Acute Lymphoblastic Leukemia (ALL)

Acute lymphoblastic leukemia (ALL) is a cancer of the lymphocytes

Leukemia, a cancer of the blood, begins when normal blood cells change and grow uncontrollably. Acute lymphocytic leukemia is a cancer of the lymphocytes, a type of white blood cell involved in the body's immune system. ALL is also called acute lymphoid leukemia or acute lymphoblastic leukemia. Acute means that the disease begins and gets worse quickly; patients with ALL usually need immediate treatment[1].

In people with ALL, the abnormal cells crowd other types of cells in the bone marrow, preventing the production of red blood cells (which carry oxygen), other types of white blood cells, and platelets (parts of the blood needed for clotting). As a result, those with ALL may be anemic, more likely to get infections, and bruise or bleed easily. Lymphoblasts also may collect in a person's lymphatic system and cause swelling of the lymph nodes. Some cells may invade other organs, including the brain, liver, spleen, or the testicles in men[1].

ALL makes up approximately **25%** of cancer diagnoses among children under 15 years old; it is the most common childhood cancer in the US[2]. The risk for developing ALL is highest in children younger than five years of age[3].

ALL Outlook

- From 2007-2013, the five-year relative survival rate in the US for ALL was **68.2%**[7]
- **80%-90%** of adults will have complete remissions; however, **roughly half** of these patients relapse[4].
- Patients with relapsed/refractory ALL have limited options
  - The chance of survival in patients who relapse or fail to attain remission is:
    - **16-30.1%** for children[8]
    - **5-8%** for adults[9]
- While bone marrow transplant (BMT) is considered curative, it is not always the answer. 3-year survival among children receiving a matched donor BMT following a 2nd or subsequent remission is **62%**[10,11]

Treatment for ALL

ALL is unique in that it is not a single disease but a group of related diseases with different subtypes. Patients with different subtypes of ALL may have different treatment regimens that may include chemotherapy, targeted therapy, radiation therapy and/or bone marrow transplant. Each patient's outcome depends on their response to treatment. Therefore, it is important for patients to discuss all options with their doctor, and develop a plan that will help them reach their treatment goals.

Following initial treatment, about 80%-90% of adults will have complete remissions[4]. Of note, despite aggressive treatment, 15%-20% of children and 40%-45% of adults relapse[4,5].

There is no formal staging system for ALL

The general classifications of ALL include[6]:

- **Newly diagnosed and untreated.** A patient may have decreased numbers of normal white blood cells, red blood cell, and platelets. Often there are many abnormal lymphoblasts in the blood and bone marrow.
- **Remission.** A patient has received treatment for ALL. The bone marrow contains less than 5% lymphoblasts, and the patient has no symptoms. The numbers of normal white blood cells, red blood cells, and platelets are normal.
- **Relapse.** Leukemia has come back after being in remission. Relapse is the most common cause of treatment failure in pediatric ALL, occurring in about 15%-20% of patients[5]. These incidents make relapsed ALL the fourth most common childhood malignancy[5].
- **Refractory.** Refractory leukemia means that the disease has not responded to treatment.

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