TEST

Carotid duplex

A carotid duplex is an ultrasound scan that checks blood flow and narrowing in the neck arteries supplying the brain.

WHAT IT MEASURES
Plaque, narrowing, and blood flow in the neck carotid arteries

SAMPLE
None; ultrasound imaging

FASTING NEEDED?
No

HOW LONG IT TAKES
About 30 to 45 minutes

RESULTS IN
Often same day; timing varies by laboratory and imaging center

USED FOR
Diagnosis, selective screening, and monitoring

MAIN LIMITATION
Operator technique and calcified plaque can misjudge narrowing

Overview

A carotid duplex is an ultrasound examination of the carotid arteries, which run along each side of your neck and carry blood to your brain.

The test combines standard ultrasound, which shows the artery walls and plaque, with Doppler ultrasound, which measures the direction and speed of blood flow. Plaque is a buildup of cholesterol, calcium, and other material.

The images help estimate whether an artery is narrowed, known as carotid stenosis, or completely blocked. The test does not use radiation, needles, or injected contrast dye.

Why the test is ordered

A carotid duplex may be ordered after symptoms that could be related to reduced blood flow to the brain, such as temporary weakness, trouble speaking, or loss of vision in one eye. It is usually part of a broader medical assessment rather than the only test used.

Other reasons include:

A bruit does not always mean an artery is severely narrowed. Some narrowed arteries produce no bruit, while normal or mildly narrowed arteries can produce one.

- Checking a neck bruit, an unusual sound heard through a stethoscope
- Monitoring known carotid narrowing
- Examining plaque found during another test
- Checking blood flow after carotid surgery or stent placement
- Assessing selected people with substantial vascular risk or disease elsewhere

Who should have the test

The test is most useful when symptoms, examination findings, or medical history make carotid disease a reasonable concern. It may also be used to follow narrowing that has already been found.

Routine screening of all adults without symptoms is not recommended by the US Preventive Services Task Force. False-positive results can lead to further imaging or procedures that may not provide a benefit.

Some professional groups allow selective testing in higher-risk situations. Whether testing is appropriate depends on your symptoms, age, medical history, examination, and whether the result would change your care.

How to prepare

You can usually eat and drink normally. Fasting is not required, and you can generally take your regular medicines unless the imaging center gives different instructions.

Wear clothing that leaves your neck accessible, such as a loose or open-collared shirt. You may need to remove necklaces or other items around your neck.

Bring details of previous carotid scans, surgery, or stent placement if the facility does not already have them. Comparing current and earlier images can be important.

What happens during the test

You will usually lie on your back with your head turned slightly away from the side being

examined. A sonographer places clear gel on your neck and moves a handheld device called a transducer over the skin.

You may hear pulsing or whooshing sounds as the machine records blood flow. The sonographer may apply gentle pressure to obtain a clear view.

Both sides of your neck are normally examined. The appointment often takes about 30 to 45 minutes, although a difficult or detailed examination may take longer.

Understanding your results

The report may describe plaque, the degree of narrowing, and whether blood flow is normal or altered. It may also comment on the vertebral arteries, which also supply the brain.

The estimated percentage of stenosis describes how much the inside of an artery has narrowed. The estimate is based on findings including:

Faster flow often suggests greater narrowing, but speed alone is not enough. Very severe narrowing can sometimes produce unexpectedly slow flow. A completely blocked artery usually has no detectable flow.

Laboratories may use different validated criteria and reporting categories. Results should be interpreted using that laboratory's method and your wider clinical circumstances.

- The appearance of plaque and the remaining channel for blood
- The highest blood-flow speed during each heartbeat
- Blood-flow speed between heartbeats
- Comparisons between parts of the carotid artery
- Turbulence or other changes in the flow pattern

What affects the results

Heavy calcium in plaque can block the ultrasound beam, hiding part of the artery and making the remaining opening difficult to measure.

A high carotid split, deeply placed artery, short or broad neck, dressings, movement, or a curved artery can also affect the images or measured speeds.

Blood-flow speeds may be influenced by:

Nicotine and caffeine can temporarily affect heart rate or blood pressure, although they rarely make an otherwise clear examination unusable.

- An irregular heartbeat or reduced heart pumping strength
- Very high or low blood pressure
- Severe narrowing or blockage on the opposite side
- Anemia, fever, pregnancy, or other high-flow states
- Recent strenuous exercise
- Medicines that substantially change blood pressure or heart output
- Previous carotid stent placement, which changes artery stiffness and flow

Accuracy and limitations

In an experienced vascular laboratory, carotid duplex is usually a reliable first test for narrowing near the carotid split and the beginning of the internal carotid artery. Accuracy varies with the equipment, reporting criteria, operator technique, plaque calcification, and the location and severity of disease.

The test may incorrectly suggest important narrowing when high speeds are caused by a curved artery, increased overall blood flow, or severe disease on the opposite side. It may miss or underestimate narrowing when flow is very slow, calcium blocks the view, or the affected area is too high or deep to examine well.

Ultrasound does not show every artery inside the skull or the full course of arteries in the chest. It also cannot determine by itself whether plaque caused a particular symptom.

CT angiography or MR angiography may be used when ultrasound is unclear, symptoms and scan findings do not match, or detailed anatomy is needed before a procedure. Catheter angiography provides detailed images but is invasive and generally reserved for selected situations.

Risks and complications

A carotid duplex has no known radiation risk because it uses sound waves. Pressure from the transducer may feel uncomfortable, especially over a tender area, but complications are not expected.

What happens next

A normal result may require no further carotid imaging unless symptoms or circumstances change. Mild plaque may lead to routine follow-up and a review of cardiovascular risk factors. Repeat-scan timing depends on the result, your history, and local practice.

Moderate or severe narrowing may be checked with another scan or discussed with a vascular or stroke specialist. The result alone does not determine whether a procedure is appropriate. Symptoms, overall health, anatomy, expected benefit, and procedural risk all matter.

New facial drooping, arm or leg weakness, trouble speaking, sudden loss of vision, severe loss of balance, or another possible stroke symptom requires emergency help. Do not wait for a scheduled ultrasound. Symptoms that have stopped can still represent a transient ischemic attack, or TIA, and need urgent medical assessment.

Common questions

Can I drink coffee before a carotid duplex?

Usually, yes. Follow the imaging center's instructions, particularly if other tests are planned that day.

Can I eat before the test?

Yes. A carotid duplex does not usually require fasting.

Does the time of day matter?

Usually not. The test can generally be performed at any time offered by the facility.

Can I exercise beforehand?

Ordinary activity is usually fine. Strenuous exercise can temporarily change heart rate and blood flow, so allow time to rest before the scan.

Should I stop my medicines?

Not unless specifically instructed. Bring an up-to-date medicine list because some medicines can affect blood pressure or circulation.

Can I drive home afterward?

Yes. The test does not use sedation, needles, or contrast dye, so you can normally drive and resume usual activities immediately.

Sources

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