

CT(a)- Non-Invasive Coronary Imaging

What is CT? CT(a)?

Computerized tomography (CT) combines the use of X-rays with the latest computer technology to create cross-sectional images of your body. Because some of these slices are as thin as 0.5mm, our Toshiba CT system offers more detail than traditional X-ray. As a result, CT is an ideal way to accurately view and screen for disorders of organs such as the heart as well as vascular structures like the aorta and carotid arteries. CT angiography CT(a) combines the use of high speed CT technology with the administration of iodine contrast to provide 3-dimensional imaging of blood vessels in the body such as the coronary arteries. Using this technique we are able to identify the presence of blockage in an artery or characterize the extent of an aneurysm of the aorta prior to correction.

The Best Medicine is Prevention

Today, new imaging technologies give doctors greater insight into the human body. That means doctors can also see signs of disease earlier than ever before, when the disease is most treatable and preventable. Consider the following, 50% of men and 63% of women who die suddenly of heart disease have no previous symptoms. Aortic aneurysms are most often found incidentally but usually do not cause any symptom until the day they rupture. Strokes are often caused by disease of the carotid arteries in the neck. These arteries even when critically blocked are silent in nature and offer little warning. Our ability to screen and identify these problems early on has improved dramatically with recent developments in medical imaging.

Who should get screened?

The most important doctor you'll ever have in your life is you, because you know your body best and you are in control of when and how often you visit a medical professional. Unlike problems such as colon cancer and breast cancer where guidelines for screening are stated clearly, other diseases such as coronary artery disease do not as yet have defined early screening guidelines. This is partly due to the fact that in the past there has not been an accurate tool for the identification of early plaque build-up in arteries. Individuals should be screened for heart and vascular disease if they carry two or more of the following risk factors.

- Family history of heart attack, stroke, or aneurysm
- Tobacco use
- Diabetes mellitus, metabolic syndrome
- Obesity, sedentary lifestyle
- Hypertension
- Elevated cholesterol / lipid abnormalities
- Male over the age of 45
- Females over age 55 or who have passed menopause or ovaries removed and not taking estrogen.

CT Angiography

The latest generation of multi-detector computerized tomographic imaging (MDCT) now allows for noninvasive imaging of the heart and vascular structures previously obtainable only by invasive angiographic procedures. In the evolution toward diagnostic procedures which minimize risk, discomfort and time, the physicians of Diagnostic Cardiology of Houston proudly offer the very latest generation of this technology.

One of the most exciting of these developments allows us to image not just large vascular structures, like the aorta, but virtually any artery in the body. In addition, we can view the images in three dimensions from any angle in order to make the most accurate anatomic diagnosis-an advantage over MR angiographic imaging, which loses resolution when looking out of the longitudinal or perpendicular planes. We provide this capability with the Aquilion 64 multi-detector ultrafast MDCT scanner from Toshiba, a clear leader the field in this exciting technology.

CT Coronary Angiography

The ability to acquire 64 simultaneous slices within 4 tenths of a second finally allows the three dimensional visualization of the coronary arteries in the moving, beating heart-data previously not obtainable with a sufficient degree of resolution and detail in older and slower systems. The entire scan of the heart takes only 7 to 10 seconds, rendering information about all of the major coronary arteries as well as data about the function of the left ventricle and about structures within and around the heart.

The Exam

The technique for obtaining these studies is very specific to the heart, and our technician will take great care in informing the patient of the details of the procedure and what needs to be accomplished to obtain a good quality study. Careful preparation, planning and instruction are crucial to achieving superior results and images, and the patient will be guided every step of the way. An I.V. catheter is placed usually in the arm and ECG electrodes are placed to monitor the cardiac rhythm. The patient will then be asked to lie on a special table before the CT machine, and positioned properly for the exam. Several "practice" runs at holding one's breath for the exam follow. Two or three runs will be made to obtain the images, one of which will include contrast injection IV. A sensation of warmth occurs throughout the body during this portion of the exam, which subsides quickly, and the patient is then removed from the scanner.

The Report

The interpreting physician will then analyze the individual coronary arteries on a special workstation using several tools for "probing" each coronary artery, and for the analysis of segments of each vessel in 3 dimensions dynamically for plaque and obstructive disease.

A 3-dimensional functional analysis program allows for the precise assessment of motion of any segment of the left ventricle and for the calculation of left ventricular ejection fraction.

Another exciting and useful tool allows for the creation of three dimensional images of internal cardiac structures, which then can be visualized by other physicians who will need to perform complex cardiovascular procedures, such as an electrophysiologist desiring anatomic information prior to attempting to ablate the source of atrial fibrillation.

The images are subsequently processed and the interpreting Physician issues a report for the cardiac findings. A separate report may also come from the radiologist reading the non-vascular portion of the scan, with attention to the lungs and soft tissues.

A verbal report of the findings for the coronary arteries will be generated, and this may also include printed images of the heart and pertinent vascular structures and analysis of left ventricular function. A coronary calcium score is usually performed, with a separate report.

It is our goal to provide correlation of anatomic MDCT data with risk factors and biochemical serum markers for coronary artery disease, thereby enabling the cardiologist to tailor therapies for the prevention of the atherosclerosis process before it ever becomes symptomatic.