

Leukemia

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Leukemia is the most common malignancy in pediatrics and is significantly different from leukemia in adults. Approximately 2,500 to 3,000 children are diagnosed with leukemia in the United States every year¹. Subgroups of leukemia include: ALL (acute lymphoblastic leukemia), AML (acute myeloid leukemia), Burkitt's leukemia and other more rare types. Leukemia is not staged like other cancers, but stratified into risk groups based on various patient and cancer characteristics.

The two major types of leukemia, ALL and AML, vary both in treatment and overall outcome. ALL is more common, comprising about 75 percent of all pediatric leukemia cases. It is subdivided into precursor B-cell ALL and precursor T-cell ALL, as determined by the lymphatic cell of origin.

Treatment is mostly outpatient and cure is possible in greater than 90 percent of patients². AML tends to be more difficult to treat and requires intensive inpatient treatment, including the potential for bone marrow transplant depending on the initial risk stratification. Overall survival of AML in pediatric patients is 65 percent, which is significantly less than ALL³.

There are subsets of patients who are at higher risk for developing leukemia due to either previous exposures/treatment or underlying genetic factors. Individuals with Down syndrome are significantly more likely to develop leukemia than the general population with an increased incidence of one out of 95. In addition, those with disorders such as Li-Fraumeni syndrome or congenital marrow failure disorders such as Diamond Blackfan anemia, Kostmann disease (congenital neutropenia) and Schwachman-Diamond syndrome are at a higher risk for development of leukemia and should be routinely screened for changes in complete blood count.

Figure 1

Leukemia Populations by Type		
Disease Type	General Population ¹	Akron Children's Hospital
ALL	75%	72%
AML	20%	18%
Other	5%	10%

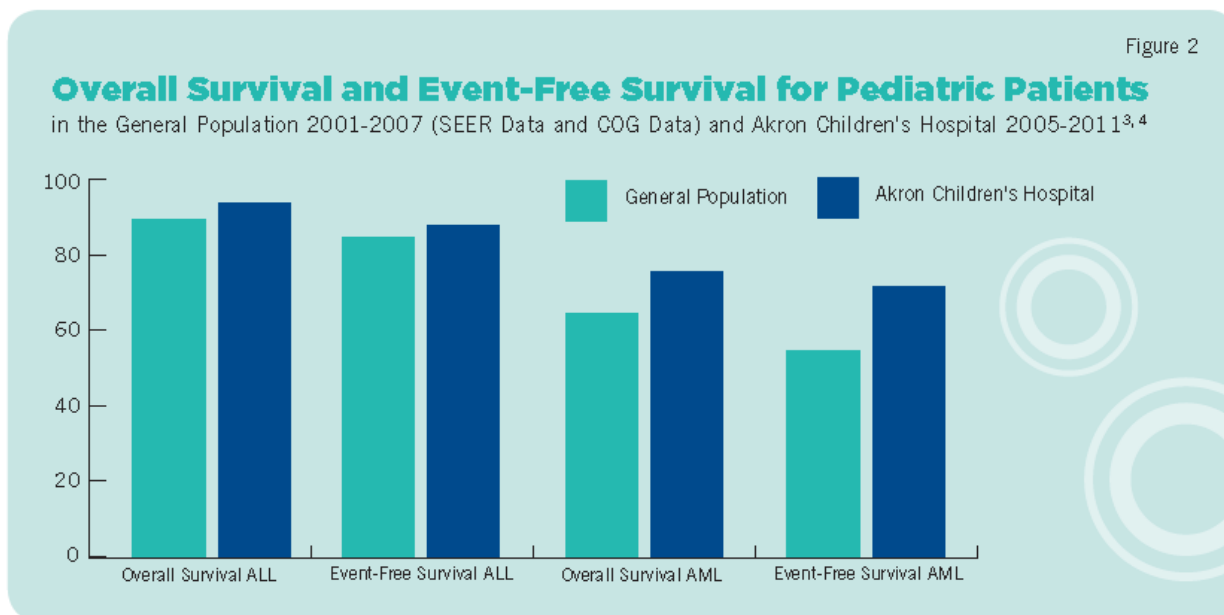
Clinical Presentation

Leukemia can present with multiple and varied symptoms including fever, weight loss, fatigue, bleeding or bruising, and bone pain. The peak incidence in childhood is between ages 2 to 5 years. Typically patients will have abnormal blood counts, such as anemia, low platelets, and low or elevated white blood cell counts. Leukemia cells may also be seen microscopically in the peripheral blood. In addition to the blood, leukemia cells can be found in the fluid surrounding the brain, spine, liver, spleen, lymph nodes and testicles.

Treatment

The mainstay of treatment for leukemia is chemotherapy, with the type of therapy dependent upon the type of leukemia and the risk stratification. In general, ALL patients undergo 2.5 to 3.5 years of treatment. The first six to eight months are the most intense, followed by oral chemotherapy at home and monthly intravenous chemotherapy in the outpatient setting. Conversely, AML patients receive about six to eight months of intensive chemotherapy in the hospital.

In general, overall survival for leukemia is good and has significantly improved over the years. Five-year survival rates for patients with ALL was about 57 percent in the 1970s and close to 90 percent in the early 2000s². In addition, with recent advances in treatment, most patients do not require more intensive therapeutic intervention such as a bone marrow transplant. New clinical trials are attempting to find innovative ways to treat leukemia other than chemotherapy. An example of this is immunotherapy or stimulating a patient’s own immune system to attack and kill off leukemia cells.



Experience at Akron Children’s Hospital

We reviewed our experience in treating leukemia in children over a seven-year period between January 2005 and December 2011. During this period, 124 new cases of leukemia were diagnosed. This accounted for 24 percent of all new cancer diagnoses during that time period. Of these new diagnoses, 72 percent were ALL, 18 percent were AML and 10 percent were other rarer forms of leukemia. These numbers are comparable to national data (Figure 1). Our overall survival (all patients alive at five years) and event-free survival (all patients alive without disease at five years) are slightly higher than the national data for both ALL and AML during approximately the same time period (Figure 2).

As a member of the Children’s Oncology Group, we currently have eight leukemia studies for patients who meet eligibility criteria. In addition, we have a tissue bank to store blood and bone marrow samples that can be used to investigate changes in patients’ leukemia cells and for future research into the cause and treatment of leukemia in pediatric patients.

References

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