Chromosome 21 abnormality tells oncologists to treat pediatric ALL more aggressively

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A recent study by members of the Children's Oncology Group reports results of a large trial showing that children whose leukemia cells have amplification of a portion of chromosome 21 may require more aggressive treatment for Acute Lymphoblastic Leukemia (ALL) than children without this gene amplification.

"This helps identify patients who need more therapy than they may otherwise get," says Stephen Hunger, MD, investigator at the University of Colorado Cancer Center, professor of pediatrics at the University of Colorado School of Medicine, and director of the Center for Cancer and Blood Disorders at Children's Hospital Colorado.

Hunger notes that this genetic abnormality was first described in 2003 and has subsequently been found in about 2 percent of pediatric ALL patients. Initial reports described poor outcomes for small groups of children with this abnormality, but the current study is by far the largest and shows the importance of this genetic abnormality even with modern treatments. The study documents the treatments and outcomes of more than 8,000 cases of pediatric ALL.

"What we found is that when this genetic abnormality is present in children with good risk features who get a standard level of treatment, there is more treatment failure than with similar, low-risk kids who don't have this genetic marker. But with kids whose risk features already dictate more aggressive treatment, this genetic abnormality doesn't seem to be associated with a worse outcome, because kids are already getting

the appropriate treatment. Recognizing this abnormality could help us treat even otherwise low-risk kids more aggressively up front leading to improved cure rates," Hunger says.

Specifically, the genetic abnormality is defined as four or more copies of the gene RUNX1, located on an abnormal chromosome 21. And this amplification is already detected as a byproduct of another genetic test standard in pediatric ALL, namely a test for fusion of this RUNX1 gene with the gene ETV6.

"In a sense, the testing comes for free with other testing you're already doing," Hunger says.

A study published by the same group in 2012 showed that pediatric ALL cure rates are at or above 90.4 percent.

"In early 1960s this disease was incurable," Hunger says. "Then in the late 1960s, the cure rate was 10 percent. Now 90 percent of children and adolescents diagnosed with ALL will be cured. Still, a 90-percent survival rate is little consolation to the 10 percent of families whose child doesn't survive. There's still more work to be done."

Provided by University of Colorado Denver