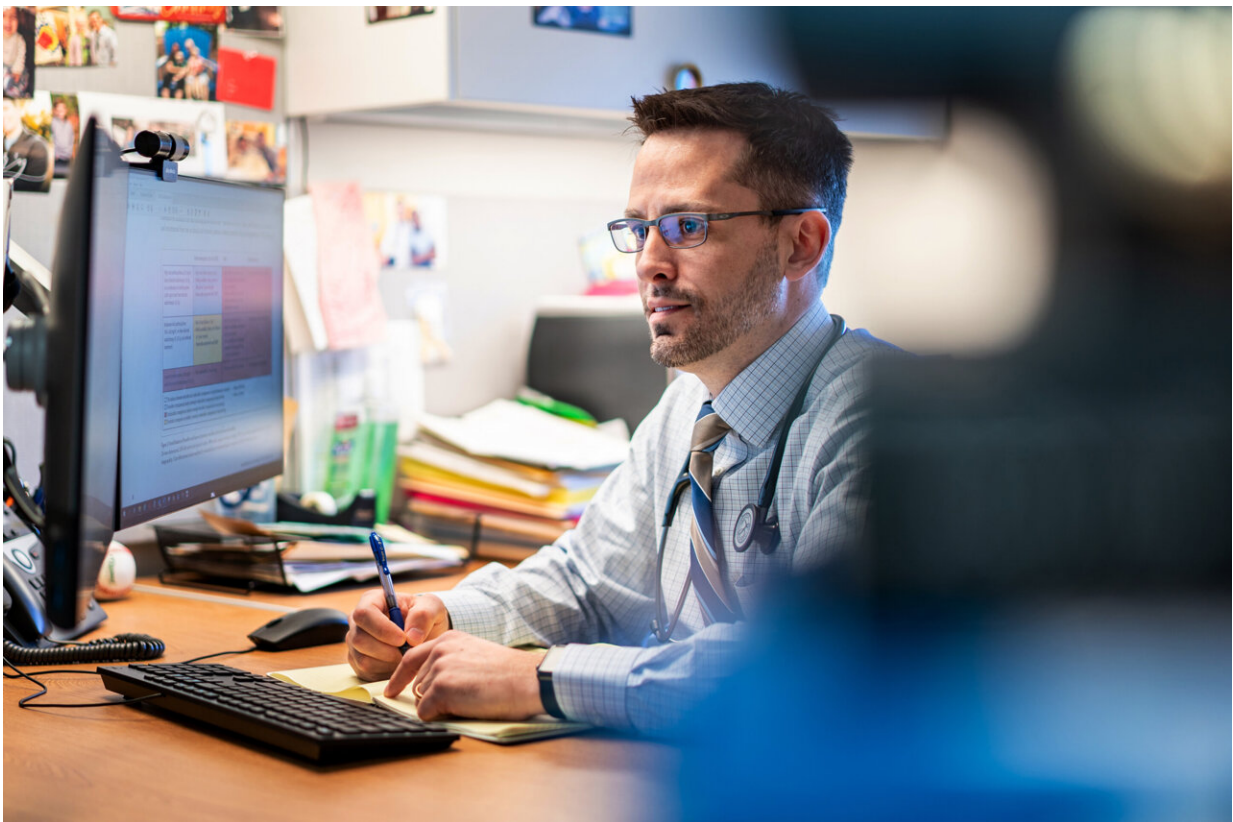


Two common biomarkers can predict heart risk in asymptomatic childhood cancer survivors

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First and corresponding author Matthew Ehrhardt, MD, MS, St. Jude Department of Oncology. Credit: St. Jude Children's Research Hospital

Data from the St. Jude lifetime cohort study (St. Jude LIFE) have

revealed that two common biomarkers of cardiac function and damage could better predict cardiomyopathy within five years than routine clinical evaluations in high-risk, asymptomatic childhood cancer survivors. Early detection through screening using these two biomarkers may lead to earlier treatment to prevent and protect against further heart damage.

The findings are [published](#) in the *Journal of Clinical Oncology*.

Cardiomyopathy is often asymptomatic at onset and thus "invisible" to routine clinical evaluations. St. Jude Children's Research Hospital scientists found that two common biomarkers, global longitudinal strain (GLS) and N-terminal-pro-B-type natriuretic peptide (NT-proBNP), could identify survivors with otherwise normal-appearing heart function who are at elevated risk of decline in heart muscle function.

"This may be a much more sensitive way to identify childhood cancer survivors that might benefit from intervention at an earlier stage," said first and corresponding author Matthew Ehrhardt, MD, MS, St. Jude Department of Oncology. "We were somewhat surprised by the magnitude of risk for declining heart function over such a relatively short period in individuals with abnormal GLS and NT-proBNP, suggesting a need for early and effective interventions that we hope will prevent progression to heart failure over time."

The results showed an increase in predicting asymptomatic heart damage in patients treated with potent anthracycline chemotherapy drugs, such as doxorubicin. The study found that these biomarkers did not improve prediction models in patients who only received radiation. This knowledge may help physicians limit testing to only anthracycline-exposed survivors, saving time and resources while maximizing utility.

"This means doing more for patients at greatest risk while avoiding

unnecessary tests for patients who will not benefit from them," Ehrhardt said.

Two signs point to invisible heart problems

The key to helping survivors with asymptomatic cardiomyopathy is to detect dysfunction early. Cardiac function is typically assessed using echocardiograms, which look at the volume of blood pumped through part of the heart. The most common measure of that volume is called left ventricular ejection fraction. Many childhood cancer survivors appear to have a normal ejection fraction, only to later develop cardiomyopathy. Findings showed that even in survivors with normal ejection fraction, abnormal GLS and NT-proBNP improved the ability to predict cardiomyopathy risk.

"A survivor with a normal ejection fraction at baseline with abnormal ranges of both biomarkers was at a fourfold increased risk for a worsening ejection fraction in the next five years," Ehrhardt said.

GLS is an additional measure of heart function obtained from an echocardiogram. GLS is more sensitive for detecting cardiac muscle injury than the traditionally reported ejection fraction. It is a software-derived mathematical estimation of the heart muscle fibers' ability to contract, rather than the more rudimentary measure of ejection fraction, or blood volume pumped at a specific time. An institution that performs echocardiograms to measure ejection fraction can theoretically also routinely measure GLS.

NT-proBNP is a [serum biomarker](#), a chemical released into the bloodstream in greater quantities when the heart is injured or overworked. It is frequently used in adult cardiac patients to identify potential heart injury and is thus widely available, though its application in pediatric oncology is relatively novel.

Practical measures to predict and protect the heart earlier

"One of the promising aspects of our findings is that both of these measures are readily available and, therefore, have the potential to impact care more immediately. Most cardiologists are already using GLS," Ehrhardt said, "and NT-proBNP has been around for a long time."

Together, these two common and easy-to-implement measures may help identify survivors at elevated risk of cardiomyopathy earlier, leading to earlier therapeutic interventions. Early detection helps protect against cardiac damage in adults with other diseases; it may extend the same benefits to [childhood cancer survivors](#).

"The exciting part of this study is that it potentially helps to identify a population that we would have otherwise looked at and said, 'You're at risk for abnormal heart function, but everything looks good today. We'll reevaluate your [heart](#) in two to five years,'" Ehrhardt said.

"Whereas now we have reason to believe those with abnormal biomarkers are a particularly high-risk group that may benefit from closer follow-up or more proactive interventions to reduce risk. The findings set the stage for future studies evaluating novel screening and early intervention strategies that we hope will ultimately improve survivors' cardiac health and well-being."

The study's other authors are Qi Liu, University of Alberta; Isaac B. Rhea, University of Tennessee Health Science Center; Daniel Mulrooney, Stephanie Dixon, John Lucas, Yadav Sapkota, Kyla Shelton, Kirsten Ness, Deo Kumar Srivastava, Aaron McDonald, Leslie Robison, Melissa Hudson, Yutaka Yasui and Gregory Armstrong, of St. Jude.

More information: Matthew J. Ehrhardt et al, Improved Cardiomyopathy Risk Prediction Using Global Longitudinal Strain and N-Terminal-Pro-B-Type Natriuretic Peptide in Survivors of Childhood Cancer Exposed to Cardiotoxic Therapy, *Journal of Clinical Oncology* (2024). [DOI: 10.1200/JCO.23.01796](https://doi.org/10.1200/JCO.23.01796)

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