Obesity and acute lymphoblastic leukemia risk in children, adolescents, and young adults: A Children's Oncology Group report

Taumoha Ghosh MD1,2, Michaela Richardson MPH1, Peter Gordon MD/PhD2, Justin Ryder PhD1, Logan Spector PhD1, and Lucie Turcotte MD/MPH2

1Division of Epidemiology and Clinical Research, Department of Pediatrics, University of Minnesota, Minneapolis, MN, USA.
2Division of Hematology/Oncology, Department of Pediatrics, University of Minnesota, Minneapolis, MN, USA.

Introduction

Prevalence of childhood obesity has increased over the last four decades in the United States. Acute Lymphoblastic Leukemia (ALL) is the most common childhood cancer and its incidence has been gradually increasing since 1975. Obesity has been linked to at least 13 types of cancer in adults, including hematologic malignancies. Is obesity a previously unrecognized risk factor for childhood ALL?

Methods

Cases were children and young adults (aged 2-30 years) diagnosed with ALL between 2004-2017 and treated on frontline COG treatment protocols (n=4726). It is associated with obesity among males and Hispanics.

Figure 1: Demographic Data. A-C. Demographics of cases and controls by sex, age, and race/ethnicity, respectively.

Figure 2: Obesity at time of diagnosis is associated with B-ALL among males and Hispanics. Using normal weight as reference, obesity at diagnosis was found to be associated with a diagnosis of ALL, specifically B-ALL. Previously known association of underweight and ALL also observed. When stratified by sex and race/ethnicity, association between B-ALL and obesity was seen in males and Hispanics. This is the first study, to our knowledge, to show that pre-treatment obesity is associated with B-ALL, specifically among males and Hispanics.

Conclusions

Obesity is associated with a diagnosis of B-ALL and may be a risk factor contributing to the increasing incidence of ALL. Obesity may be associated with high-risk disease features and may impact prognosis. Sex hormones may play a role in the association between ALL and obesity, since the association was only seen in males in our study.

Future Directions

Further analyze data for other cytogenetic characteristics that may be associated with obesity and have an implication for prognosis. Create an animal model to assess cytokines and adipokines to better understand the association with obesity and ALL, in particular within the CNS microenvironment.

References


Acknowledgements

Children's Oncology Group (ALL17D2). Viking Award, University of Minnesota. National Institute of Health, T32 Grant.

Contact: Taumoha.Ghosh@umn.edu