

Carotid Endarterectomy

Introduction

We expect you to make a rapid recovery after your operation and to experience no serious problems. However, it is important that you should know about minor problems which are common after this operation, and also about more serious problems which can just occasionally occur. The section "What problems can occur after the operation?" describes these, and we would particularly ask you to read this. The headings from this section will also be included in the consent form you will be asked to sign before your operation.

What is carotid endarterectomy?

Carotid endarterectomy is an operation for clearing narrowed carotid arteries. It is done if the carotid artery becomes seriously narrowed, and especially if this has caused blood clots to go to the brain (Transient Ischaemic Attack, (TIA) or stroke) or to the eye, causing temporary blindness.

It is an operation to reduce the risk of future strokes above and beyond the benefits of Best Medical Therapy (stopping smoking and taking all the correct drugs). It does not improve symptoms following a stroke and is not indicated for everyone with disease of the carotid arteries. The benefits of the operation depend on whether you have had symptoms or not. If you have not had symptoms the benefits of the operation take 5 years to realise.

Why are the carotid arteries important?

One carotid artery runs up each side of the neck, to supply blood to the head. The most important branch of the main (common) carotid is the internal carotid artery, which takes blood

to the eye and the brain. A problem with blood flow to the eye causes loss of vision: a problem with blood flow to the brain causes a stroke (for example, loss of movement and/or feeling). Either of these may be temporary or permanent. A serious stroke can be fatal.

The right side of the brain controls the left side of the body, and vice versa. In a right handed person the left side of the brain usually controls speech. This means, for example, that trouble in the left carotid artery could cause loss of sight in the left eye, weakness or numbness on the right side of the body, or loss of speech. In a left handed person the speech area may be located on either side of the brain.

What can go wrong in the carotid arteries?

The carotid artery can be affected by atherosclerosis (hardening of the arteries), particularly in the part of the neck near the angle of the jaw. A narrowing develops in the artery, which often has a roughened surface. Blood clots can form on this narrowed area, which are then swept on by the flow of blood, and lodge in the small arteries of the eye or the brain. These blood clots can cause loss of vision or strokes.

Small blood clots in the eye or brain often break up quickly, and the symptoms get better. These temporary symptoms are called "transient ischaemic attacks" or TIAs. Larger blood clots can take longer to clear, and can sometimes cause permanent blindness or a stroke.

If a carotid artery blocks completely, this may cause a stroke, but may cause no trouble at all if the connections with other arteries inside the head are good enough. This varies from person to person. Once blocked a carotid artery should not be reopened.

What are the warning signs?

Narrowing of the carotid arteries may present with symptoms as above, or it can be found incidentally during an examination or scan for another purpose. Temporary loss of movement or feeling, speech disturbance or loss of part or all of the sight in an eye (often like “a curtain coming down”) may be the first signs of clots coming from a narrowing of the carotid artery. Carotid artery problems are the cause of around a third of all TIA’s and strokes.

What tests can show up narrowing in the carotid artery?

A duplex ultrasound scan is usually the first test, and in most cases provides a clear picture of the carotid artery. It is painless and is done by moving a smooth probe over the neck, after putting special jelly on the skin.

Occasionally special X-rays are needed (magnetic resonance scans or CT scans). Scans of the brain are also required to show up the damage done by blood clots, or other problems.

What if the carotid artery is narrowed?

There are two aspects to treatment if you have had a TIA or stroke due to narrowing of the carotid artery - “Best Medical Therapy (BMT)”, which aims to correct the known risk factors for narrowed arteries anywhere in the body (particularly the heart, kidneys and legs), and Carotid Endarterectomy to clear out the disease itself.

Best Medical Therapy

BMT means control of your blood pressure, your diabetes (if you are diabetic), stopping smoking (this is a vital part of your treatment) and taking statin tablets. Statins lower your cholesterol level but also affect the disease directly and so it is important you take these tablets if you are able to even if your cholesterol level is normal. You will also be given tablets such as aspirin, dipyridamole, clopidogrel or warfarin, alone or in combination, to thin the blood.

Carotid Endarterectomy does not improve symptoms after a TIA or stroke. It reduces the risk of further stroke over a period of time. There is a very big difference in our approach to carotid disease which has caused symptoms as opposed to disease which has not.

Carotid Endarterectomy

The treatment depends on whether your narrowing (of more than 50%) is associated with symptoms or not.

Carotid narrowing of over 50% with symptoms

If the narrowing exceeds 50% and is associated with symptoms then you are at risk of further stroke. The greatest risk is within 48 hours; the risk remains high for 2 weeks and then tails off. After 6 weeks your risk of further events is as small as if you had not had symptoms (see below).

For this reason we operate urgently on patients with symptoms and a narrowing of >50%. We assess your risk of stroke with and without surgery and advise you whether you would benefit from surgery or not.

Carotid narrowing of over 50% without symptoms (“Incidental finding”)

Sometimes a seriously narrowed carotid artery is discovered by chance, before it has caused symptoms (“asymptomatic”). The risk of stroke or death is less than for a carotid artery which has caused symptoms, but carotid endarterectomy is sometimes advised because it can still halve the risk from around 12% over 5 years, to 6% after surgery. This decision needs particularly careful discussion.

Key differences between operations for disease with and without symptoms

Patients with symptoms are at high risk of stroke within the first two weeks and therefore gain the greatest benefit from surgery within two weeks.

Patients without symptoms are at risk over a five year period. This means that they need to be likely to live (with a good quality of life) for 5 years to obtain benefit from the operation. It also means that the benefits are gained over a 5 year

period, but the risks are very much “Up front” as the risk of post-operative stroke is within 30 days of the operation.

All decisions about whether to do a carotid endarterectomy are a matter of balancing the additional risks and benefits of operation against best medical treatment alone. Vascular surgeons, stroke physicians and other doctors advising patients about the pros and cons of carotid endarterectomy spend time discussing these risks, and advising whether operation seems the most sensible thing to do in each individual case.

What does the operation involve?

You will come into hospital on the morning of the operation and stay for one night afterwards. We may ask you to attend a “pre-admission clinic” about a week beforehand for blood tests and other checks (these may not be necessary if you have been in hospital shortly before). You will also be invited for a COVID-19 swab within 72 hours of the operation. As active COVID infection significantly increases the risk of major complications if surgery, we would consider delaying or even cancelling surgery if there is a positive swab.

On the day you come in, members of the surgical team examine you and arrange final checks. You will also meet the anaesthetist. The surgeons, anaesthetist and nurses will explain exactly what is going to happen, and will be pleased to answer any questions you have. Do not feel afraid to ask about anything which worries you.

Carotid endarterectomy is usually done under a local anaesthetic, together with some sedation so that many people cannot remember anything about the operation. Local anaesthetic is used so that we can be sure enough blood is getting to the brain - a nurse gets you to squeeze her/his hand from time to time to make sure that you are still moving properly, and we are also able to talk to you during the operation. If there is any suggestion that the blood flow to the brain is becoming inadequate, then a temporary plastic shunt bypass is used.

The operation is done through an incision a few inches long on the side of the neck. The carotid artery is opened and the material narrowing it is removed. The artery is closed with stitches; sometimes with a “gusset” patch of synthetic material to keep it widely open.

The skin of the neck may be closed with stitches under the skin, or sometimes with stitches or clips which need to be removed a few days later.

What happens after the operation?

You are likely to have some discomfort in the area of the wound, but you will do no harm moving your head and neck normally. You will be offered painkillers, and it is sensible to take these regularly during the first few days. Sometimes the area under the wound is quite swollen, and it may become bruised. All this will settle.

You should be able to get up and walk about within a few hours after the operation. You can get home as soon as you feel sufficiently confident: we decide this with you at the time. Most people get home within 24 hours of the operation.

What can I do when I get home?

You can return to all your normal activities as soon as you feel able. You may feel a little tired for a week or two after the operation, but you will do no harm becoming normally active very quickly.

Bathing and washing the neck - usually from 48 hours after the operation.

Driving the car - There are two aspects – your symptoms and your operation. Your entitlement to drive depends on whether you have had a TIA or a stroke. The operation itself does not prevent you from driving once you are comfortable and are able to move your neck sufficient to ensure adequate attention whilst driving.

The table below summarises the DVLA guidance (please see weblink for details)

| Clinical Condition | Group 1 Entitlement ODL – Car, Motorcycle | Group 2 Entitlement VOC – LGV/PCV |
|--|--|---|
| TIA | No need to notify DVLA Must not drive for 1 month | Licence refused or revoked for 1 year following a stroke or TIA |
| Stroke | Must not drive for 1 month Notify DVLA if there is a residual deficit after 1 month | |
| Carotid stenosis not requiring treatment | No need to notify DVLA | |

www.dft.gov.uk/dvla/medical/atag glance.aspx

Work - when you feel active and well enough. In general it is sensible to allow for at least two weeks off, but you would do no harm by returning to work earlier if you wanted.

Are there any special precautions after the operation?

You will be on a number of tablets after your operation, Some may be new to you. We usually advise that you continue with these in the long term. Treatment of high blood cholesterol, high blood pressure and diabetes are particularly important for people who have narrowed arteries. You will be checked for these and your general practitioner will discuss treatment with you.

Having had treatment for a narrowed artery it is very important that you do not smoke (ever) after the operation.

All these precautions reduce your risk of stroke, heart attack and death in the months and years after the operation.

What problems can occur after the operation?

Bruising and swelling

Some bruising and swelling of the neck is common and occasionally this can be extensive. Bleeding beneath the wound is a special risk immediately after the operation (particularly because of the drugs which have been used to thin the blood). Occasionally it is necessary to go back to the operating theatre to control bleeding. This bleeding is usually from tiny arteries in tissues beneath the skin, and not from the carotid artery.

Numbness

The incision on your neck will divide some small nerves in the skin, giving an area of numbness in front of the scar (which can make shaving a little difficult for a while). This numbness gradually recovers, but the feeling may not come completely back to normal.

Nerve damage

Other nerves are at risk during the operation, either because they are close to the carotid artery and may need to be pulled to one side or because they have been affected by the local anaesthetic block. This occurs in about 7% of cases. If damaged then they usually recover within a few days to a few weeks, but occasionally damage can be permanent (if a nerve is badly bruised or divided):

- the nerve controlling the corner of the mouth leading to a lifting of the corner of the mouth on the affected side
- the nerve controlling movement of one side of the tongue causing weakness
- one of the nerves controlling speech: damage to a nerve to the voice-box causes a hoarse voice and a “Bovine” cough, which usually recovers, but hoarseness can be permanent.

Headache

Headache, which may be severe, occasionally occurs after the operation. This usually settles within about 48 hours. Temporary high blood pressure may occur, which can be treated.

Infection

Infection of the wound is a small risk in the days after the operation, but is uncommon. Rarely, pieces of stitch placed under the wound come to the surface and need to be removed. If a gusset patch of material used to close the carotid artery becomes infected, further complex surgery may be required to remove this.

Stroke, loss of vision, and death

The most serious risks of carotid endarterectomy are stroke, blindness of one eye, and death. These will be discussed with you before the operation. In general the risk of stroke (or blindness in one eye) is about 2%. Any stroke may be mild or serious, and may recover well or may be permanent. The risk of death at the time of operation is about 1%.

What should I do if there is a problem?

If there is an acute problem such as persistent severe pain, bleeding, fever, or an inflamed or discharging wound it is best to contact your own family doctor first, who may suggest that you see the surgeons at the hospital, and if this is necessary, he/she will make the arrangements. Should you be unable to get urgent medical attention from a General Practitioner, then come to the Emergency Department.

The surgical team who did your operation will always be prepared to see you at the request of your own doctor or the doctors who see you urgently in the hospital. If you attend hospital urgently, you may be looked after by a different surgical team initially.

If there is any concern in the longer term, the surgeon responsible for your operation will see you in clinic at the request of your family doctor.

What are the alternatives to carotid endarterectomy?

Best Medical Treatment. Medical treatment reduces the risk of blood clots in the carotid artery and slows the development of disease in the carotid and other arteries. It means taking aspirin (or similar drugs which make the blood less "sticky"), stopping smoking, and lowering blood cholesterol, in addition to treating high blood pressure and diabetes.

Medical treatment is always important, whether or not you decide to have a carotid endarterectomy. Carotid endarterectomy is seldom essential, but it may give a very worthwhile reduction in the risk of stroke (or loss of vision) which will be explained to you.

Stenting. In recent years stenting has been developed as a treatment for narrowed carotid arteries. This involves stretching the narrowed carotid artery with a balloon and then inserting a metal stent (like a cylindrical cage) into the area which has been stretched to keep the artery open in the long term. Stenting is done by introducing special catheters into the artery under local anaesthetic under x-ray guidance. A special filter is used to reduce the risk of blood clots going to the brain during the procedure. This risk has been a concern but improvements in the technique of stenting have reduced the chance of stroke as a result of dislodging blood clots. Surgery is still the treatment recommended for most patients: we use stenting only in situations which would make surgery especially complex. We currently use carotid stents for patients in whom surgery might be particularly challenging (for example people with scarring of the tissues of the neck due to previous surgery or radiotherapy) or for patients who have recurrent, symptomatic narrowing of a previously operated artery. Carotid stenting is still the subject of clinical trials but may become more widely used in the future.

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