

Cardiac Calcium Scoring

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For 150,000 Americans each year, the first and only sign of heart disease is a fatal heart attack. This means they had no symptoms, their cholesterol levels were normal, they weren't smokers, and nothing abnormal had ever been uncovered in their physical exams. A new breakthrough in determining a person's risk of heart disease, the cardiac calcium-scoring exam, allows physicians to determine the amount of calcium plaque that's accumulated in the coronary arteries, something that until recently has been difficult to detect.

A cardiac calcium score is determined using a new, high-speed CAT scan that takes pictures about 10 times faster than a traditional CAT scan. In the past, taking these pictures has been difficult because the heart is moving and images come out blurry. This new type of CAT scan is so fast it can render images of a human heart, even as it beats. By "stacking" these images, computer software can construct a 3-D model of your heart.

Most of us are familiar with traditional x-rays and how they work. The x-ray shows only the calcium in your body, usually in your bones or your teeth. This new CAT scan procedure is able to detect areas of the heart that

are hardening (where plaque or calcification is building up). The x-ray beam moves all around the body, scanning from hundreds of different angles. Unlike many current tests for heart disease, this procedure is completely non-invasive and painless.

About the exam

Unlike many tests used to determine the existence of heart disease, the calcium-scoring exam is painless and non-invasive. It doesn't involve injections or require patient preparation, such as fasting or drinking special fluids, either. The test usually takes about 20 or 30 minutes.

During the test, small EKG patches will be applied to your chest. You'll be asked to lie down on the scanning table, which will slide under a large arch while the high-speed CT scanner takes pictures of your heart. A technician will then ask you to hold your breath for a few seconds at a time while the images are being recorded.

After the test, your results are usually read by a radiologist, who analyzes the images and calculates the amount of calcification in each of the vessels that supply blood to your heart. Your final "score" may be sent to your primary care physician, who can help determine if you are at low, moderate, or high risk of developing heart disease. Based on your results and your risk factors, your physician may suggest further medical tests, prescribe medication, or help you modify certain lifestyle and health habits.

New technology allows doctors to detect heart disease earlier, painlessly cardiac calcium score screening utilizes new CAT scan technology.

About plaque and calcium in your arteries

Many people don't realize that cholesterol calcifies or hardens in their arteries, in essence reducing the artery's size and the amount of blood that can flow to the heart. Cholesterol is a waxy substance made naturally by the liver. It's also supplied in foods like meats, poultry, fish, and dairy products. Your body needs cholesterol to insulate nerves, make cell membranes, produce certain hormones, vitamin D, and the bile acids that help to digest food. When there is too much cholesterol in your blood, cholesterol and other substances (like calcium) build up in many parts of the body, including the wall of your arteries.

This build-up is called plaque. Over time, this build-up causes "hardening of the arteries," so that the arteries become narrowed and blood flow to the heart is slowed down. If enough blood and oxygen cannot reach the heart you may experience chest pain. If the blood supply cannot reach the heart at all, you have a heart attack.

The calcium that collects in plaque can actually be seen on x-ray. However, you aren't supposed to have calcium in your heart and arteries, just in your bones and teeth. And that's the benefit of using this new technology, doctors can see when plaque is building up where it's not supposed to be.

Yes, the calcium that collects in your arteries is the same calcium that you need for healthy bones and teeth and is good for you. Calcium is very important for your body and you need to ensure you take the recommended amounts everyday. Calcium is needed for the heart, muscles, and nerves to function properly and for blood to clot. All the vital functions of your body are dependent on calcium. But when calcium goes to places it's not supposed to, it can harden and cause other problems.

Plaque comes in various sizes and shapes throughout the coronary arteries. Larger, hard plaques have scars over them and block the blood flow through the arteries, often causing pain (angina). Small, soft plaques are often invisible on many tests doctors use to identify coronary heart disease. Soft plaques are full of cholesterol and are not covered by a scar. While they block less than half the artery opening, they are now thought to be very unstable and more likely to rupture or burst, releasing their cholesterol contents in the bloodstream. This triggers blood clotting inside the artery. If the blood clot totally blocks the artery, it stops blood flow and a heart attack occurs.

Many people used to think the most dangerous plaques were the hard, larger ones because they are most likely to cause a blockage of the artery and cause angina. Soft plaque does not have calcium in it yet and is difficult to detect. If there are hard plaques, it usually means that there are soft plaques, too, in fact, it's thought to be a one-to-one relationship.

Calcium Score graph

When should you get an exam?

Cardiac calcium scoring is not a routine procedure. If you are male aged 45 or older, or a female aged 50 or older, and have one of the following risk factors, we recommend you receive a calcium scoring exam: Family history of heart disease; Smoker; High cholesterol; High blood pressure; Diabetic; Overweight.

Physicians are learning that one of the most important risk factors for people can be their family history. In addition to a parent's history of heart disease, a more important factor may be a person's siblings. They tend to have the same environmental factors in childhood and many have the same risk of developing heart disease, especially at a young age. Early onset of both cardiac disease and strokes or stents for both your parents and, most importantly, your siblings should be a call to action for you. New research suggests siblings are exposed to the same environmental factors, such as food, diet, and exercise from an early age. We also know that cardiac disease develops at a much earlier age than previously thought, and that it's progressive. Everything you're doing in your teens, 20s and 30s is cumulative, which means you don't just wake up one day and have heart disease at 40. It's not like the flu. If it's starting to show up in your brother in his 40s, there's a good chance you're going to have it, too.

More on cardiac calcium scoring

This technology is still being researched in its application and use. While it's been successful in determining hard plaque levels in thousands of patients screened that had no previous symptoms, the screening only detects the hard plaque with calcium, not the unstable soft plaque that causes heart attacks.

This technology is also showing promise in women and early heart disease detection. Some of the traditional testing is difficult to do with women because women have breasts and it's hard to get an image of the heart through breast tissue. However, this technology is a little bit different and looks promising for diagnosing cardiovascular disease in women.

All people should consult with their physician or their local hospital to see if they are designated to provide the cardiac calcium scoring scans. If you do get an elevated score, that means you need to go on for more diagnostic testing so that you can see if there are blockages or obstructions. It's important for people to look at all their risk factors. This test is just one tool in a full cardiac risk screening. Results may show you need to go on for additional diagnostic testing. ■

About the author

Judith Lenane, RN, MHA, a popular speaker on heart health issues and cardiac risk assessment, is director of the cardiovascular department at The Medical Center of Aurora in Colorado. One of the founders of American Cardiology Care and LifeWatch, she has over 24 years of cardiovascular experience. Judith also worked for 10 years at the Washington Hospital Center in Washington, D.C. Judith can be reached at Judith.Lenane@HealthONEcares.com.

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