Abnormal blood vessel function found in women with broken heart syndrome

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A team of Mayo Clinic researchers has found that patients with broken heart syndrome, also known as apical ballooning syndrome (ABS), have blood vessels that don't react normally to stress. These results offer clues to the cause of this rare syndrome and may help with efforts to identify patients who are more vulnerable to mental stress so that appropriate therapies can be developed. The study is published online in the *Journal of the American College of Cardiology.*

Apical ballooning syndrome affects mainly postmenopausal women, and a few men. The symptoms mimic those of a heart attack, but unlike heart attack patients, ABS patients' heart arteries show no blockages and there is no permanent damage to the heart. Their hearts show the hallmark of ABS - a ballooning and weakening of the tip of the left ventricle, the heart's main pumping chamber.

"This is usually associated with severe mental or emotional stress in the patient," says Amir Lerman, M.D., a Mayo Clinic cardiologist. "Fortunately, for most of these patients, their heart function returns to normal in several weeks, although ABS recurs in about 11 percent of cases."

Besides stress, estrogen levels and functioning of the blood vessels are other suspected causes of ABS. For the study, Dr. Lerman and his research team compared blood vessel responses to mental stress in 12 women who had been diagnosed with ABS in the last six months, 12 postmenopausal women control subjects, and four women who had

experienced typical heart attacks.

Although the original stressors in the ABS patients included the death of a husband or family member, divorces, claustrophobia and church fundraising, no such extreme measures were employed for the study. Instead, to elicit mental stress, the women were given number and letter memory tests of increasing length and complexity along with subtraction tasks and Stroop word-color conflict tests. Blood samples were taken before and after the stress tests, and blood vessel function was measured with noninvasive devices such as blood pressure arm and finger cuffs.

In the ABS women, researchers found increased vascular reactivity and decreased endothelial function in response to acute mental stress compared to other postmenopausal women and the women who had regular heart attacks.

"In the ABS patients, rather than the blood vessel getting bigger to provide more blood during mental stress, the blood vessel gets smaller and prevents the blood from going where it's needed," explained Dr. Lerman. "This study tells us there is a group of women patients who are more sensitive to mental stress, which is a unique risk factor for them to have an ABS-type heart attack. The body's response to mental stress plays a significant role in ABS syndrome."

Dr. Lerman and his team are working to develop treatment options for ABS patients. "It's possible that we could identify these stress-sensitive patients with a mental stress test," Dr. Lerman says. "If we discover that some patients are more sensitive to mental stress in this way, we could design specific therapies to aid them if they have an ABS attack or to prevent its recurrence."

Provided by Mayo Clinic