symptoms such as bruising and anaemia can occur.

Eventually there are so many cancerous cells that the immature leukaemia cells eventually leach out of the bone marrow along with the good white cells, platelets and red cells.

Causes of Acute Lymphoblastic Leukaemia

The exact cause of Acute Lymphoblastic Leukaemia is not known, even though there is continuous research being done on ALL.

Children with genetic disorders like Down's syndrome, Neurofibromatosis, or Shwachman syndrome have a high risk of developing leukaemia. Other risk factors include previous chemotherapy treatment, pre-birth x-rays, and exposure to radiation.

Signs and Symptoms

Some of the typical signs and symptoms of ALL are:

- Bone or joint pain and trouble standing or walking
- Loss of appetite or continuous weight loss
- Pain or a feeling of fullness below the ribs
- Painless lumps in the stomach, neck, underarm, or groin
- Lethargy, weakness, paleness, and dizziness
- Repeated, frequent infections
- Night sweats or irritability
- A fever that lasts for several days
- Being prone to frequent and easy bruising and frequent nosebleeds, bleeding gums or Petechiae (flat, pinpoint, dark-red spots under the skin caused by bleeding).

Many of the above symptoms could also be a sign of a different medical condition. Children will not normally complain of feeling sick, very tired or weak, so if they do, please consult your child's doctor immediately.

Tests and Diagnosis

ALL can be diagnosed or staged using the following tests and procedures:

- **Physical Exam and History:** The doctor will perform a physical examination, checking your child's general health as well as checking for anything unusual or any lumps. The doctor will also request complete medical history including health habits, past illnesses and eating habits.
- **A Complete Blood Count (CBC):** This procedure is crucial in the diagnosis of leukaemia and will include blood being drawn and sent for various tests to check the number of red blood cells, white blood cells, and platelets, and the amount of haemoglobin (the protein that carries oxygen) in the red blood cells

- **A Bone Marrow Aspiration and Biopsy**: A sample of the bone marrow is required to confirm the diagnosis. This is done by inserting a hollow needle into the hipbone or breastbone and withdrawing a sample. These samples, containing blood, bone, and bone marrow are scrutinised under a microscope in a laboratory test called Cytogenetic Analysis, which detects changes in chromosomes in the lymphocytes.

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Treatment options

Treatment options will depend on whether the leukaemia cells began from B lymphocytes or T lymphocytes; whether the ALL is standard or high-risk; the age of the child at diagnosis, and various other factors.

Treatment options consist of:

- **Chemotherapy:** The use of a combination of anti-cancer drugs and steroids to destroy or shrink cancer cells is the preferred treatment for children, and may include treatment of the central nervous system (CNS).
- **Radiotherapy:** High-energy rays that destroy the cancer cells but do minimal harm to normal cells. Radiation and stem transplant treatment is sometimes used, especially to treat recurrent or relapsed leukaemia.
- **Bone Marrow Transplantation:** Bone marrow treatment is only done where the ALL is likely to return after standard chemotherapy treatment.

Some of the treatment options may result in after-effects such as nausea, vomiting, irritation or soreness of the skin from radiation, hair loss, risk of infection, fatigue, bruising and bleeding or diarrhoea. The doctor should explain all of this to you, but if they do not, please ask them about side effects.

Awareness Ribbon Colour

The awareness ribbon colour for Acute Lymphoblastic Leukaemia is Orange.