

Certain treatments for childhood cancer may increase obesity risk later in life

May 11 2015

Childhood cancer survivors - especially those whose treatment included brain irradiation or chemotherapy with glucocorticoids - are 14 percent more likely to be obese than their healthy peers. The St. Jude Children's Research Hospital study appears today in the journal *Cancer*.

Of the 1,996 childhood cancer survivors in this study, 36.2 percent had a body mass index (BMI) of 30 kilograms per meters squared or more, which qualifies as obese. That was 14 percent greater than the expected prevalence based on federal health survey data of a comparison group of U.S. residents.

Among the strongest predictor of obesity in survivors was childhood obesity, which is also a strong predictor of adult obesity in the general public. Survivors who were obese when their pediatric cancer was discovered were almost five times more likely than other survivors to be obese when their BMI was calculated for this study.

Other obesity risk factors were age and childhood cancer treatment. Survivors who were ages 30 and older when their BMI was calculated were more likely than younger survivors to be obese. Also, 47 percent of survivors who received brain irradiation as part of their treatment were obese, compared to 29.4 percent of survivors who received other therapies. The risk increased for survivors whose cancer was diagnosed when they were younger than age 4 and whose treatment included glucocorticoids.

In comparison, survivors treated with chest, abdominal or pelvic irradiation were about half as likely as other survivors to be obese.

"The high prevalence of obesity in cancer survivors is of great concern and underscores the need to develop more effective counseling and weight-loss interventions for this growing population," said first author Carmen Wilson, Ph.D., a research associate in the St. Jude Department of Epidemiology and Cancer Control.

Corresponding author Kirsten Ness, Ph.D., a member of St. Jude Epidemiology and Cancer Control, added: "Childhood cancer survivors are known to be prone to developing chronic disease. Obesity just adds to that risk."

In the general public, obesity is associated with an increased risk of premature death as well as cancer, heart disease and other chronic health problems. St. Jude researchers are working on more effective weight management strategies for childhood cancer survivors, some possibly starting shortly after the cancer diagnosis.

The current study is one of the first to explore how genetics may impact obesity in childhood cancer survivors and the first to scan the entire genome for small variations in DNA that may influence the risk of treatment-related obesity.

Researchers identified four regions of genetic variation associated with a greater likelihood of obesity following brain irradiation, a therapy used to treat brain tumors in some patients, but no longer used to treat St. Jude patients with acute lymphoblastic leukemia (ALL). The genetic regions identified were in and around genes that have been implicated in nervous system development. The genes are FAM155A, SOX11, CDH18 and GLRA3.

"The results must be verified, but the findings suggest that variations in genes responsible for neural growth, repair and connectivity may modify the risk of obesity in childhood cancer survivors treated with cranial irradiation," Wilson said. "Understanding the genetic basis of why certain survivors are more vulnerable to treatment-induced health problems may help us identify high-risk patients and develop strategies to reduce or better manage their risk."

Information about diet, exercise and other lifestyle factors that influence obesity was not available for study participants.

The average survivor in this study was 32 years old and almost 25 years beyond a cancer diagnosis, making this among the most comprehensive efforts yet to understand obesity in childhood cancer survivors. The research was part of the St. Jude Lifetime Cohort Study (St. Jude LIFE), which brings cancer survivors treated at St. Jude back to the hospital for several days of health screenings and other assessments. St. Jude LIFE is the centerpiece of the hospital's ongoing efforts to improve medical care and the quality of life for current and future childhood cancer survivors.

Treatment-related risk factors help to explain the high rate of obesity among childhood ALL survivors. In this study, 43 percent of the ALL survivors were obese, which is higher than the 19 to 32 percent reported in previous research.

The study is one of the largest yet involving survivors of pediatric solid tumors. "We found that the frequency of obesity in solid tumors survivors was higher than had been previously reported," Wilson said. With the exception of female survivors of kidney cancer, more than 25 percent of solid tumor survivors in this study were obese.

More information: "Genetic and clinical factors associated with obesity among adult survivors of childhood cancer: a report from the St.

Jude Lifetime cohort." Carmen L. Wilson, Wei Liu, Jun J. Yang, Guolian Kang, Rohit P. Ojha, Geoffrey Neale, Deo Kumar Srivastava, James G. Gurney, Melissa M. Hudson, Leslie L. Robison, and Kirsten K. Ness. *Cancer*; Published Online: May 11, 2015. [DOI: 10.1002/cncr.29153](https://doi.org/10.1002/cncr.29153)

Provided by Wiley

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