Information about Your Coronary Calcium Scoring

Cardiac CT, or coronary calcium scoring, is a fast, painless, and non-invasive way of obtaining information about the location and extent of calcified plaque in the coronary arteries—the vessels that supply oxygen-containing blood to the heart wall. Plaque is a build-up of fat and other substances, including calcium, which can, over time, narrow the arteries or even close off blood flow to the heart. The result may be painful angina in the chest or a heart attack.

Because calcium is a marker of coronary artery disease, the amount of calcium detected on a cardiac CT scan is a helpful diagnostic tool. The findings on cardiac CT are expressed as a calcium score and can help present an overall picture of your heart health.

What are the benefits of Coronary Calcium Scoring?

- Cardiac computed tomography (CT) for calcium scoring is a convenient and noninvasive way of evaluating the coronary arteries.
- Cardiac CT takes little time and causes no pain.
- The exam does not require injection of contrast material and therefore avoids its possible side effects.
- The examination can suggest the presence of CAD even when the coronary arteries are less than 50 percent narrowed. Standard cardiac tests will not reliably detect this level of blockage, and more than half of all heart attacks occur with less than 50 percent narrowing.
- No radiation remains in a patient's body after a CT examination.
- X-rays used in CT scans usually have no side effects.

What are some common uses of the procedure?

The goal of cardiac CT for calcium scoring is to detect coronary artery disease (CAD) at an early stage when there are no symptoms and to determine its severity. It is a screening study that may be recommended by a physician for patients with risk factors for CAD but no clinical symptoms. The procedure is most often suggested for men aged 45 years or older and for women who are aged 55 and above or who are postmenopausal. Some patients choose to have the test on their own even if their doctors have not recommended it, in order to detect early-stage CAD.

The major risk factors for CAD, other than age, are:

- abnormally high blood cholesterol levels
- a family history of heart disease
- diabetes
- high blood pressure
- cigarette smoking
- being overweight or obese
- being physically inactive
How should I prepare for the procedure?

No special preparation is necessary in advance of a cardiac computed tomography (CT) examination. You may continue to take your usual medications, but should avoid caffeine and smoking for four hours before the exam. If your heart rate is 90 beats a minute or higher, you may be given a drug to slow the rate in order to obtain accurate CT images.

You should wear comfortable, loose-fitting clothing to your exam. You may be given a gown to wear during the procedure. Metal objects including jewelry, eyeglasses, dentures and hairpins may affect the CT images and should be left at home or removed prior to your exam. Women should always inform their physician or technologist if there is any possibility that they are pregnant as this test may be harmful to the fetus.

What does the equipment look like?

The CT scanner is typically a large machine with a hole, or tunnel, in the center. A moveable examination table slides into and out of this tunnel. In the center of the machine, the x-ray tube and electronic x-ray detectors are located opposite each other on a ring, called a gantry, which rotates around you. The computer that processes the imaging information and monitor are located in a separate room.

How is the procedure performed?

The technologist begins by positioning you on the CT examination table lying flat on your back. Straps and pillows may be used to help you maintain the correct position and to hold still during the exam. Electrodes (small metal discs) will be attached to your chest and to an electrocardiograph (ECG) machine that records the electrical activity of the heart. This makes it possible to record CT scans when the heart is not actively contracting.

Next, the table will move quickly through the scanner to determine the correct starting position for the scans. Then, the table will move slowly through the machine as the actual CT scanning is performed.

Patients are periodically asked to hold their breath for periods of 20 to 30 seconds while images are recorded.

When the examination is completed, you will be asked to wait until the technologist determines that the images are of high enough quality for the radiologist to read. The actual CT scanning is usually completed in less than 10 minutes.
What will I experience during and after the procedure?

CT exams are painless, fast and easy. When you enter the CT scanner, special lights may be used to ensure that you are properly positioned. With modern CT scanners, you will hear only slight buzzing, clicking and whirring sounds as the CT scanner revolves around you during the imaging process. You will be alone in the exam room during the CT scan, however, the technologist will be able to see, hear and speak with you at all times.

After a CT exam, you can return to your normal activities immediately.

Who interprets the results and how do I get them?

A radiologist, a physician specifically trained to supervise and interpret radiology examinations, will analyze the images and send a signed report to your primary care or referring physician, who will share the results with you.

A negative cardiac CT scan that shows no calcification within the coronary arteries suggests that atherosclerotic plaque is minimal and that the chance of coronary artery disease developing over the next two to five years is very low.

A positive test means that coronary artery disease is present, regardless of whether or not the patient is experiencing any symptoms. The amount of calcification—expressed as a score—may help to predict the likelihood of a myocardial infarction (heart attack) in the coming years.

General Guidelines for Interpretation of Calcium Scores

<table>
<thead>
<tr>
<th>Calcium Score</th>
<th>Presence of Plaque</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No evidence of calcified plaque</td>
</tr>
<tr>
<td>1-10</td>
<td>Minimal evidence of calcified plaque</td>
</tr>
<tr>
<td>11-100</td>
<td>Mild evidence of calcified plaque</td>
</tr>
<tr>
<td>101-400</td>
<td>Moderate evidence of calcified plaque</td>
</tr>
<tr>
<td>Over 400</td>
<td>Extensive evidence of calcified plaque</td>
</tr>
<tr>
<td>MDCT Calcium Score</td>
<td>Plaque burden &amp; probability of significant CAD</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>0-10</td>
<td>Cannot exclude the possibility of atherosclerosis. Although negative or extremely low, there is a five percent or lower probability of significant obstructive disease</td>
</tr>
<tr>
<td>11-100</td>
<td>Consistent with mild atherosclerotic burden and despite the fact that the likelihood of significant obstructive disease is low (less than 20 percent) atherosclerosis is clearly present.</td>
</tr>
<tr>
<td>101-400</td>
<td>Consistent with at least moderate atherosclerosis and a high likelihood of moderate non-obstructive CAD.</td>
</tr>
<tr>
<td>Over 400</td>
<td>Advanced atherosclerotic plaque present. There is high likelihood of at least one obstructive coronary stenosis and high CVD risk.</td>
</tr>
</tbody>
</table>

* NCEP-National Cholesterol Education Program
* If calcium score is greater than or equal to 75th percentile for age/gender, advance to recommendations for next calcium score range.