

What is a stress test?

Coronary arteries are the vessels that feed the heart muscle with proper blood and nutrients. Plaque formation in the arteries is commonly referred to as Coronary Artery Disease or CAD. Significant CAD may cause decreased blood flow to its target territory of muscle and potentially cause a negative outcome.

The most typical symptom of CAD is angina which is defined as chest pain typically described to be a form of pressure or a tight feeling located in the center of the chest. Angina may be triggered or worsened by activity or emotional stress.

Symptoms related to angina are typically relieved with rest. Symptoms caused by CAD vary amongst different populations, particularly women. Symptoms may include fatigue, shortness of breath and heartburn.

There are several modalities available in order to diagnose significant or "obstructive" coronary artery disease. One of the most commonly used modality is stress testing. There are few types of stress testing.

Typically, a treadmill is used with a set protocol with increasing speed and inclination in three minute intervals. The goal of this test is to increase the heart rate to a desired level which is calculated based on age, and evaluate for any symptoms such as chest pain

and electrocardiogram (ECG) changes which may suggest significant CAD.

As we exercise, the demand on the heart increases to work harder to supply the body and muscles with oxygen. However, if there is a blockage in the coronary arteries, ECG changes may appear. Although this method is about 50 percent accurate, this form of testing can aid in the diagnosis of many other health conditions.

During a stress test, one's blood pressure is continuously monitored. Abnormal blood pressure response to exercise can diagnose underlying hypertension. Arrhythmias which may be present during exercise can diagnose underlying conduction disease of the heart or imply significant CAD. After heart attack, or in patients with heart failure, a cardiac rehab protocol can be designed to improve cardiac conditioning.

In order to increase the accuracy of this test, imaging modalities of the heart have been added to the traditional exercise stress test. One form of stress testing commonly referred to as a nuclear stress test utilizes radioactive isotopes traditionally known as *thallium*. The radioactive isotope highlights the heart and shows how well the heart muscle is perfused.

Nuclear camera images of heart are obtained before and after the exercise

THE HEART BEAT

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stress test and are compared to help evaluate areas in jeopardy of decreased blood supply or the presence of a previous heart attack.

The drawback to nuclear stress testing is the amount of radiation that it carries and the lengthy time of the test. The advantage to this test is that a normal nuclear stress test can be reassuring that CAD is not significant in the appropriately selected patient.

Another modality of stress testing includes the use of an echocardiogram and ultrasound.

Images of heart are obtained pre and post exercise and reveal the heart's capability to pump blood. This form of testing is equally accurate as a nuclear stress test.

Although this test may not reveal clear imaging in some individuals, the advantage to this modality is that it does not include radiation and

is completed after a short period of time.

Some patients who cannot exercise on a treadmill, have a specific ECG abnormality or have a pacemaker may have a stress test using pharmacological ways of *stressing* the heart. This method is accurate with regard to diagnosis of CAD, however does not provide the other informative benefit of a treadmill stress test as discussed above.

It is important to respond and seek medical advice if you suspect signs or symptoms of angina. Stress tests may be contraindicated for some patients. It is essential to consult with a physician – particularly a cardiologist in choosing the most beneficial form of testing needed to diagnose or evaluate the progression of coronary artery disease.