Smarter use of existing treatment helps dramatically boost survival of young AML patients

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More individualized therapy and better supportive care helped push the survival for children with acute myeloid leukemia (AML) to 71 percent three years after diagnosis, according to new research led by St. Jude Children's Research Hospital investigators and reported in the medical journal The *Lancet Oncology*. The survival rate of 71 percent is 20 percent better than previously reported U.S. rates and is similar to the success achieved in a 2009 Japanese study, said Jeffrey Rubnitz, M.D., Ph.D., a member of the St. Jude Oncology department.

Results of the study, which involved 230 young AML patients treated at St. Jude and six other U.S. hospitals, are among the best reported nationally or internationally. Rubnitz said saving even more lives will likely require new medications and novel treatments. He is the lead author of this study, which appears in the current advance online issue of the journal The Lancet Oncology and is scheduled for publication in the June print edition.

AML, a cancer of certain white blood cells, is diagnosed in about 500 U.S. children and adolescents each year. While cure rates for acute lymphoblastic leukemia (ALL), the most common childhood cancer, have soared to better than 90 percent, long-term survival among AML patients has lagged.

"In this study, we focused on getting the maximum benefit from existing

therapies and applying lessons learned from earlier studies to identify and treat patients who faced the highest risk of relapse," Rubnitz said.

More than three years after diagnosis, about 89 percent of study patients classified at low-risk of relapse were still alive, compared with about 63 percent of standard-risk patients and about 47 percent of high-risk patients. AML patients are most likely to relapse within a year of diagnosis, and Rubnitz said cancer rarely returns after two years.

This study featured several firsts, including the first use of minimal residual disease (MRD) to guide the timing and makeup of later chemotherapy. MRD measures cancer cells that survive treatment. Rubnitz said patients assigned to more intensive therapy had MRD levels of greater than 1 cancer cell in 1,000 normal bone marrow cells after the first or second course of chemotherapy. In the study, MRD measures were also used to determine which patients received the drug gemtuzumab ozogamicin. The drug has been approved for use in AML patients age 60 and older and is now being studied in young patients.

MRD screening is commonly used to help guide ALL treatment, but Rubnitz said technical issues delayed widespread application in AML care.

The study also marked the first time all patients received antibiotics after each course of chemotherapy in hopes of preventing bacterial and fungal infections. The strategy dramatically decreased all measures of infection, including hospitalizations and deaths. Initially, all patients were treated with the anti-fungal medication voriconazole, but later the antibiotics vancomycin and ciprofloxacin were added.

The study included patients ranging in age from 2 days to 21 years. The work helped answer several other questions, including whether patients benefited from using a high dose of the anti-cancer drug cytarabine early

in treatment. Researchers found no additional benefit.

In addition to MRD, the study used genetic factors, including chromosomal rearrangements and gene mutations, and tailored treatment to reflect if patients had high, standard or low risk AML.

Patients initially received three-drug combination therapy, including either high- or low-dose cytarabine. After the first and second courses of chemotherapy, investigators used genetics factors and MRD measures to determine additional care a patient received, including whether patients were referred for a transplant to replace diseased blood-producing stem cells with cells from a healthy donor.

Provided by St. Jude Children's Research Hospital