



## Carotid Artery Disease and Carotid Endarterectomy

### Information for Patients

#### **Introduction**

The brain requires a constant supply of blood and oxygen; interruption of that supply for more than just a few minutes usually results in permanent brain damage i.e.. a stroke.

There are many different types and causes of stroke but probably the most common results from furring up (atherosclerosis) of the arteries in the neck that lead up to the brain.

There are four such arteries:

- Two carotid arteries that lie at the front of the neck and supply the front part of the brain and the eyes
- Two vertebral arteries that run up the back of the neck through the spine and supply the back of the brain

The carotid arteries are the more important because they carry more blood and because the front of the brain is responsible for some of our most important functions i.e. consciousness, movement, sensation and speech.

The left side of the brain runs the right side of the body; and vice-versa. In right handed people the left side of the brain (known as the left hemisphere) is arguably the most important because it supplies the right hand. This, so-called dominant hemisphere also usually controls speech. In left handed people either the left or the right hemisphere can be dominant.

Thus, if there is a narrowing or blockage of the left carotid artery then this may result in a lack of blood supply to the:

- Left hemisphere (left front side of the brain), resulting in loss of sensation and paralysis down the right side of the body and, in a right handed person, loss of speech (i.e. a stroke)
- Left eye, resulting in blindness in the left eye

If the blockage lasts for only a short period of time then the symptoms of the stroke may be temporary (last less than 24 hours). This is called a *transient ischaemic attack* (TIA). The word ischaemic is the medical term for lack of blood supply. Similarly, the blindness can also be temporary; a condition known as *amaurosis fugax*.

The recognition of TIA and amaurosis fugax is important as affected persons are at high risk of going on to develop a full blown stroke or of going blind if the furring up in the carotid artery is not treated.

## Causes of carotid artery disease

Although all adults will have some furring up (atherosclerosis) of the arteries to a greater or lesser extent, there are several influences that might determine how severe this is in the individual:

- Smoking; this is by far the biggest single risk factor for atherosclerosis and stroke
- High blood pressure (hypertension)
- High cholesterol levels
- Diabetes
- Age – atherosclerosis increases as we grow older
- Gender – more common in men (perhaps because they have tended to smoke more)
- Family history of atherosclerosis (stroke, heart attack, angina or intermittent claudication)

## Diagnosis

Carotid artery disease is usually diagnosed following a duplex ultrasound scan of the neck or sometimes after CT or MRI scans of the brain

## Treatment

All patients diagnosed with carotid artery disease should be commenced on so called 'best medical therapy'. This involves:

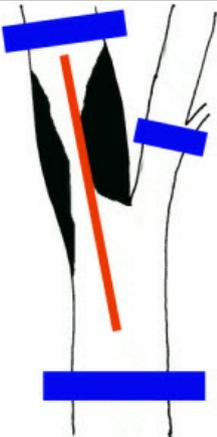
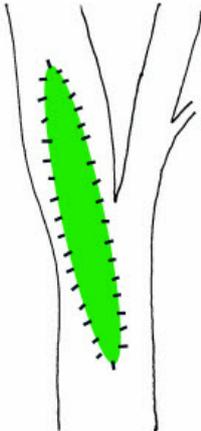
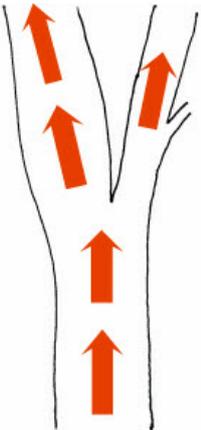
- Complete and permanent smoking cessation
- Control of blood pressure
- An anti-platelet agent e.g. aspirin 75mg once daily
- Cholesterol lowering therapy with a statin e.g. Simvastatin 40mg at night

This will reduce the risk of the atherosclerosis getting worse and the risks of stroke or blindness.

If the carotid artery disease has caused significant narrowing of the artery (greater than 70%) and given rise to symptoms (i.e. stroke, TIA or amaurosis fugax), the risk of stroke or blindness can be further reduced by removing the atherosclerosis and widening the artery. This is done by means of an operation called *carotid endarterectomy*.

## Carotid Endarterectomy

This operation should only be performed by experienced specialist vascular surgeons. It is often performed under local anaesthetic and usually involves a stay in hospital of just one night.

	<p>The diagram represents a carotid artery with significant narrowing (in black) affecting the blood flow to the brain (in red).</p> <p>During the operation an incision is made in the side of the neck over the carotid artery</p>
	<p>Clamps (in blue) are placed on the common carotid artery (bottom) external carotid artery (middle right) and internal carotid artery (top left) and an incision (in red) is made along the length of the artery</p>
	<p>The narrowing is carefully removed from the inside of the artery and the incision is closed by stitching in a patch of woven material (in green). The clamps are then removed</p>
	<p>This allows the blood to flow normally up to the brain</p>

## Potential complications of carotid endarterectomy

- Stroke:** This occurs in 1 to 3% of patients either during or within 24 hours of the operation. The stroke may vary from very mild (causing no disability) to very severe (causing permanent major disability or even death). Of course, all possible precautions are taken to prevent this.
- Bleeding:** Occasionally (about 1-2%) a collection of blood clot can accumulate underneath the wound (haematoma) resulting in swelling of the neck. This will often settle on its own, but occasionally may need to be dealt with by means of a further operation to remove the blood clot.
- Nerve injuries:** It is not uncommon for patients to report some numbness of the side of the face and neck after carotid endarterectomy. This usually recovers over a few months but can, rarely, be permanent. Male patients need to take care shaving after the procedure. Very rarely deeper nerves in the neck can be damaged during the surgery resulting in a hoarse voice. Again, this may or may not recover over the course of a few months.
- Heart attack:** As with any major operation there is a small risk (perhaps 1%) of heart attack during or following carotid endarterectomy.
- Patch infection:** This is a very rare but potentially very serious complication. All patients undergoing carotid endarterectomy are given a single shot of intravenous antibiotics during the operation to minimise this risk. If the patch does become infected then it usually has to be removed and replaced with a patch of the patient's own vein
- Minor complications:** There is a small risk of developing minor complications such as chest or urine infections after carotid endarterectomy.

## Stenting for carotid artery disease.

For some years doctors have been investigating the feasibility of minimally invasive treatment of carotid artery disease using stents (tubular metal frames) to reline the arteries under x-ray control.

A series of studies, most recently the International Carotid Stenting Study (ICSS), has shown stenting is both a more risky and less successful treatment for carotid artery disease than surgery.

As a result we no longer offer carotid stenting to patients with carotid artery disease.

Please refer to the trial website for further information:

<http://www.cavatas.com/>

## Carotid endarterectomy for asymptomatic carotid artery disease.

Whilst there is excellent evidence that suggests that carotid endarterectomy significantly reduces the risk of major stroke when the artery is at least 70% narrowed and has produced symptoms (TIA, amaurosis or stroke) the evidence for surgery when the narrowing of the artery has not resulted in one of these symptoms is less robust. Occasionally, however, surgery can be beneficial in these situations (for example if the carotid arteries are tightly narrowed on both sides of the neck). Your surgeon will discuss with you the potential risks and benefits of any proposed intervention well before the surgery is planned.



For further information, or to book an appointment, please contact us:

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