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Mental stress effects on heart more common than previously known

Heart blood flow decreases in some patients who have no problems with other stress tests

Even when heart disease patients can pass stress tests done on a treadmill or with chemical stressors after treatment, their hearts may still suffer silent ischemia during mental stress, according to a new study in the Mar. 7, 2006, issue of the Journal of the American College of Cardiology.

"Mental stress induced ischemia is more common than we had recognized," said David S. Sheps, M.D., M.S.P.H. from the University of Florida and the Malcom Randall Veterans Administration Medical Center in Gainesville, Florida. "It remains to be seen whether that ischemia is also associated in this population with an elevated risk for future health events, as it is in other populations."

The researchers, including lead author Srikanth Ramachandrani, M.D., monitored heart blood flow in 29 patients as they performed a mentally stressful role-playing scenario. All of the patients had coronary artery disease, but they had been treated and did not show any signs of ischemia (decreased heart muscle blood flow) on either treadmill tests or after an injection with a chemical that puts stress on heart blood flow. Mental stress has been shown to produce ischemia in heart disease patients who also have problems during exercise or chemical stress tests, but this is the first such study specifically designed to look at this broader group of patients.

The participants were asked to imagine a stressful situation, such as learning that a relative was being mistreated in a nursing home, and then give a short speech demonstrating how they would respond.

None of the patients felt chest pain or other symptoms of ischemia and there were no important differences in heart rate or blood pressure. But a minute into the speech, a radioactive tracer was injected into the patients. On the images then produced of blood flow in the heart muscle, six of the 29 patients showed signs of ischemia.

"If we didn't have the radionuclide imaging procedure, we would not have been able to tell whether the patient actually had ischemia. It's really totally silent. The patients didn't have any chest pain," Dr. Sheps said.

Ischemia produced by mental stress has been associated with an increased risk of health events and death in heart patients who also suffer ischemia during physical stress. Dr. Sheps emphasized that this study just showed that mental stress ischemia can happen even in heart patients who are free of exercise-induced ischemia. The researchers do not know whether the silent ischemia they detected is hazardous to the health of the patients.

"Nobody has followed the patients that we are talking about in this article. Nobody has followed that population. So we don't know whether it is predictive in this population or not. It's an important question," he said.

The results tend to support proposals that mental stress works through a different mechanism than physical stress. This study did not explore the possible mechanisms, but the researchers noted that some hypotheses include effects on very small blood vessels in the heart muscle or on the endothelium, the inner layer of blood vessels that helps control responses to changes in blood flow.

"The basic message is that psychological stress or behavioral stressors are important. The effects are hard to measure, but several groups of researchers are interested in them and I think we are going to find out a lot more about them in the years to come," Dr. Sheps said. "We and others are also looking at interventions to try to teach people how to tolerate stress better."

David S. Krantz, Ph.D., from the Uniformed Services University in Bethesda, Maryland, who was not connected with this study, said this study expands the group of patients who may be vulnerable to the effects of mental stress.

"It has previously been shown that mental stress can induce myocardial ischemia in a substantial number of coronary artery disease patients. The common thinking is that

this occurred primarily in patients with positive exercise tests. This study is important because it demonstrates that mental stress ischemia may occur in coronary artery disease patients who don't have ischemia with exercise. This patient group warrants further study since they may have functionally more severe coronary artery disease that is not shown during standard exercise radionuclide testing," Dr. Krantz said.

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