Study shows that treadmill testing can predict heart disease in women

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Although there is a widespread belief among physicians that the exercise treadmill test (ETT) is not reliable in evaluating the heart health of women, UC Davis researchers have found that the test can accurately predict coronary artery disease in women over the age of 65. They also found that two specific electrocardiogram (EKG) indicators of heart stress during an ETT further enhanced its predictive power.

Published in the December issue of *The* American Journal of Cardiology, the study can help guide cardiologists in making the treadmill test—an accessible, economic and easy-to-administer evaluation of patients with heart disease symptoms—more useful in clinical practice.

"Newer cardiac imaging technologies are more accurate in identifying the presence of heart disease, but those tests are considerably more expensive than ETT and in many cases unnecessary" said Ezra Amsterdam, senior author of the study and UC Davis professor of cardiovascular medicine. "Our study found that the test is a very valuable tool for identifying coronary artery disease in women older than 65, and that it can be used to help select those who may require higher-tech diagnostics."

During ETT, a patient exercises on a treadmill at gradually increasing speed and elevation while undergoing blood pressure monitoring and an EKG to gauge exercise-induced changes in the heart's electrical activity. If signs of heart disease are present, more definitive and invasive evaluations such as coronary angiography may be conducted to

determine if any blood vessels are narrowed or blocked by plaque. Coronary angiography, which produces a series of X-rays of the interior of the arteries by injecting dye into them to make them visible, may be recommended when there is evidence of heart disease.

The current study analyzed 111 women who had seen their doctors at UC Davis Medical Center because of chest pain and whose exercise treadmill tests were "positive," indicating they should have further cardiovascular testing. Coronary angiography was performed on each patient, and the researchers analyzed how often the results showed definite evidence of arterial narrowing.

They found that overall only half of the women with positive treadmill tests had coronary artery disease as determined by coronary angiography. But when test results were evaluated by age, the predictive value of ETT rose. While the treadmill test predicted arterial disease in only 36 percent of the youngest group (aged 35 to 50 years) of study participants, it successfully identified the condition in 68 percent of those aged 65 years and older, when the prevalence of coronary artery disease rises sharply for women.

The investigators also found that two EKG parameters of heart stress due to poor blood flow—an ST-segment depression greater than 2.0 mm or ST-segment recovery time longer than three minutes—added to the diagnostic value of ETT. Longer ST-segment recovery time was in fact the best predictor across all age groups of whether a positive treadmill test result was "true" or "false" and accurately identified coronary artery disease in eight out of 10 women older than 65.

"Our results provide physicians with a way to make an old heart disease screening tool more reliable for women," said Amsterdam. "The study also supports the guidelines of the American Heart Association and American College of Cardiology, which recommend that exercise

treadmill testing should remain the initial test for both women and men who require evaluation for chest pain."

Provided by UC Davis