

Media Contact: Kelli Hanley
E-mail: kelli.hanley@cshs.org
Telephone: 1-310-423-3674

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PATIENTS WITH METABOLIC SYNDROME AND MODERATE LEVELS OF CORONARY CALCIUM FOUND TO HAVE A GREATER CHANCE OF HAVING BLOCKED ARTERIES, AS DETECTED ON A STRESS IMAGING TEST

LOS ANGELES (May 26, 2005, 12:01a.m. EDT) – Conditions such as abdominal obesity, high blood pressure, abnormal cholesterol levels and high blood sugar are problematic enough for people all on their own. But when patients have three of these disorders at the same time, they have what is called the “metabolic syndrome” – an increasingly prevalent disorder affecting up to 40 percent of the adult population in the United States – frequently leading to diabetes and accelerated heart disease.

Now, researchers at Cedars-Sinai Medical Center have found that patients with metabolic syndrome and a moderate level of calcium in the coronary arteries had a greater chance of having blockage of those arteries, as detected on a stress imaging test. The findings, reported in the June issue of *Diabetes Care*, show that analyzing a patient’s metabolic profile in relation to their coronary calcium levels will help physicians identify patients who need stress testing so that effective treatment measures can be taken.

“Metabolic syndrome is very similar to diabetes in accelerating heart disease,” said Daniel Berman, M.D., the director of Cardiac Imaging at Cedars-Sinai Medical Center and senior author of the study. “Importantly, our findings reveal that patients with the metabolic syndrome who had only moderate amounts of calcium in their coronary arteries had a significantly greater chance of having ischemia – too little blood flow to the heart – during a stress test.”

Coronary calcium indicates the presence of atherosclerosis – plaque build-up in the arteries surrounding the heart. The amount of coronary calcium in the arteries, called a calcium score, is measured by using computed tomography (CT) scanning to obtain cross-sectional pictures of the heart and surrounding arteries. Even when patients have no symptoms, their coronary calcium score directly correlates with their *long-term risk* of cardiac events, such as a heart attack, or sudden death. Calcium scores of zero are the best scores; scores between one and 100 are considered mild and correlate with a low risk for any cardiac event over the ensuing five years. Patients with moderate calcium scores of 100 to 400 are at increased or intermediate risk for cardiac events, and patients with extensive coronary calcium (score over 400) are at even higher risk.

“Although coronary calcium scores provide an excellent measure of plaque build-up in the arteries, the presence of calcium doesn’t mean that we will see evidence of ischemia or artery blockage when a patient does a stress test,” Berman said. “In most patients, the calcium buildup causes the artery to expand outward, without blocking the vessel, and does not cause ischemia. This occurrence is associated with a low likelihood of a cardiac event over the next few years – but a relatively high long-term risk. Regardless, the calcium scan correctly identifies these patients as needing aggressive medical treatment to reduce their risk for a cardiac event, but they don’t need to be considered for angioplasty or bypass surgery.”

Still, some patients with coronary calcium have arteries that are partially blocked, restricting blood flow to the heart muscle during stress. The most widely used approach to detect blocked coronary arteries is stress imaging, during which patients exercise on a treadmill or, if they can't, are given medication that causes the heart's arteries to dilate. Once the patient reaches "peak" stress, a small amount of radioactive imaging agent is given that concentrates in the heart according to blood flow, emitting signals that are captured by a special type of camera. The cardiac images show the parts of the heart which do not get enough blood flow during stress and is very effective in predicting *short-term risk* of a cardiac event and determining whether it is necessary to consider angioplasty or surgery at that time.

To test whether the presence of metabolic syndrome might help identify patients at highest risk for coronary artery blockage, the researchers evaluated 1,043 patients without any known heart disease who underwent a coronary calcium scan and stress imaging within a three-month time period. They found that metabolic abnormalities were present in a total of 313 or 30 percent of patients. Among these patients, 140 had diabetes, while 173 had metabolic syndrome without diabetes.

The investigators then compared coronary calcium scores and stress test results of the three groups of patients: those without metabolic syndrome, those with metabolic syndrome, and those with diabetes. They found that 15 percent of metabolic syndrome patients with moderate calcium scores between 100-399 (a level which is generally not considered high enough to require stress testing) had ischemia on stress imaging indicating blocked arteries. Importantly, these patients were also as likely to have these stress test abnormalities as were patients who had extensive calcification but no metabolic abnormalities. Similar findings were observed in patients with diabetes and those with the metabolic syndrome.

When coronary calcium scores were greater than 400, the amount of blockage identified on stress tests among patients with metabolic syndrome was significantly higher compared to those without the disorder, (23.4 percent vs. 13.6 percent). Among patients with calcium scores below 100, only about three percent had artery blockage that was detected by stress testing.

"Our findings suggest that patients' coronary calcium scans need to be interpreted in light of whether or not they have metabolic syndrome or diabetes, in order for us to best determine which patients need to be referred for stress testing. Contrary to previous thinking, our data show that patients with the metabolic syndrome or diabetes deserve earlier stress testing than patients without those metabolic abnormalities," Berman said. "If our findings are confirmed in additional clinical trials, the practice guidelines for stress testing are likely to be changed so that more patients with metabolic syndrome can be stress tested, allowing those with ischemia – those who are at highest risk for heart attack – to be identified and appropriately treated."

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One of only four hospitals in California whose nurses have been honored with the prestigious Magnet designation, Cedars-Sinai Medical Center is one of the largest non-profit academic medical centers in the Western United States. For 17 consecutive years, it has been named Los Angeles' most preferred hospital for all health needs in an independent survey of area residents. 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. It 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). Additional information is available at www.csmc.edu.

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