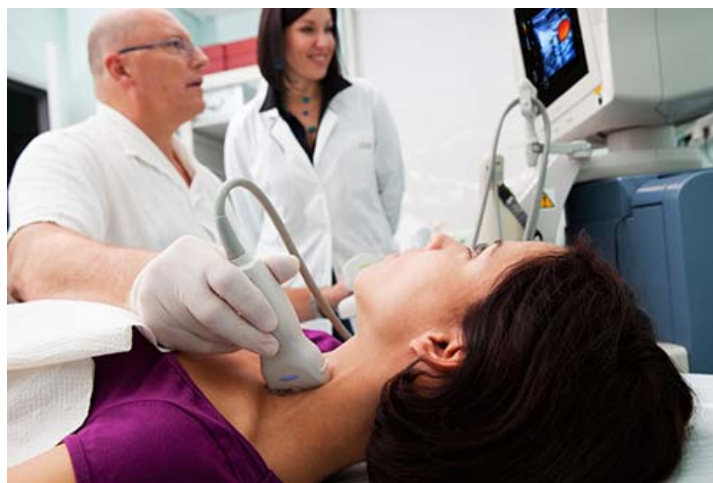




Carotid Intima-Media Thickness Test

A carotid intima-media thickness test (CIMT) is used to determine the extent of plaque buildup in the walls of the arteries supplying blood to the head. If a CIMT shows increased thickness in the inner layers of the carotid artery, you may be at risk for cardiovascular disease. CIMT uses ultrasound imaging to measure the thickness of the two inner layers of the carotid artery—called the intima and media.



Little or no special preparation is required for this procedure. Leave jewelry at home and wear loose, comfortable clothing. A loose-fitting, open necked shirt or blouse is ideal.

What is a Carotid Intima-Media Thickness Test?

A carotid intima-media thickness test (CIMT), also known as a carotid artery IMT ultrasound scan, uses ultrasound to measure the thickness of the intima and media, the two inner layers of the carotid artery. These measurements can help physicians assess the health of the carotid arteries and the risk of cardiovascular disease-related events like heart attacks and strokes, even in asymptomatic patients. Risk factors for increased carotid intima-media thickness include:

- aging
- high cholesterol
- high blood pressure
- smoking
- diabetes
- obesity
- an inactive lifestyle

What are some common uses of the procedure?

CIMT is used to diagnose and determine the extent of plaque buildup in the walls of the vessels supplying oxygenated blood to the head. Increased thickness in the intima and media is associated with an increasingly diseased artery. Because there is a link between intimal medial thickness and cardiovascular events, CIMT is an important test for detecting disease in its earliest stage, when interventions such as diet, lifestyle, and medications can have the greatest impact.

How should I prepare for a CIMT?

You should wear comfortable, loose-fitting clothing for your ultrasound exam. You may need to remove all clothing and jewelry in the area to be examined.

A loose-fitting, open necked shirt or blouse is ideal.

No other preparation is required.

What does the ultrasound equipment look like?

Ultrasound scanners consist of a console containing a computer and electronics, a video display screen and a transducer that is used to do the scanning. The transducer is a small hand-held device that resembles a microphone, attached to the scanner by a cord. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out high-frequency sound waves (that the human ear cannot hear) into the body and then listens for the returning echoes from the tissues in the body. The principles are similar to sonar used by boats and submarines.

The ultrasound image is immediately visible on a video display screen that looks like a computer or television monitor. The image is created based on the amplitude (loudness), frequency (pitch) and time it takes for the ultrasound signal to return from the area within the patient that is being examined to the transducer (the device placed on the patient's skin to send and receive the returning sound waves), as well as the type of body structure and composition of body tissue through which the sound travels. A small amount of gel is put on the skin to allow the sound waves to travel from the transducer to the examined area within the body and then back again. Ultrasound is an excellent modality for some areas of the body while other areas, especially air-filled lungs, are poorly suited for ultrasound.

How does the procedure work?

Ultrasound imaging is based on the same principles involved in the sonar used by bats, ships and fishermen. When a sound wave strikes an object, it bounces back, or echoes. By measuring these echo waves, it is possible to determine how far away the object is as well as the object's size, shape and consistency (whether the object is solid or filled with fluid).

In medicine, ultrasound is used to detect changes in appearance, size or contour of organs, tissues, and vessels or to detect abnormal masses, such as tumors.

In an ultrasound examination, a transducer both sends the sound waves into the body and receives the echoing waves. When the transducer is pressed against the skin, it directs small pulses of inaudible, high-frequency sound waves into the body. As the sound waves bounce off internal organs, fluids and tissues, the sensitive receiver in the transducer records tiny changes in the sound's pitch and direction. These signature waves are instantly measured and displayed by a computer, which in turn creates a real-time picture on the monitor. One or more frames of the moving pictures are typically captured as still images. Short video loops of the images may also be saved.

The ultrasound device utilizes sophisticated digital imaging and special software to accurately measure the thickness of the inner two layers of the carotid artery and detect plaque, if present.

How is the procedure performed?

For most ultrasound exams, you will be positioned lying face-up on an examination table that can be tilted or moved. Patients may be turned to either side to improve the quality of the images.

A clear water-based gel is applied to the area of the body being studied to help the transducer make secure contact with the body and eliminate air pockets between the transducer and the skin that can block the sound waves from passing into your body. The sonographer (ultrasound technologist) or radiologist then places the transducer on the skin in various locations, sweeping over the area of interest or angling the sound beam from a different location to better see an area of concern.

A CIMT examination is usually completed in approximately 30 to 45 minutes. The test generates a CIMT measurement and a report identifying your risk profile.

When the examination is complete, you may be asked to dress and wait while the ultrasound images are reviewed.

What will I experience during and after the procedure?

Ultrasound examinations are painless and easily tolerated by most patients.

After you are positioned on the examination table, the radiologist or sonographer will apply some warm water-based gel on your skin and then place the transducer firmly against your body, moving it back and forth over the area of interest until the desired images are captured. There is usually no discomfort from pressure as the transducer is pressed against the area being examined.

If scanning is performed over an area of tenderness, you may feel pressure or minor pain from the transducer.

Your head will be supported to keep it still, but it may be necessary to tilt or rotate your head for the best exposure as the transducer is swept over the entire length of your neck on both sides to obtain views of the artery from different perspectives. It also helps to keep your arm and shoulder down.

Once the imaging is complete, the clear ultrasound gel will be wiped off your skin. Any portions that are

not wiped off will dry quickly. The ultrasound gel does not usually stain or discolor clothing.

After an ultrasound examination, you should be able to resume your normal activities immediately.

Who interprets the results and how do I get them?

A radiologist, a physician specifically trained to supervise and interpret radiology examinations, will analyze the images and send a signed report to your primary care physician, or to the physician or other healthcare provider who requested the exam. Usually, the referring physician or health care provider will share the results with you. In some cases, the radiologist may discuss results with you at the conclusion of your examination.

Follow-up examinations may be necessary, and your doctor will explain the exact reason why another exam is requested. Sometimes a follow-up exam is done because a suspicious or questionable finding needs clarification with additional views or a special imaging technique. A follow-up examination may also be necessary so that any change in a known abnormality can be monitored over time. Follow-up examinations are sometimes the best way to see if treatment is working or if an abnormality is stable or changes over time.

What are the benefits vs. risks?

Benefits

- Most ultrasound scanning is noninvasive (no needles or injections).
- Occasionally, an ultrasound exam may be temporarily uncomfortable, but it should not be painful.
- Ultrasound is widely available, easy-to-use and less expensive than other imaging methods.
- Ultrasound imaging is extremely safe and does not use any ionizing radiation.
- Ultrasound scanning gives a clear picture of soft tissues that do not show up well on x-ray images.
- If CIMT shows thickening in the carotid artery, treatment can be initiated to reduce the risks associated with the development of atherosclerosis.
- CIMT can be used repeatedly with no adverse effects.
- CIMT scanning protocol can detect atherosclerotic diseases in their early stage, before symptoms appear.
- CIMT allows for observation of the arterial wall, the actual site of the atherosclerotic disease, rather than the lumen
- CIMT is not dependent on calcification of the plaque like other assessment tools such as cardiac CT for calcium scoring.

Risks

- For standard diagnostic ultrasound, there are no known harmful effects on humans.

What are the limitations of a Carotid Intima-Media Thickness Test?

- Occasionally, imaging a patient is difficult because of the size or contour of the neck.
- Calcium deposits in the wall of the carotid artery may make it difficult to evaluate the vessel.
- CIMT is only an indirect assessment of the possible atherosclerotic burden in the coronary arteries.

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