

Attention problems persist in childhood leukemia survivors treated with chemotherapy alone

February 10 2016

Pediatric acute lymphoblastic leukemia (ALL) patients treated with chemotherapy alone remain at risk for attention and learning problems that persist after treatment ends, according to St. Jude Children's Research Hospital investigators. The research appears online this week in the *Journal of Clinical Oncology*.

ALL is the most common childhood cancer and among the most curable. The study involved the largest and most comprehensive assessment to date of neurocognitive outcomes in pediatric ALL [survivors](#) treated with intensive chemotherapy alone rather than in combination with cranial radiation therapy.

This contemporary therapy has helped to reduce treatment-related neurocognitive deficits while maintaining high cure rates. However, although about 90 percent of young ALL patients are alive a decade after their disease was diagnosed; survivors remain at risk for problems with attention and processing speed.

Participants in this study underwent neurocognitive assessments at the beginning, end and two years after finishing contemporary ALL treatment. The research focused on neurocognitive functioning two years after survivors completed therapy, particularly changes that surfaced since the end of therapy.

Two years after therapy, survivors performed as expected for their age on measures of overall intelligence, learning and memory; however, survivors showed a higher risk for attention problems, and parents reported that their children showed increased learning difficulties. The risks were greatest for survivors who were less than 5 years old when their cancer was found and for those who received more [intensive chemotherapy](#). Researchers also found that survivors with attention problems at the end of therapy had lower academic scores two years later.

"These findings provide additional evidence that neurocognitive functioning has improved in survivors of childhood ALL since cranial irradiation was replaced with intensified chemotherapy," said first and corresponding author Lisa Jacola, Ph.D., a St. Jude Department of Psychology research associate. "But we also show these young people are at an elevated risk for attention problems that have real-world consequences, particularly for learning and school performance.

"Attention is a building block for learning, and in this study attention difficulties predicted academic problems later," Jacola said. "If we know [attention problems](#) seen at the end of therapy continue and contribute to academic problems, then our goal is to intervene earlier to reduce or prevent such difficulties."

This study built on previous St. Jude research. Participants were enrolled in the St. Jude Total XV protocol (2000 to 2007). The survivors completed standardized tests of overall intelligence, attention, learning and academic performance. Parents and other caregivers also rated survivors' attention, learning and behavior.

Of the 339 patients eligible for the assessments, 167 completed the process at the end of therapy and two years later. Researchers found no significant differences between survivors who did and did not complete

both assessments, suggesting that the results apply to everyone in the study.

"This is an important contribution to the literature because the smaller size and design of previous studies made examining the impact of treatment difficult," Jacola said. "The findings underscore the need for neurocognitive and academic screening to be included as part of routine survivorship care for all pediatric ALL survivors."

Meanwhile, research continues to address how ALL treatment affects brain structure and function, particularly for the vast majority of patients who are 3 to 5 years old when their disease occurs. While stimulant medications have been shown to improve survivors' attention, the medications are not always an option. Computer-based interventions designed like video games are more acceptable to families and are proven to improve working memory in [childhood cancer survivors](#) with memory difficulties. More research is needed to determine the best time to intervene to prevent or ease problems.

More information: L. M. Jacola et al. Longitudinal Assessment of Neurocognitive Outcomes in Survivors of Childhood Acute Lymphoblastic Leukemia Treated on a Contemporary Chemotherapy Protocol, *Journal of Clinical Oncology* (2016). [DOI: 10.1200/JCO.2015.64.3205](#)

Provided by St. Jude Children's Research Hospital

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