Can stress trigger a second heart attack? Yes, new research suggests

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Stress can be caused by financial woes, work pressures, relationship issues, illness or even natural disasters or health crises like the emerging coronavirus. For some people who survive a heart attack, it seems mental

stress—as opposed to physical stress—may be a stronger predictor of a repeat heart attack or dying from heart disease, according to research presented at the American College of Cardiology's Annual Scientific Session Together with World Congress of Cardiology (ACC.20/WCC).

Traditional stress tests, in which someone exercises on a treadmill or takes a medicine that makes the heart beat faster and harder as if the person was actually exercising, have long been used to check blood flow to the heart and gauge the risk of heart problems. Researchers at Emory University sought to investigate whether myocardial ischemia—when blood flow to the heart is reduced such that the heart muscle doesn't get enough oxygen—induced by mental stress was associated with poor outcomes among heart attack survivors and how this type of stress testing compares with conventional stress brought on by exercise.

Among more than 300 young and middle-aged individuals enrolled in the study, those who endured myocardial ischemia with mental stress had a two-fold higher likelihood of having another heart attack or dying from heart disease compared with those who did not have cardiac ischemia induced by mental stress.

"In our study, myocardial ischemia provoked by mental stress was a better risk indicator than what we were able to see with conventional stress testing," said Viola Vaccarino, MD, Ph.D., Wilton Looney Professor of Cardiovascular Research in the department of epidemiology at Emory University Rollins School of Public Health in Atlanta, and the study's principal investigator, adding that this is the only study of its kind in this relatively young adult population of heart attack survivors. "These data point to the important effect that psychological stress can have on the heart and on the prognosis of patients with heart disease. It gives us tangible proof of how psychological stress, which is not specifically addressed in current clinical guidelines, can actually affect outcomes."

She added that taking into account patients' psychological stress may help clinicians better evaluate the risk of recurrent heart attacks or death seen in some patients surviving a heart attack. These results also underscore the need for strategies to identify the best stress management interventions for these patients.

The investigators studied 306 adults aged 61 years or younger (50 years on average and ranging from 22-61 years), who had been in the hospital for a heart attack in the previous eight months. Participants were recruited in the Atlanta metro area and represented a diverse group of patients; half were women and 65% were African American. All participants underwent two types of "stress" testing to examine blood flow to the heart: mental stress testing (provoked by giving one speech with emotional content in front of an intimidating, seemingly disinterested audience followed by myocardial perfusion imaging), and conventional stress testing (pharmacologic or exercise). Patients were followed for a median of three years for the primary endpoint, which included a combination of either the occurrence of a repeat heart attack or cardiovascular death. These were adjudicated through an independent medical record review and examination of death records. Ischemia was defined as a new or worsening disruption in adequate blood flow to the heart and was assessed using cardiac nuclear imaging scans.

Overall, mental stress induced myocardial ischemia occurred in 16% of patients and conventional ischemia in 35%, suggesting that traditional ischemia due to exercise or drug-induced stress is more common. Over a three-year follow-up, 10% of patients (28 individuals) had another heart attack and two died of heart-related problems. The incidence of heart attack or cardiovascular-related death was more than doubled in patients with mental stress induced ischemia compared with those without mental stress ischemia, occurring in 10 (20%) and 20 (8%) patients, respectively. The relationship between acute mental stress and heart attack or death remained even after adjusting for clinical risk factors and

symptoms of depression. In contrast, conventional stress ischemia was not significantly related to the primary endpoint.

"Patients who developed ischemia with mental stress had more than two times the risk of having a repeat heart attack or dying from heart disease compared with those who did not develop ischemia during mental stress," Vaccarino said. "What this means is that the propensity to have a reduction in blood flow to the heart during acute psychological stress poses substantial future risk to these patients."

Such reduction in blood flow, when it occurs in real life, could trigger a heart attack or serious heart rhythm problems, she said. Another interesting finding, according to Vaccarino, is that ischemia with mental stress and with conventional stress were not strongly related to each other, suggesting that they occur through different pathways.

"This points to the fact that stress provoked by emotions has a distinct mechanism of risk for heart disease and its complications compared with physical stress," she said.

Vaccarino and her team plan to expand this research using a larger sample size and a longer follow-up time to determine if there are specific subgroups of patients that are especially at risk of adverse outcomes when they develop ischemia from mental stress. Because of the relatively small sample size, the investigators were not able to determine if such risk differs by sex or race, for example, or whether past exposures to social stressors or trauma play a role. Furthermore, the investigators plan to examine whether myocardial ischemia induced by mental stress in the lab reflects enhanced physiological responses to stress in real life.

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