

Elevated troponin linked to mental stress ischemia in heart disease patients

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Some people with heart disease experience a restriction of blood flow to the heart in response to psychological stress. Usually silent (not painful), the temporary restriction in blood flow, called ischemia, is an indicator of greater mortality risk.

Cardiologists at Emory University School of Medicine have discovered that people in this group tend to have higher levels of troponin—a protein whose presence in the blood that is a sign of recent damage to the heart muscle— all the time, independently of whether they are experiencing stress or chest pain at that moment.

The results are scheduled for presentation by cardiology research fellow Muhammad Hammadah, MD at the American College of Cardiology meeting in Chicago on April 3, as part of the Young Investigator Awards competition. Hammadah works with Arshed Quyyumi, MD, and Viola Vaccarino, MD, PhD, and colleagues at the Emory Clinical Cardiovascular Research Institute.

"Elevated [troponin levels](#) in patients with [coronary artery disease](#) may be a sign that they are experiencing repeated ischemic events in everyday life, with either psychological or physical triggers," Hammadah says.

Doctors test for troponin in the blood to tell whether someone has recently had a heart attack. But the levels seen in this study were lower than those used to diagnose a heart attack: less than a standard cutoff of 26 picograms per milliliter, in a range that only a high-sensitivity test for

troponin could detect.

The Emory team studied 587 people with known coronary artery disease who were asked to undergo both a [mental stress](#) test, involving public speaking on an uncomfortable topic, and a conventional exercise test on a treadmill. Blood flow to the heart was monitored by SPECT imaging. A few people were unable to exercise at a high heart rate and had to have a pharmacological [stress test](#) with a drug that dilates the coronary arteries.

Sixteen percent of the study participants developed mental stress-induced ischemia and 35 percent developed conventional—either exercise or pharmacological—stress-induced ischemia. In the mental stress ischemia group, the average baseline (that is, before stress) levels of troponin were markedly higher than in the rest: 5.9 picograms per milliliter compared to 4.1.

"This is the first study to date showing the effects of mental stress-induced ischemia on a marker of myocardial damage, however subtle that damage may be," Hammadah says. "Although this difference in troponin levels between those with and without ischemia is small, the difference has been shown by other investigators to predict increased risk of future heart attacks and death."

Seventy-five percent of the study participants who developed mental stress ischemia developed ischemia in response to exercise as well. Baseline troponin levels were also higher in the exercise-induced ischemia group: 5.4 pg/mL compared to 3.9.

When doctors tested for troponin 45 and 90 minutes after the mental stress test, they detected a small average increase in the mental stress ischemia group that was not statistically significant. The exercise test did result in a significant increase in troponin in the exercise-induced

ischemia group. This may be because the exercise test lasts longer and puts more demands on the heart, Hammadah says.

Provided by Emory University

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