MedicalXpress

Acute leukemia patients treated with common therapy have increased risk for heart failure

December 17 2019

Patients with acute lymphoblastic leukemia (ALL) or acute myeloid leukemia (AML) who are treated with anthracyclines are at a heightened risk of heart failure—most often within one year of exposure to the chemotherapy treatment, according to a new study led by researchers at Penn Medicine.

To help identify a patient's risk for heart failure following the treatment, researchers developed a risk score based on clinical and echographic variables, including left ventricular ejection fraction (how much blood the LV pumps out with each contraction), myocardial strain, and cumulative treatment dose. Oncologists, authors say, can use the scoring system to classify patients as low or high risk for heart failure and then tailor their treatment plans accordingly. The risk score model and results of the study were published today in *JACC: CardioOncology*.

"While we are more effective at treating cancer, the improved survival rates have helped to unmask the cardiotoxic impact of some of the most common cancer therapies," said the study's corresponding author Marielle Scherrer-Crosbie, MD, Ph.D., director of the Cardiac Ultrasound Laboratory and a professor of Cardiovascular Medicine in the Perelman School of Medicine at the University of Pennsylvania. "Our hope, in creating this risk score system, is to help clinicians identify patients with the highest risk for potential cardiac damage, so they can more closely monitor the patients via a multidisciplinary

approach."

Over the past decade, the incidence of acute leukemia in the United States has steadily increased. Advances in treatment during that time, however, have led to drastically improved survival, with mortality rates dropping by one percent each year from 2006 to 2015. Antracyclines remain a standard therapy for acute leukemia, and they are delivered as high doses over a very short period of time—a treatment schedule that increases toxicity. While previous research found patients with hematologic malignancies (cancer that begins in blood-forming tissues) had the highest rates of symptomatic heart failure, there is limited evidence on the comorbidities in adult patients with acute leukemia and little is known about the incidence and risk stratification of symptomatic heart failure in this population.

In this study, researchers analyzed data of 450 patients with ALL (when bone marrow makes too many lymphocytes, a type of white blood cell) or AML (when bone marrow makes abnormal myeloblasts—a type of white blood cell—red blood cells, or platelets). Of the patients studied, 40, or about 9 percent, developed symptomatic heart failure. The patients, on average, developed heart failure 10 months following exposure to treatment. Patients with AML had a higher incidence of heart failure compared to patients with ALL.

Researchers then developed a risk score, which ranged from 0 to 21, based on six clinically relevant variables and myocardial strain—a measure of strain on the heart muscles that can be calculated by echocardiography. The team assigned points to each of the variables: a baseline global longitudinal strain of greater than -15 percent (6 points); baseline LV ejection fraction of less than 50 percent, preexisting heart disease, AML (4 points each); cumulative anthracycline dose of greater than or equal to 250 mg/m (2 points) and older than 60 years of age (1 point).

The patients were divided into three subgroups based on their risk scores: low (0 to 6), moderate (7 to 13) and high (14 to 21). The majority of patients (318) were classified as low risk, while 112 were considered moderate and 20 classified as high risk for heart failure. The team found that 65 percent of patients classified as high risk developed heart failure, while only 1 percent of the patients in the low risk group did.

"While this is a significant step toward identifying patient risk for heart failure, additional studies are needed to determine the effectiveness of such a risk score in clinical practice," said the study's lead author Yu Kang, MD, Ph.D., a post-doctoral research fellow at Penn.

Provided by Perelman School of Medicine at the University of Pennsylvania