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Editorial Open Access

Advances in Pediatric Acute Lymphoblastic Leukemia Treatment

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Editorial

Acute lymphoblastic leukemia (ALL) is the most frequently diagnosed pediatric hematologic malignancy, representing approximately 75-80 percent of all childhood acute leukemias. Statistically, the median age of diagnosis is approximately 15 years, while more than 55 percent of patients with ALL are under 20 years of age.

“With the ever-increasing pace of discoveries in the fields of molecular biology and nucleic acid sequencing techniques, the need for guidance in the diagnosis and treatment of ALL in pediatric patients has never been greater,” Brown noted. “These guidelines are meant to incorporate the latest diagnostic techniques, as well as the most current targeted therapies to treat patient subpopulations according to the genetic changes driving the leukemia. The guidelines for pediatric ALL arose as a result of multidisciplinary meetings of pediatric ALL experts; our goal was to provide recommendations for standard treatment approaches based on current evidence.”

ALL is a hematologic malignancy in which immature lymphoid cells undergo excessive proliferation. In the U.S., the age-adjusted frequency is approximately 1.4 cases per 100,000 individuals per year, with an estimated 5,930 new cases and 1,500 deaths in 2019. While roughly 55 percent of newly diagnosed cases of ALL are for patients 20 years or younger, 28 percent of diagnoses are for patients 45 years or older and approximately 12 percent are for those 65 years or older.

“Over the last few decades, there has been steady improvement in the care for pediatric ALL patients,” Brown stated. “Cure rates have drastically improved as better understanding of the molecular underpinnings of the disease, as well as risk stratification and advances in treatments such as optimizing the use of chemotherapy and incorporating targeted therapies.”

“Symptoms that we frequently see in our pediatric patients at their initial visit are fatigue or lethargy, fevers, night sweats, weight loss, pain in the extremities or joints, shortness of breath, dizziness, infections, and easy bruising or bleeding,” Brown observed. Patients with the presence of CNS or cranial nerve involvement may also display focal neurologic symptoms.

For a diagnosis of ALL, generally, the presence of 20 percent or greater bone marrow lymphoblasts in hematopathology reviews of bone marrow aspirates or other biopsy samples is required. “Unlike in myeloid leukemia, there is no clear lower limit for the diagnosis of ALL. However, since presentations of ALL with low blast counts are not common, diagnosis of ALL should not be avoided when the marrow blast count is less than 20 percent,” Brown explained.

In cases where there is a significant amount of circulating disease, according the NCCN Pediatric ALL panel, peripheral blood may be used as the biopsy sample if there are ≥1,000 circulating lymphoblasts per microliter or ≥20 percent lymphoblasts.

“The most significant advance to come from the use of NGS diagnostics has been the ability to detect Ph-like ALL cases,” Brown said. “Interestingly, the NGS sequences of many of the fusions we now know to define Ph-like ALL were initially discarded during quality control filtering processes. It was only after subsequent analyses that these were discovered and recognized as defining aberrations for cases of Ph-like ALL.”

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