

Coronary CTA: Frequently Asked Questions



How does CTA work?

A Coronary CTA is a specialized X-ray examination that uses an iodine-containing contrast dye solution. The clear dye is injected through an arm vein. The intravenous injection of the dye is why this study is considered noninvasive. The same IV in the arm could be used to give a medication to slow or stabilize the patient's heart rate. The slower heart rate improves the image quality. Nitroglycerin in tablet or spray form is used to dilate the arteries so that they can be seen more effectively.

During the examination, which typically last 10 minutes, X-rays pass through the body and are picked up by special detectors in the scanner. The highest numbers (especially 64 or more) of these detectors result in the clearest final images. The large numbers of detectors involved in the specialized CT equipment are referred to as "multi-detector" or "multi-slice" CT scanning. The information collected during the Coronary CTA examination is used to identify the coronary arteries and, if present, plaques in their walls. This requires the creation of 3D color images on a computer screen. Heart functions, such as the wall motion and the ejection fraction, can also be assessed as the beating heart can be viewed through the heart's cycle of movement. Areas of the heart muscle where there is decreased, absent or "paradoxical" motion can be determined. The heart valves can also be viewed. The structure and movement of the valves can be assessed and the area of the opening between the valves can be calculated. The size of the heart's chambers and the presence of or absence of blood clots in these chambers can be determined. Before pulmonary vein ablation procedures, the size, and number of the pulmonary veins can be assessed.

How is Coronary CTA different from other heart tests?

One of the most common heart tests is the coronary angiogram, or cardiac catheterization. This test is more invasive and requires more patient recovery time than Coronary CTA. Patients who receive coronary angiograms must have a catheter, or tube, threaded into their coronary arteries, which run along the outside of the heart. The catheter typically is inserted into a blood vessel in the upper thigh and then maneuvered up to the coronary arteries. The catheter then is used to inject the iodine dye needed for the test, which uses X-rays to record "movies" of the interior of the coronary arteries. A different type of catheter needs to be placed onto the heart in order to obtain a left ventriculogram to assess the ejection fraction and calculate the cardiac output.

Although Coronary CTA examinations are growing in use, coronary angiograms remain the "gold standard" for detecting coronary artery narrowing termed stenosis. When present to a significant degree such narrowing of a coronary artery is often considered for intervention. Interventions on the coronary arteries require either catheter-based intervention (such as stents) or surgery (coronary artery bypass grafts).

On the other hand, this new technology has consistently shown an accurate ability to exclude or rule out significant narrowing of the major coronary arteries. Furthermore, the test can non-invasively detect "soft plaque," or "fatty plaque", which may not be seen on coronary catheter angiography due to a phenomenon called positive remodeling. These early forms of plaque build-up can create a change in the outer part of the artery wall while the passage or lumen is not yet altered. Progression of the plaque build up can eventually alter the lumen resulting in narrowing. It is this earliest form of plaque build-up that may lead to future problems without lifestyle changes or medical treatment. It is also the earliest form of this type of plaque that can rupture, precipitating so called sudden death. Until recently, there has not been a noninvasive test that demonstrated these early fatty plaques. Early on, they do not narrow the artery lumen to be visible by catheter angiography.

What type of Multidetector CT is used at Sparrow?

Sparrow uses more than one type of multi-detector/multi-slice system for Cardiac CTA. Currently, 64-detector scanners are used for coronary arterial imaging at the main hospital and at the St. Lawrence campus. A 40-detector system scanner is used for cardiac chamber imaging-pulmonary vein mapping for ablation as an outpatient examination at Sparrow Ramblewood Imaging Center. The best uses of these scanners continue to evolve. At Sparrow we are dedicated to advancement in the imaging systems we will utilize as this technology evolves.

What happens during the study?

- Contrast (x-ray) dye is used for this study. An IV will be placed in the right arm, near the elbow area.
- A 3-lead EKG will be attached to monitor the patient's heart rate.
- Patients may be given oxygen via nasal cannula (oxygen tube under the nose), to help with breathing during the study. This is done to insure the patient can perform the breath hold and to have a stable steady heart rate during this period. It also helps to decrease anxiety.
- Patient will receive one nitroglycerin tablet during the exam (under the tongue), unless contraindicated.

What happens after the study?

Patient is advised to eat and drink as usual and to push plenty of fluids after the study.