CORONARY ARTERY CALCIFICATION (CAC) SCAN

I want to shine that light on a subset of the population: those without any clinical evidence of disease (i.e., those who have not already had a heart attack or shown symptoms of heart disease, such as chest pain on exertion). Think of this as a backward-looking proxy for risk. A backward-looking test will tell you if anyone has tried to break into your home. This is the CAC scan.

Coronary Artery Calcification (CAC)

- Coronary artery calcification (CAC) is the buildup of calcium in the arteries, which can cause blood vessels to narrow and lead to the development of heart disease.

Coronary artery disease (CAD)

- Also known as coronary heart disease or simply heart disease.
- Heart disease occurs when coronary arteries become clogged with plaques, fatty substances that cause the arteries to harden.
    - Calcium is one of several materials found in plaque, a substance that can build up in your arteries, causing them to harden and narrow.

Risks

- Coronary artery calcification increases with age and is more common in men than woman.
- Furthermore, people with metabolic syndrome, dyslipidemia, tobacco use, hypertension, chronic kidney disease are at an increased risk to develop coronary artery calcification.

Symptoms

- Angina (chest pain), the main symptoms of the disease are heart attacks and heart failure
- However, not everyone has the same symptoms, and some people may not have any before Coronary Heart Disease is diagnosed.
- Studies have shown that even for patients who had no risk factors, but high coronary artery calcium had more heart attacks than those who had multiple risk factors but no coronary artery calcium.

Testing

- A calcium-score screening heart scan is a type of CT scan that picks up calcium deposits in the arteries of your heart. It's also known as a coronary calcium scan (CAC scan) calcium score test or a cardiac CT for calcium scoring.

Why it's done

- I have ordered a heart scan to get a better understanding of your risk of cardiac events.
- The evaluation of coronary artery calcium scoring via CT offers a fast, reproducible and relatively cheap modality to determine the extent and presence of specks of calcium in the walls of the coronary arteries.

How to arrange

- **Our staff can order the test and our testing center will call you to arrange to appointment.**
- **Most insurance companies now cover this testing.**

What you can expect

- Before the scan begins, the technician attaches sensors, called electrodes, to your chest. These connect to an electrocardiogram (ECG or EKG), which records your heart activity during the exam and coordinates the timing of X-ray pictures between heartbeats, when the heart muscles are relaxed.
- During the heart scan, you lie on your back on a movable table, which slides into the tubelike CT scanner. Your head is outside the scanner the whole time. The exam room will likely be cool.
- You'll be asked to lie still and hold your breath for a few seconds while the pictures are taken. The technician operates the scanner from a room next door but can see and talk to you the entire time. The entire procedure should take about 10 to 15 minutes.
- After the procedure there are are no special precautions are needed after having a heart scan. You should be able to drive yourself home and continue your daily activities.

Results

- The result of the test is usually given as a number called an Agatston score. The score reflects the total area of calcium deposits and the density of the calcium. CAC score results fall into four categories which correlate with the severity of disease and range from no disease to severe disease.
- Importantly, and discussed in more detail below, soft plaques can escape detection using a CAC scan. A low to zero CAC score suggests a lower risk of future events, but it does not mean a zero risk of future events

Score	Category
0	No atherosclerosis
1–99	Mild disease
100–399	Moderate disease
≥ 400	Severe disease

Analogy

- When I talk about CAC, I like to use an analogy of atherosclerosis as a crime scene involving breaking, entering, and vandalizing. A criminal went into your house while you were on vacation and did some damage to your home, damage that was somewhat irreparable in that you couldn't repair your home back to a state where you never would've known there was a break-in. Holes in the walls of your home needed to spackle to patch them up. The repair work left clues of damage. In the case of atherosclerosis, a lesion is a damaged artery, and the calcium deposits are a sign of repair to the artery.
- A CAC score above zero tells you that there's been a bad enough break-in to require repair. However, a lot can go on in the disease process leading up to that point that goes unnoticed by a CAC scan. Additionally, a CAC scan does not necessarily identify the plaques that might do the most damage.

Absolute Risk

The CAC score predicts events independently of standard risk factors and is better than the commonly used Framingham risk score in the prediction of cardiovascular events. To get a sense of the absolute risk, look at the event rates in this Table.

Score	n (Weighted)	Event Rate (%)	Relative Risk (95% CI)
0	1,504	0.54	1.0
1–99	1,973	1.00	1.9 (0.8–4.2)
100–399	686	5.5	10.2 (4.8–21.6)
≥400	450	14.0	26.2 (12.6–53.7)

*Includes coronary death, nonfatal myocardial infarction, coronary bypass surgery, and percutaneous coronary angioplasty (n = 4,613). Relative risk is based on comparison to subjects with calcium scores of zero. Analysis of unweighted sample yielded similar results, with relative risks of 1.0, 1.9, 10.3, and 26.9, respectively, for the different strata of calcium scores.

CI = confidence interval.

Next Steps

We will communicate your results to you and depending on the outcome, one or more of the following strategies may be needed:

- No change to current treatment plan
- Changes to your diet and exercise routine
- New weight-loss goals
- Additional tests
- Or I may refer you to a cardiologist who specializes in the plumbing of the heart, your coronary arteries. I am a cardiologist who specializes in your heart's electricity.