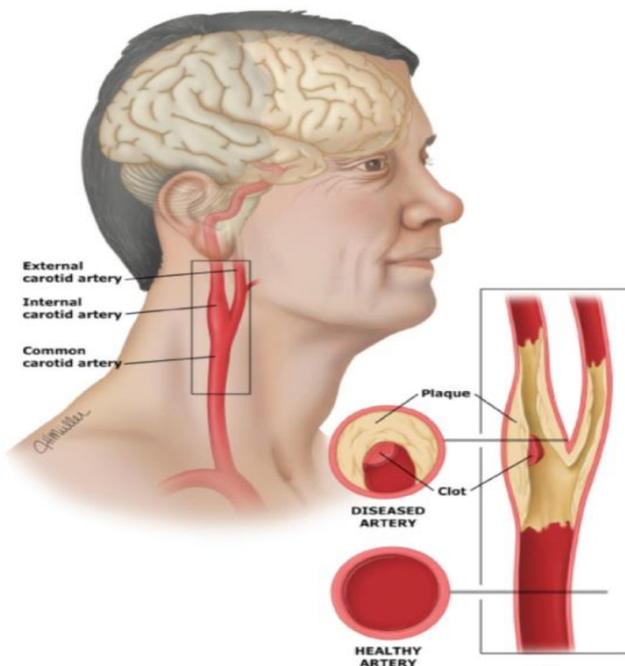




What is Carotid Artery Disease?

Carotid artery disease is caused by a build – up of fatty deposits in the large arteries located on each side of the neck that carry blood to the head, face and brain. A substance called plaque (fat and cholesterol) accumulates inside your arteries as you age (atherosclerosis). If too much plaque builds up in your carotid artery it can cause the artery to narrow (carotid stenosis). As the disease progresses, the atherosclerotic plaques can rupture resulting in the formation of a clot (thrombus) or material dislodging from the plaque (embolus), and travelling to the brain, causing a TIA (Transient Ischaemic Attack) or major stroke. The most common causes of plaque build – up is due to multiple risk factors including high cholesterol, high blood pressure, smoking and diabetes. People with carotid artery disease often have plaque build – up in the coronary and/or peripheral arteries in the lower limbs.



Symptoms

The brain can be easily damaged by an interruption to its blood supply, and this may cause a stroke or a transient ischaemic attack (TIA). Unfortunately, many people with carotid artery disease may not experience any symptoms and the first sign may be a TIA or stroke. However, greater awareness of the warning signs of stroke or TIA and detection of carotid stenosis in patients with peripheral artery disease (see patient information booklet) will increase the chance of early intervention to reduce the risk of stroke. Carotid stenosis is only one of a number of possible causes of stroke which includes spontaneous bleeding, atrial fibrillation and other cardiac causes.

Symptoms of stroke that may be related to carotid disease include:

- loss of power or numbness in the face, arm or leg
- speech disturbance – inability to speak or find words
- sudden loss of vision in only one eye, described 'like a curtain coming down'
- loss of co-ordination (clumsy movements) on one side of your body,
- Paralysis (total loss of feeling and movement) on one side of your body including face or mouth

A TIA causes the same symptoms but they usually disappear within an hour or so. The range and severity of symptoms depends on which parts of the blood supply to the brain is interrupted, and for how long.

Seek emergency care if you experience any signs or symptoms of stroke, even if they last only a short while.

Diagnosis

Techniques used to diagnose carotid artery disease include a

- Medical history
- Physical examination – involves the physician placing a stethoscope on your neck to listen for changed or reduced blood flow to the carotid artery (this does not always mean that significant carotid stenosis is present)
- Duplex ultrasound – The most common and non-invasive diagnostic test is a carotid artery duplex ultrasound that can determine whether the artery is narrowing and if so, provide an accurate estimate of severity.
- Magnetic resonance angiography (MRA) – This imaging technique uses a powerful magnet to gather accurate information about the brain and arteries. Then a computer uses this information to generate high-resolution images. An MRA can often detect even small strokes in the brain.
- Computed tomography angiography (CTA) – More detailed than an X-ray, a CT uses X-rays and computer technology to produce cross-sectional images of the carotid arteries. A contrast dye is injected into a blood vessel. The CT scan uses a low level of radiation. The test is particularly useful for patients with pacemakers or stents.

Treatment

The treatment for carotid artery disease depends on the

- I. degree of stenosis or blockage in your artery
- II. the presence of symptoms and
- III. your general health and risk factors

All efforts are aimed at reducing the risk of TIA and stroke.

You can take a number of important measures to reduce your risk of carotid artery disease or manage atherosclerosis that may be already present. These will also help delay/prevent atherosclerosis in other blood vessels in your body, such as those supplying your heart and other vital organs, and those in your legs. Mild to moderate carotid artery disease can be treated with reducing your risk factors and best medical management.

Lifestyle changes:

- Stop smoking – Smoking cessation is highly advised to prevent further damage to your arteries. The chemicals in tobacco smoke harm your blood cells and damage the structure and function of your blood vessels. This damage increases your risk of atherosclerosis. Smoking also increases your heart rate and blood pressure and increases risk of heart attack
- Eat foods low in saturated fat and cholesterol
- Diabetes lowers your ability to process blood sugars efficiently, placing you at greater risk of high blood pressure and atherosclerosis. If you have diabetes, see your doctor regularly and ensure good diabetic control.
- Take regular exercise
- Lose weight, if you are overweight

Medications:

- Work with your doctor to lower high blood pressure and reduce the stress in your life – blood pressure lowering medication is commonly prescribed.
- Take blood thinning medicines which make clots less likely to form such as aspirin or plavix (clopidogrel).
- Take a statin that lowers your cholesterol as prescribed by your doctor.

Often a combination of lifestyle changes and medications can slow the progression of carotid artery disease.

Surgery:

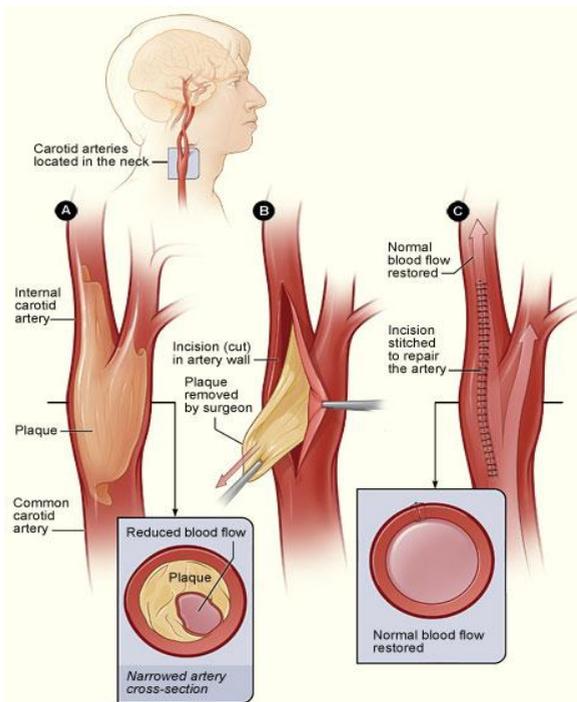
The narrowing can usually be treated by an open operation (carotid endarterectomy) or alternatively but less commonly carotid artery stenting.

Carotid Endarterectomy (CEA)

A carotid endarterectomy is a durable procedure but is not a cure; though rare, blockage can accumulate again. It is very important to follow the measures mentioned on the previous page to reduce a blockage from occurring. Ideally, surgery should be carried out within two weeks of your symptoms of stroke or TIA in order to prevent a second event like a more severe stroke.

Your vascular surgeon may recommend you have a carotid endarterectomy if you have:

- ❖ A moderate (50-79%) blockage of a carotid artery and are experiencing symptoms of stroke or TIA (transient ischemic attack)
- ❖ A severe (80% or more) blockage even if you have no symptoms



Your stroke physician or vascular surgeon will discuss the risks of intervention versus non-intervention in detail with you. A few days before the procedure, pre-procedure tests may be performed to ensure that it is safe to perform the surgery.

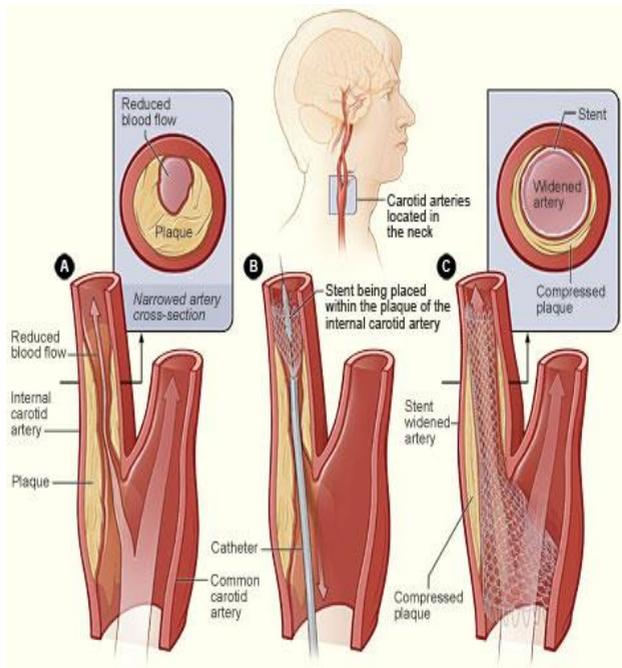
Under general anaesthetic, the surgeon will make an incision (cut) in the side of your neck so they can see your carotid artery, which will then be clamped shut. During the procedure, your surgeon will decide whether to use a temporary shunt to maintain adequate blood flow to the brain. A shunt is a small plastic tube that diverts blood around the section of the carotid artery being operated on. The surgeon will then open up your artery and remove the inner lining along with any plaque. A small patch will usually be stitched to the artery to prevent further narrowing. Your artery will then be sutured up, the blood supply restored, and the wound in your neck is closed with stitches or glue. A small drain may be inserted to drain away any blood that might build up after the operation. This is usually removed the following day.

Carotid Artery Stenting

This procedure is said to be less invasive than the endarterectomy because it does not involve open surgery of the neck. A catheter is threaded from an incision in the groin to the site of the blockage, where a balloon tip is inflated to open the artery.

A stent may be placed in the artery to expand it and hold it open. The stent stays in place permanently and acts as a scaffold to support the artery walls and keep the artery open.

Whether medication or surgery is the treatment choice, both must be accompanied by



lifestyle changes. These include quitting smoking, following a healthy diet, and regular exercise.

What are the risks?

As with any operation, there are some risks associated with surgery. Complications are more likely if you had a

- recent serious stroke,
- if you have a blockage in your other carotid artery,
- if you have other health conditions (heart disease),
- if you're a smoker and
- your age is a factor

Complications post procedure can include:

- Wound infection
- Bleeding from the site of your wound
- Blocked airway from swelling or from bleeding in the neck
- Nerve injury affecting your voice box, tongue and neck, it is usually temporary
- Numbness or slight pain around the wound (this is normal and may go away with time)
- chest infection
- heart attack
- Stroke may occur during or after surgery in 2–3% of patients
- Repeated blockage of the carotid artery. Or new blockage that develops in the artery on the other side of your neck.

Before the procedure

Majority of patients requiring surgery are already in hospital following their TIA or stroke and we try to offer surgery within 2 weeks because it is considered an urgent procedure.

If a carotid endarterectomy or stenting has been arranged in advance, the assessment will usually be carried out at the hospital's pre-assessment clinic a few days before you're due to have the procedure.

In some cases, you'll be asked to attend the pre-assessment clinic on the day of the operation.

Pre-procedure tests may be performed to ensure that it is safe to perform the surgery. An anaesthetist will see you to assess your risks for surgery.

Tell your surgeon what medicines you are taking, including any supplements.

- A few days before the surgery, you may need to stop taking blood-thinning drugs. These include clopidogrel (plavix), warfarin and other similar medications.
- Ask your anaesthetist which medicines you should still take on the day of your surgery.
- If you smoke, you need to stop. Ask your doctor for help quitting.
- Tell your surgeon about any cold, flu, fever, herpes breakout, or other illness you may have before your surgery.

Follow instructions on when to stop eating and drinking before surgery.

On the day of your surgery:

- Fast from midnight
- Take any medicines your surgeon or anaesthetist has advised to take with a small sip of water.
- Follow instructions on when to arrive at the hospital. Be sure to arrive on time.

Recovery and Aftercare

From the recovery area of the operating theatre you will go back to the High Dependency Unit or Post – Operative Care Unit (POCU) for 24 – 48 hours.

- After the operation you will have neurological observations performed at the bedside and will be asked to move your arms and legs to make sure that you have not had any new stroke symptoms.

Although it sounds like a dramatic operation, most people recover remarkably quickly.

- You will be allowed to eat and drink once you are fully recovered following surgery. Once you are well enough to return home, you will be discharged. At this stage, you may still need pain relief.
- It is likely that you will experience bruising and swelling in the neck, but this settles within 7-10 days. Your wound should be dry and healed within 10 days. If you develop redness or swelling in the wound, you should see your doctor about this. You will be referred back to your surgeon if your doctor has any concerns.
- You may be advised to limit your physical activity for a short period. Most people can return to work after 4 – 8 weeks but extra care needs to be taken in jobs that involve manual labour.
- You should be able to return to driving 2 – 3 weeks following your operation, providing you can perform an emergency stop safely and look over your shoulder.
- If you've had a stroke you may have some long – term effects that make returning to work or driving more difficult. Your GP will be able to advise you further.

If you have carotid artery disease, it is particularly important to maintain a healthy lifestyle, as this will help reduce the risk of your arteries becoming blocked up again, and will reduce the risk of a further stroke or TIA.

Questions

If you have any questions or queries you can contact your GP, or alternatively the secretary of your consultant surgeon

- Prof. Eamon Kavanagh's secretary, University Hospital Limerick
061482761
- Mr Tony Moloney's secretary, University Hospital Limerick:
061482121
- Mr Mekki Medani's secretary, University Hospital Limerick:
061588249
- Limerick Vascular: 061315080

This booklet has been developed by Vascular Surgery, UHL Group 2020.