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STRESS TESTS MAY MISS LATENT HEART DISEASE: ADDITIONAL CORONARY CALCIUM SCREENING MAY HELP WHEN PATIENTS HAVE NORMAL STRESS TEST RESULTS

LOS ANGELES (August 18, 2004) – Researchers at Cedars-Sinai Medical Center have found that stress tests may not adequately screen for latent atherosclerosis – a hardening of the arteries due to plaque build-up – and the leading cause of heart disease. Their findings, published in the August 18th issue of the *Journal of the American College of Cardiology*, indicate that many patients who have normal stress tests could benefit from additional screening for coronary calcium with x-ray computed tomography, or CT scanning technology.

“Our findings demonstrate that a relatively high number of patients who had normal readings on their stress tests had a calcium score of greater than 100, a score that is accepted as implying the need for aggressive medical treatment,” said Daniel Berman, M.D., Director of Cardiac Imaging at the S. Mark Taper Foundation Imaging Center at Cedars-Sinai Medical Center.

Stress tests have been used for over fifty years to identify patients with coronary artery disease and to help physicians know which treatment options might be best. During a stress test, heart rate and blood pressure is measured before, during, and after a patient exercises on a treadmill or, when exercise is not possible, medication is used to induce the stress condition. Over the past three decades, imaging stress tests have become the most common form of stress testing, usually performed by adding the injection of a very small amount of a radioactive imaging agent during exercise. The imaging agent works by concentrating in the heart according to blood flow, emitting signals that are captured by a special type of camera that reveals an abnormality in the parts of the heart that are not getting enough blood flow.

In more recent years, a CT scan using either electron beam computed tomography (EBCT) or multislice spiral computed tomography (MSCT) has been used to screen for the presence and amount of calcium accumulated in the coronary arteries. These tests are performed without an injection and use special x-ray equipment to obtain cross-sectional pictures of the heart and surrounding arteries during a single breath. The pictures provide the basis for a patient’s “calcium score,” representing the total amount of calcium deposits found in the coronary arteries. This information directly correlates with a patient’s risk of cardiac events, such as a heart attack or sudden death, regardless of symptoms. Calcium scores of zero are the best scores; scores between one and 100 correlate with a low risk for any cardiac event over the ensuing five years. Patients with calcium scores from 100 to 400 are at increased risk for cardiac events, while scores above 400 identify patients at the highest risk for a heart attack.

“If we know that atherosclerosis is present, most of these events can be prevented. Given the wide use of conventional stress testing and the growing availability of coronary calcium screening to determine calcium

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scores, we wanted to see how the two could be integrated to provide the most accurate assessment of heart disease,” commented Dr. Berman.

In the study, Dr. Berman and his research team followed 1,195 patients without any known heart disease who underwent stress testing as referred by their physician followed by coronary calcium scanning within six months of each other at Cedars-Sinai Medical Center. The patients’ average age was 58 and about 73 percent of these patients were men. The researchers found that 79 patients had ischemia (too little blood flow) as defined by abnormal stress imaging tests, indicating significant blockage of their coronary arteries. In these ischemic patients, calcium scores were greater than zero in 95 percent, greater than 100 in 88 percent, and greater than 400 in 68 percent. Importantly, stress test abnormalities were rare in patients with calcium scores less than 100, but increased markedly when calcium scores were above 100.

“From these results we concluded that patients with coronary calcium scores of less than 100 usually do not need to be referred for stress imaging testing,” said Dr. Berman.

What may be most important to the public, were the findings in patients who had normal stress imaging tests. Among the 1,119 patients who had normal stress imaging tests and subsequently underwent coronary calcium scanning, the investigators found that 56 percent of patients had scores greater than 100, and 31 percent of patients had scores greater than 400.

“Our study shows that patients who have normal imaging stress test results frequently have extensive atherosclerosis as revealed by coronary calcium scanning,” said Dr. Berman. “These findings imply a potential role for the coronary calcium scan, *after* an imaging stress test among patients whose results are normal. These patients could then be identified as needing an aggressive treatment program of diet, exercise, and medications--something which they often would not otherwise get based upon standard blood tests and the imaging stress test results alone.”

In addition, Dr. Berman noted that calcium scanning is useful only in patients with suspected coronary artery disease. “Once we know a patient has this disease, imaging stress tests can still be helpful to establish risk, but there doesn’t appear to be any information gained by having the calcium scan,” said Dr. Berman.

Cedars-Sinai Medical Center is one of the largest non-profit academic medical centers in the Western United States. For the fifth straight two-year period, Cedars-Sinai has been named Southern California’s gold standard in health care in an independent survey. Cedars-Sinai is internationally renowned for its diagnostic and treatment capabilities and its broad spectrum of programs and services, as well as breakthroughs in biomedical research and superlative medical education. The Medical Center ranks among the top 10 non-university hospitals in the nation for its research activities and was recently fully accredited by the Association for the Accreditation of Human Research Protection Programs, Inc. (AAHRPP).

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