

# Study: Response to emotional stress may be linked to some women's heart artery dysfunction

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Researchers at the Barbra Streisand Women's Heart Center at the Cedars-Sinai Heart Institute have found that emotional stressors – such as those provoking anger – may cause changes in the nervous system that controls heart rate and trigger a type of coronary artery dysfunction that occurs more frequently in women than men.

They will describe their findings at the American Psychosomatic Society's annual meeting on March 13 in San Francisco.

In men with [coronary artery disease](#), the large arteries feeding the heart tend to become clogged by plaque, and these blockages are evident on coronary angiograms. Women, however, may have chest pain related to the heart being starved for oxygen but have no evidence of arterial obstruction.

"Women who go to emergency rooms and cardiologists because they have chest pain often are told that their arteries are clear and their hearts are fine. But the reality is that women's [coronary artery](#) disease tends to be different from men's. In women, the large arteries may remain clear but the smaller branches that connect to the even-smaller capillaries lose their ability to widen. Whether the large arteries are blocked or the small arterioles don't function correctly, the result is the same – the heart becomes starved for oxygen," said C. Noel Bairey Merz, MD, professor of medicine, medical director of the Barbra Streisand Women's Heart Center, director of the Preventive and Rehabilitative Cardiac Center and the Linda Joy Pollin Women's Heart Health Program and the Women's Guild Chair in Women's Health.

Bairey Merz, senior author of the abstract that will be presented, chairs the Women's Ischemic Syndrome Evaluation study. WISE research, which

began in 1997 and is sponsored by the National Heart, Lung, and Blood Institute, has brought to light gender-related differences in heart disease.

After finding that many women's small arteries fail to function properly – a condition called coronary microvascular dysfunction – Bairey Merz and her colleagues set out to discover the cause or causes.

"We know that women who have [chest pain](#) and reduced oxygen to the heart – in the absence of 'male-pattern' obstructive coronary artery disease – may experience microvascular dysfunction during times of emotional distress even though their heart rates stay relatively low. In this study, we evaluated the heart's autonomic system – the nerve network that regulates [heart rate](#)," said Puja K. Mehta, MD, director of the Non-Invasive Vascular Function Research Lab at the Barbra Streisand Women's Heart Center and co-director of center's Cardio-Oncology Program. These findings come from her NIH-funded grant on Cardiac Autonomic Nervous System (CANS) function in women.

Sixteen women diagnosed with coronary microvascular dysfunction participated, as did eight women of similar age and weight who did not have coronary microvascular dysfunction, said Mehta, the abstract's first author. "We measured heart rate, blood pressure and [heart rate variability](#) – alterations in the time from one beat to the next. These were measured when the women were at rest and again when they were subjected to several types of mental stress using standardized tests for anger, performing mental arithmetic and having a cold pack placed on the forehead," Mehta said.

Both groups responded in the same way to the stressors – except when dealing with the [emotional stress](#) of anger. In women with microvascular dysfunction, emotional stress appeared to increase

sympathetic nerve stimulation – which is associated with the quickened heart rate of the fight or flight mechanism – and decreased parasympathetic nerve activity, which relaxes and slows heart rate.

Mehta said these results suggest that the autonomic nervous system may be one pathway involved in microvascular dysfunction in women.

"More specifically, we hypothesize that emotional stress may trigger microvascular dysfunction and lead to [heart](#) attacks and other cardiac problems in [women](#)," she said, adding that more research is needed to better understand this mechanism and identify others that might exist.

**More information:** Citation: American Psychosomatic Society, Poster presentation on March 13, at annual meeting in San Francisco.

Provided by Cedars-Sinai Medical Center

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