

# MultiSlice CT Angiogram

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**Aquilion™ 64-slice MSCT scans\*\***

Whether it's called multislice CT (MSCT), multidetector CT (MDCT), cardiac CT or cardiovascular CT, the CT stands for "Computed Tomography", a way of measuring parts of the anatomy by sections (originally known as "Computed Axial Tomography" or CAT scans). Single CT scans are widely used in medical imaging, but have been less useful for imaging the heart, since a beating heart doesn't stand still for a picture.

Now the development of multiple detectors, or Multislice CT systems has allowed imaging of the heart, which moves as it beats, with a level of detail not previously available.

If EKG's, stress tests or other indicators have revealed a potential cardiac problem, the next step is for the cardiologist to get a close-up look at the arteries in the heart, to see where there might be blockages.

A few years ago the patient would move on to a cardiac catheterization, during which a physician inserts a catheter into the circulatory system, advances it to the heart and injects dye into the coronary arteries. The physician then makes an X-ray (cine-angiography) movie from several different angles, develops the film and sits at a viewing machine to analyze the 35mm motion pictures. More recently, the film may have been replaced by digital video. In either case, because the X-ray is a "shadow" image that is two-dimensional, the cardiologist has to interpret a number of different "camera angles" that were shot to determine the presence and shape of any obstructions to the blood flow.

But a much better diagnostic option would be a detailed 3D virtual model of the patient's heart -- so that the cardiologist could rotate, zoom and move through the heart's anatomy at any angle at will, as if it were a video game. And without impacting on the patient!

Multislice CT angiography provides this 3D model, and it is revolutionizing cardiac imaging to the point where a separate Society of Cardiovascular Computed Tomography ([scct.org](http://scct.org)) has recently been formed to set standards for training and interpretation.

Multislice CT systems with 16 or more detectors have made a quantum leap into imaging of the coronary arteries. A 256-slice system is now in development that will image the entire heart in a single beat.

In less than 30 minutes, without the invasiveness of a cardiac catheterization, a patient can have an MSCT done to determine if there are any arterial blockages that require an intervention, such as an angioplasty or stent. The only immediate impact on the patient is an IV with iodine-containing contrast and possibly a beta-blocker to slow the heart beat (the equivalent of saying "cheese" and holding still for the photographer).



**This is an actual 3D Multislice CT scan made on an Aquilion™ 64-slice CT scanner\*\***



**Aquilion™ 64-slice CT scanner\*\***

Although MSCT does entail a higher radiation dose from that experienced during a standard catheterization, mitigating this risk is the fact that the patient is not exposed to the complications that sometimes accompany cardiac catheterization (angiography). Additionally, newer technology developments and scanning methods that reduce the necessary radiation exposure are ongoing.

If no blockages are found, MSCT provides a less invasive and less expensive method of ruling out the need for additional intervention.

If significant blockages are found, then the patient is referred to a cardiac catheterization with a probable angioplasty or stent. If previous tests show a very high likelihood that the patient has significant coronary artery disease, then MultiSlice CT angiography probably is not indicated, because the patient will no doubt have to go to interventional treatment anyway.

An interesting feature of MSCT scans comes into play if some disease is found, but it is not advanced enough to require

revascularization using angioplasty or stenting. Physicians have reported that when patients see such a clear and understandable picture of their heart, they are much more motivated to make lifestyle and other changes to lower their risk factors.

As MultiSlice CT becomes more widespread, it is likely that several of the tests described in this section will become less and less used. Some cardiologists think that nuclear stress testing will be replaced by MSCT. For certain patients, MSCT will also replace the "gold standard" of cardiac catheterization.

This is a rapidly developing technology. Methods of characterizing the type of plaque in the arteries are being refined, so that "vulnerable" plaques that are more likely to rupture can be pinpointed for treatment, reducing the risk of heart attack. Right now, MSCT provides a significant "next step" to patients whose stress tests have proven inconclusive, and who may have a good chance of being "screened out" for coronary artery disease.

**Who Does the Procedure:** MSCT can be done by a cardiologist, radiologist or technologist trained in this specific imaging modality. Because the MSCT scan reads the entire upper torso, a growing number of heart and vascular centers are having both cardiology and radiology specialists "read" the results -- the cardiologist for coronary disease, and the radiologist to identify other potential non-cardiac problems, such as cancers, etc.

**Patient Preparation:** As with any procedure that involves radiation, tell the technologist if you are pregnant. You may be asked not to eat or drink for a while prior to the procedure. You will need to remove any metallic jewelry, etc. During the procedure, you will be injected with some iodine-containing dye, as well as beta-blockers, so let the doctor know if you have a known allergy to those.

**\*\* photo courtesy of Toshiba America Medical Systems**

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