Children with non-chromosomal birth defects face higher risk of several childhood cancers

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Children with non-chromosomal birth defects such as congenital heart disease had a significantly higher risk of developing childhood cancer than children who did not have birth defects, according to a study presented at the AACR Annual Meeting 2018, April 14-18.

"Approximately one in 33 children is born with a birth defect," said the study's lead author, Jeremy M. Schraw, Ph.D., a postdoctoral fellow at Texas Children's Cancer Center, Texas Children's Hospital, and Department of Medicine, Section of Epidemiology and Population Science, Baylor College of Medicine in Houston.

"While we know that children with certain chromosomal conditions, like Down syndrome, have an increased risk of cancer, the majority of birth defects have no known chromosomal or genetic cause, but less is known about cancer risk in these children. There is growing evidence that non-chromosomal birth defects may predispose children to cancer, and we are trying to learn more about this connection so that we can potentially identify children who may benefit from early cancer detection," Schraw continued.

In this study, the researchers pooled statewide registry data from Texas, Michigan, North Carolina, and Arkansas for the period 1992-2013, and linked information from birth certificates, birth defects registries, and cancer registries. They used Cox proportional hazard models to evaluate associations between 60 birth defects and 31 childhood cancers.

Beginning with a population of more than 10 million live births, Schraw and colleagues identified 517,548 children with non-chromosomal birth defects and 14,774 children with cancer. They found that the risk of any cancer was 2.6 times higher in children with non-chromosomal birth defects than in those without a defect.

Certain cancers were strongly associated with certain birth defects. For example, children with ventricular septal defects, which cause a hole in the wall between the heart's lower chambers, were at significantly higher risk (10-fold increased risk) of hepatoblastoma, a rare form of cancer that starts in the liver. Children with craniosynostosis and right ventricular outflow tract defects were significantly more likely (more than three- and seven-fold increased risk, respectively) to have neuroblastoma.

Some birth defects, including the fairly common cleft palate and cleft lip, had no association with childhood cancer, Schraw said.

Schraw emphasized that childhood cancer is rare and, therefore, the risk that a child with a non-chromosomal birth defect will develop cancer during childhood is low.

"This study cannot establish a cause-and-effect relationship between birth defects and childhood cancers, and it is much too soon to make clinical recommendations based on this information," Schraw said. "We do hope our findings spur additional inquiries into these associations, so that we may better understand the biology underlying these associations."

He added that if confirmed in future research, these findings could provide justification for increased cancer surveillance protocols in children with non-chromosomal birth defects.

Schraw said that he and his colleagues are planning to expand this study

into other states. They are also conducting genomic sequencing in families where a child has both a birth defect and cancer to explore whether there are shared genetic origins underlying these associations. He said this additional genomic information could also shed light on why certain cancer types were more strongly associated with certain birth defects.

Schraw said that because the study was based on registry data, the researchers had little information on the children's health between birth and cancer diagnosis. Also, because the researchers did not have biological samples from the children, they could not fully discern the molecular features of their cancers.

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