Heart Scan: Assessing Cardiac Risk *by Ann Gerhardt, MD*
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Bottom Line at the Top: If you are not sure of your heart disease risk, you might want to do a heart scan that measures coronary artery calcium content, but recognize that the test is not a perfect predictor of heart attacks.

A relatively new technique called coronary artery calcium (CAC) screening helps to determine your risk of heart attack. Diseased coronary arteries grow what is called 'plaque,' patches of brittle blood vessel wall, in response to inflammation, clotting and high cholesterol. Calcium tends to deposit in plaque. **Capitalizing on the assumption that calcium equals plaque, doctors are using a special kind of ultra-fast CT scan to detect calcium in coronary arteries.** They score the amount of calcium in each artery and calculate a global CAC score. This CAC score reasonably, but not perfectly, reflects a person's heart attack risk.

People under 50 years old should have a zero CAC score and any positive score should raise red flags in that age group. A score above 400 denotes greater risk of dying from heart disease, but the test can't tell you when. CAC score helps to stratify the risk of already high-risk patients such as diabetics and smokers, but if we know they have high risk, do we need to do the test?

In 2007, the American College of Cardiology Foundation, along with the American Heart Association, published guidelines regarding the use of CAC. These recommendations, which were published in the February 20, 2007, issue of *Circulation*, **do not favor the routine use of CAC screening among adults already known to be at low or high risk for coronary heart disease events. They suggested that CAC screening was most helpful among patients with an intermediate risk for coronary heart disease.**

I would also test people with unclear risk – For example, someone with high cholesterol who follows a very healthy lifestyle and has no family history of heart disease might want to know their risk before starting cholesterol-lowering medication. Among these indeterminate-risk patients, a higher CAC score could prompt more aggressive treatment of cholesterol and other risk factors.

Arterial calcium accumulates with age, so it would seem that the test would be redundant in the elderly. A recent report suggests the contrary, with some aged people having very little coronary calcium and some with a lot. Currently doctors use older age (>50) as a risk factor, assuming that an aged person's coronary arteries are more likely to clog than those of a young person. Since the study proves that not all aged people are alike, the authors believe that coronary calcium screening should be substituted for age in risk calculations.

CAC score sometimes misses the mark. I have a patient with high cholesterol and a very strong family history of heart disease. His score at age 42 was zero, but within a year he had had a heart attack. Clearly CAC is not a perfect predictor.

On the other end, when someone has a high score, what do we do? If we use the test to determine which people need to have aggressive cholesterol and risk-factor reduction, a high number helps point us in the right direction.

But when do we say, "You are at risk of a heart attack today" and do further testing? Some cardiologists do stress testing only in patients with high CAC scores who have chest pain. That misses the significant percentage of women and elderly who have atypical symptoms or no chest pain in the face of significant coronary narrowing.

Others do a stress test in all people with high scores. If negative, they treat patients with aspirin and aggressive cholesterol-lowering medications. But stress testing gives false negative results in 10% of men and 25% of women. **A major question remains: Is there a CAC score high enough to lead to a coronary angiogram?**