CONDITION

Carotid artery disease

Learn how carotid artery narrowing can affect stroke risk, including symptoms, diagnosis, treatment options, emergency warning signs, and follow-up care.

WHAT IT IS
Narrowing or blockage of one or both carotid arteries

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
One-sided weakness or numbness, facial drooping, speech difficulty, one-eye vision loss

WHAT CAUSES IT
Usually atherosclerosis

HOW IT IS DIAGNOSED
Carotid duplex ultrasound, CTA or MRA

MAIN TREATMENT
Medical management, sometimes surgery or stenting

CAN IT BE CURED?
No, underlying atherosclerosis tendency remains

IS IT AN EMERGENCY?
Sometimes, with any stroke or TIA symptom

LONG-TERM OUTLOOK
Stroke risk with possible lasting disability

Overview

Carotid artery disease is narrowing or blockage of one or both carotid arteries. These large blood vessels run along each side of the neck and supply oxygen-rich blood to the brain, face, and scalp.

The condition is usually caused by atherosclerosis. This means fatty material, cholesterol, calcium, and inflammatory cells have collected within an artery wall to form plaque. Plaque can gradually reduce blood flow. It can also break open, allowing a blood clot or pieces of plaque to travel to the brain.

Carotid artery disease matters because it can cause a transient ischemic attack, or TIA, and ischemic stroke. A TIA is a temporary interruption of blood flow to part of the brain or eye. An ischemic stroke occurs when blocked blood flow injures brain tissue.

Some people have carotid narrowing without symptoms. This is called asymptomatic carotid stenosis. Others are diagnosed after a TIA, stroke, or temporary loss of vision. This is called symptomatic carotid stenosis when the event is linked to the affected artery.

The amount of narrowing is important, but it is not the only factor that affects risk or treatment. Doctors also consider whether symptoms have occurred, plaque features, other health conditions, life expectancy, and the risks of a procedure.

Symptoms

Carotid artery disease often develops slowly and may not cause symptoms until blood flow to the brain or eye is interrupted. The symptoms of a TIA and stroke can be the same. With a TIA, they usually resolve, but there is no safe way to determine at home whether symptoms are temporary.

Warning signs may include:

Temporary loss of vision in one eye is sometimes described as a shade or curtain coming down. The medical term is amaurosis fugax . It may last only minutes, but it still needs urgent assessment.

A carotid bruit is a whooshing sound that a clinician may hear over the neck with a stethoscope. A bruit does not cause symptoms. It may suggest disturbed blood flow, but it does not prove that severe carotid narrowing is present. Some significant narrowings produce no bruit.

Call emergency services immediately for any possible stroke or TIA symptom, even if the symptom improves or disappears. Note when the person was last known to be well. Do not drive yourself to the hospital. Rapid assessment matters because some stroke treatments are time-sensitive, and a TIA can warn of an upcoming stroke.

- Sudden weakness or numbness of the face, arm, or leg, especially on one side
- Sudden facial drooping
- Sudden difficulty speaking, finding words, or understanding speech
- Sudden loss, dimming, or blurring of vision in one eye
- Sudden trouble walking, loss of coordination, or severe imbalance
- Sudden confusion or other new neurological symptoms

Causes and risk factors

Atherosclerosis is the main cause of carotid artery disease. Plaque develops over many years as the artery wall is repeatedly exposed to factors that promote injury and inflammation.

Risk increases with age. It is also associated with:

These factors do not mean that a person has carotid artery disease. Some people develop significant plaque without having every common risk factor.

Less commonly, carotid narrowing or blockage can result from other problems. These include injury to the artery wall, inflammation of blood vessels, radiation treatment to the neck, or carotid artery dissection. A dissection is a tear within the artery wall and differs from typical plaque-related disease.

- Tobacco use, including current or past smoking
- High blood pressure
- High LDL cholesterol or other unhealthy blood-fat levels
- Diabetes
- Chronic kidney disease
- Limited physical activity
- Excess body weight
- A family or personal history of early cardiovascular disease
- Atherosclerosis in other arteries, such as the coronary or leg arteries

Diagnosis

Evaluation begins with a medical history and physical examination. A clinician will ask about neurological or vision symptoms, when they began, how long they lasted, and whether they affected one side of the body. They may check blood pressure, pulses, heart rhythm, speech, strength, sensation, balance, and vision.

Carotid duplex ultrasound is often the first imaging test. It uses sound waves to show the artery and estimate how quickly blood moves through it. Faster flow can indicate narrowing. The test does not use radiation and is usually painless, but the result may need confirmation if the images are unclear or a procedure is being considered.

Computed tomography angiography, or CTA, uses X-rays and contrast material to create detailed images of the head and neck arteries. Magnetic resonance angiography, or MRA, uses

magnetic fields and may be performed with or without contrast. These tests can show the location and extent of narrowing and help doctors plan treatment.

Catheter angiography provides detailed artery images after a thin tube is guided into a blood vessel and contrast is injected. Because it is invasive and carries risks, including stroke, it is generally reserved for selected situations rather than routine diagnosis.

After possible TIA or stroke symptoms, evaluation may also include brain imaging, heart rhythm testing, and blood tests. This helps determine whether symptoms came from carotid plaque or another source, such as a clot formed in the heart.

Routine ultrasound screening for carotid narrowing is not recommended for adults in the general population who have no symptoms. Screening can lead to additional tests or procedures without clear overall benefit. This differs from diagnostic testing ordered because of symptoms, examination findings, or a clinician's assessment of a specific situation.

Treatment and management

Treatment aims to reduce the risk of stroke and other cardiovascular problems. The best approach depends on whether symptoms have occurred, how narrow the artery is, and the person's overall health.

Medical management is important for everyone with plaque-related carotid disease, including people who undergo a procedure. It may include:

Antiplatelet medicines make platelets, a type of blood cell, less likely to stick together and form a clot. Statins like atorvastatin or simvastatin lower LDL cholesterol and can help stabilize plaque. Blood pressure and diabetes medicines may also be part of care. These medicines have different benefits and risks, so they should be selected by a clinician. Do not start, stop, or combine antiplatelet or anticoagulant medicines without medical advice.

Some people may benefit from a procedure to restore blood flow.

Carotid endarterectomy is surgery that opens the artery and removes plaque. It is most clearly beneficial for appropriately selected people who recently had symptoms caused by substantial narrowing. The likely benefit depends on the degree of narrowing, timing after symptoms, surgical risk, and other health conditions.

Carotid artery stenting uses a catheter to place a small mesh tube inside the narrowed artery. A filter or other protective device may be used to catch debris. Stenting may be considered when surgery is less suitable because of anatomy, prior neck treatment, medical risk, or other factors.

A procedure does not remove the underlying tendency to develop atherosclerosis. Medicines and risk-factor management remain important afterward. Both endarterectomy and stenting can cause complications, including stroke, bleeding, or artery injury. Surgery can also temporarily or permanently affect nearby nerves. The balance of benefits and risks differs between patients and procedures.

For asymptomatic narrowing, a procedure is not automatically needed. Modern medical treatment has reduced stroke risk for many people. Specialists consider the severity and progression of narrowing, plaque features, procedural safety, general health, and the person's preferences before recommending intervention.

- Stopping tobacco use and avoiding secondhand smoke
- Managing blood pressure, cholesterol, and diabetes
- Eating a diet centered on vegetables, fruit, whole grains, legumes, fish, and other minimally processed foods
- Taking part in regular physical activity that is appropriate for the person's health
- Using prescribed medicine to reduce blood clot formation
- Using cholesterol-lowering medicine when clinically appropriate

Complications

The main complication is ischemic stroke. Plaque or a blood clot can block an artery supplying the brain, leading to lasting problems with movement, speech, vision, swallowing, memory, or independence. The effects depend on the location and size of the brain injury.

A TIA does not cause the same lasting brain injury as a completed stroke, but it is an important warning event. Prompt evaluation can identify treatable causes and lower future risk.

Carotid plaque can also block blood flow to the retina, the light-sensitive tissue at the back of the eye. This may cause temporary or permanent loss of vision.

Carotid disease often reflects atherosclerosis throughout the body. A person may also have a higher risk of coronary artery disease, heart attack, or poor circulation in the legs. Managing cardiovascular risk factors therefore protects more than the carotid arteries alone.

Rarely, severe disease can result in complete carotid artery blockage. Reopening a chronically blocked carotid artery is usually not approached in the same way as treating a narrowed artery. Management depends on symptoms, blood flow from other arteries, and specialist assessment.

Follow up

Follow-up care is used to monitor symptoms, risk factors, medicines, and the artery itself. Visits may include blood pressure checks, cholesterol or diabetes testing, medication review, and support with tobacco cessation, nutrition, or activity.

Repeat carotid ultrasound may be appropriate for some people. The timing depends on the degree of narrowing, whether it has changed, and whether surgery or stenting was performed. Not everyone needs imaging at the same interval.

Tell the treating clinician promptly about new medication side effects, unusual bleeding, or changes in exercise tolerance. New but non-sudden concerns can usually be discussed through routine or expedited outpatient follow-up.

After carotid surgery or stenting, follow the procedure team's instructions for wound care, activity, and medicines. Contact the team promptly for increasing neck swelling, wound drainage, fever, worsening pain, or a new lump near the procedure site.

Seek emergency help for sudden weakness, numbness, facial drooping, speech difficulty, confusion, vision loss, severe imbalance, or another possible stroke symptom. After a neck procedure, rapidly increasing swelling or trouble breathing is also an emergency.

Sources

- Kleindorfer DO, Towfighi A, Chaturvedi S, et al. 2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack. Stroke . 2021;52(7):e364-e467.
- Naylor AR, Rantner B, Ancetti S, et al. Editor's Choice-European Society for Vascular Surgery 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease. European Journal of Vascular and Endovascular Surgery . 2023;65(1):7-111.
- AbuRahma AF, Avgerinos ED, Chang RW, et al. Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. Journal of Vascular Surgery . 2022;75(1S):4S-22S.
- US Preventive Services Task Force. Screening for Asymptomatic Carotid Artery Stenosis: US Preventive Services Task Force Recommendation Statement. JAMA . 2021;325(5):476-481.

- National Institute of Neurological Disorders and Stroke. Stroke: signs, symptoms, and emergency response. National Institutes of Health.
- National Heart, Lung, and Blood Institute. Carotid artery disease. National Institutes of Health.