

What is coronary computed tomography angiogram or CTA?

- A coronary computed tomography angiogram (CTA) uses advanced CT technology, along with intravenous (IV) contrast material (dye), to obtain high-resolution, three-dimensional pictures of the moving heart and great vessels.
- CTA is also called multi-slice computed tomography (MSCT), cardiac CT or cardiac CAT. During CTA, x-rays pass through the body and are picked up by detectors in the scanner, that produce 3D images on a computer screen. These images enable physicians to determine whether plaque or calcium deposits are present in the artery walls.
- CTA is used as a noninvasive method for detecting blockages in the coronary arteries. A CTA can be performed much faster (in less than one minute) than a cardiac catheterization, with potentially less risk and discomfort as well as decreased recovery time.



One of the most common invasive heart imaging procedures, called coronary angiogram or [cardiac catheterization](#) (cath), is the standard method for diagnosing coronary artery disease.

During a cardiac cath, a long, slender tube— called a catheter—is inserted through a blood vessel in the leg or arm and guided into the heart with the aid of a special x-ray machine.

A small amount of contrast material is injected through the catheter and into the arteries and heart. As the heart beats, the contrast material outlines the vessels, valves and chambers and pictures are taken to identify blockages or narrowed areas in the coronary arteries.

The average catheterization procedure lasts about 30 minutes, but the preparation and recovery time add several hours. Most patients are at the hospital all day for this test.

Although coronary CTA examinations are growing in use, coronary angiograms remain the “gold standard” for detecting coronary artery stenosis, which is a significant narrowing of an artery that could require catheter-based intervention (such as placing a coronary artery stent) or surgery (such as placing coronary artery bypass grafts). On the other hand, this new technology has consistently shown the ability to rule out significant narrowing of the major

coronary arteries and can noninvasively detect “soft plaque,” or fatty matter, in their walls that has not yet hardened, but that may lead to future problems without lifestyle changes or medical treatment.

Who should consider a coronary CTA?

The single most important step for patients trying to determine whether they should consider a coronary CTA is consultation with their primary physician. Appropriate use of coronary CTA is important as the scan carries some risk from X-ray exposure (a very small potential for stimulating cancer) and contrast dye exposure (allergic reactions and kidney damage).

Overall, coronary CTA examinations have tended to help determine a lack of significant narrowing and calcium deposits in the coronary arteries, as well as the presence of fatty deposits. Particularly, this has been found to exclude coronary artery disease. As a result, WBAMC currently supports the careful use of coronary CTA for patients who have:

- Intermediate risk profiles for coronary artery disease with suspicious cardiac symptoms
- Unusual symptoms for coronary artery disease (such as chest pain unrelated to physical exertion) with low to intermediate risk profiles for coronary artery disease
- Unclear or inconclusive stress-test results
- Those with suspected congenital abnormalities of coronary arteries

For these types of patients, coronary CTA can provide important insights to their primary physician into the extent and nature of plaque formation with or without any narrowing of the coronary arteries. Coronary CTA also can noninvasively exclude narrowing of the arteries as the cause of chest discomfort and detect other possible causes of symptoms. Initial consultation with a primary physician is key for patients seeking to determine the appropriateness of coronary CTA.

Who should not have Coronary CTA?

To date, coronary CTA has not been proven as effective as the coronary angiogram in detecting disease in the smaller heart arteries that branch off the major coronary arteries. For that reason, most physicians do not consider coronary CTA as an adequate substitute for needed coronary angiography in patients with strong evidence of narrowing of the coronary arteries. Such patients include those with a history of chest pain during heavy physical activity, a history of positive stress-test results, or a known history of coronary artery disease or heart attack. Coronary CTA also is of limited use in patients who are extremely overweight or who have abnormal heart rhythms as imaging quality is compromised.

Note: Patients and their primary physician must decide on the appropriateness of coronary CTA, including indications (i.e., intermediate-high risk profile without symptoms vs. atypical symptoms with low-intermediate risk profile vs. uncertain stress-test results) and level of safety (i.e., unnecessary X-ray exposure in young adults, especially women, should be avoided; histories of significant allergic reaction are best avoided; creatinine < 2.0 mg/dL required).