You have been diagnosed as having carotid artery disease and you may benefit from having a procedure called carotid stenting. This leaflet explains more about carotid stenting and answers some of the most frequently asked questions.

If, after reading it, you have any more questions or concerns, you should write them down and discuss them at your next appointment.

**Where will my hospital appointments take place?**

Your appointments will usually be at the Sheffield Vascular Institute at the **Northern General Hospital**. We also run local outpatient clinics at the Royal Hallamshire Hospital, Rotherham and Barnsley District General.

The Sheffield Vascular Institute is one of the largest vascular centres in Europe. We specialise in the treatment of all circulatory conditions affecting the arteries, veins and lymphatics. If you wish to find out more about the Sheffield Vascular Institute then look under the Guide to Services of the Sheffield Teaching Hospitals NHS Foundation Trust website (www.sth.nhs.uk)

**Why do I need the procedure?**

You need the procedure because you have a severe narrowing of the carotid artery in your neck that supplies blood to the brain. This is known as **carotid artery disease**. This narrowing is due to a build up of plaque caused by a condition called **atherosclerosis** (otherwise known as hardening of the arteries).

If you have already had symptoms, (for example a small stroke or transient blindness), then narrowing of the carotid artery is associated with a 10 - 15% risk of a further stroke in the first year, and a 5% risk of stroke every year after that. If we successfully treat the narrowing this risk is reduced to 0.5 - 1% per year.
The risk of a stroke from carotid artery disease which has not caused symptoms is much less, but treatment may still be justified in some cases.

If you and your specialists agree to proceed with treatment for the narrowing, then there are 2 options: conventional surgery (carotid endarterectomy) or minimally invasive treatment (carotid artery stenting).

A separate information leaflet about carotid endarterectomy is available.

Carotid artery stenting is a newer treatment than carotid endarterectomy. It has a number of potential benefits over surgery, as it avoids a cut in the neck and your stay in hospital may be shorter. However, stenting is not suitable for everyone.

**What is a stent?**

A stent is a small metal cage that springs open inside the artery to hold open the narrowed section.
**Is it safe?**

A large international study has shown that stenting had a higher short-term risk of stroke or death than surgery (8.5% vs. 5.1%). However, most of the extra strokes were minor (non-disabling) and long term, there is no difference between the rates of disability in those treated with surgery and those treated with stenting.

In this hospital we have performed more than 500 carotid stenting procedures with a short-term risk of stroke or death of 2.9%.

It is important to realise that the left side of the brain looks after the right arm and leg and the right side of the brain looks after the left arm and leg. For this reason you may think that the "wrong" side is being treated when in fact it is the correct side!

**Will I need any tests first?**

Most patients will have had a Magnetic Resonance Angiogram (MRA), which is a scan of the arteries in the neck. This helps to confirm the need for treatment and helps the doctors decide if a carotid stent is suitable for you.

You will also be seen in the Pre-Admission Clinic before your procedure where you will have a number of other preparatory tests. These will include blood tests to check that you are fit for the procedure.

**How long will I need to be in hospital?**

You will need to be in hospital for about 1 - 2 days.

You will usually be admitted to hospital the evening before or the morning of the procedure and most patients stay in hospital for one night after the procedure.
Do I need to bring anything in particular with me?

Please bring all the medicines you are taking in to hospital with you. You will also need to bring toiletries, nightwear, and glasses or hearing aid, if you wear them. We do ask that you bring a supply of your own clothing into hospital. However, we advise that you leave valuables and cash at home, with the exception of a small amount of cash for you to purchase newspapers and other items, or to pay to use the patient-line system.

Before the procedure

If you take warfarin (an anticoagulant medication) then this may need to be stopped or changed to an alternative before the procedure. You will be told which tablets to stop taking before the operation by the nurse in the Pre-Admission clinic.

You should be on a medication called Clopidogrel (an anti-platelet tablet). This works by making the blood less sticky which reduces the risk of clot formation during placement of the carotid stent. If you are not on Clopidogrel then this should be started before the procedure.

We must obtain your consent for any procedure or treatment beforehand. Staff will explain all the risks, benefits and alternatives before they ask for your consent. If you are unsure about any aspect of the procedure or treatment proposed, please do not hesitate to ask for more information.

Who will do my procedure?

The procedure is carried out by a specially trained doctor called a Vascular Radiologist and it will take place in the Angiography X-ray suite.
How is it done?

You will be lying flat on your back for the procedure. It is important to keep everything sterile, so the doctor will wear sterile gloves and gown, and the skin in your groin will be cleaned to kill any bacteria. Local anaesthetic is used to anaesthetise the skin in your groin.

Carotid artery stenting is performed by placing a fine tube (catheter) into the artery in your groin and feeding this tube up through the vessels in the body to the narrowed carotid artery. The narrowing is then treated from the inside; first it is stretched open slightly using a tiny balloon (angioplasty), then the stent is deployed across the narrowing, and finally a larger balloon is used to help the stent open the narrowing up more.

A. The stent is placed across the narrowing in the artery, which has already been stretched open slightly

B. The stent being released

C. The fully opened stent holds open the artery where it was narrowed
During the procedure, you will be given a dose of a drug called heparin to prevent blood clots forming, and a medicine called Glycopyrrolate, which keeps your heart rate normal. This may make your throat feel very dry and cause blurred vision on the side being treated.

At the end of the procedure, the tiny hole we make in the artery is sealed up, either with a stitch, or a plug or by firm pressure for 10 minutes or so.

**What happens after the procedure?**

You may be asked to apply a little pressure over the area where the tube was inserted in your groin, until you get back to the ward. This is to reduce the risk of oozing.

Once back on the ward, you will be asked to lie flat for an hour or two, for the same reason. After that, you will be allowed to sit up, and then get out of bed. You should be able to eat and drink once back on the ward.

The nursing staff will take regular observations including your pulse and blood pressure, and check your groin for oozing. Occasionally, your blood pressure can be low after a carotid stent. Most patients are untroubled by this, but it can cause dizziness and blackouts when sitting up. In this case, you will be asked to remain in bed a little longer, until your blood pressure improves.

You will need to continue to take Clopidogrel (the anti-platelet tablet) long term following your carotid stent. This medication is very important. This helps in preventing the stent from occluding (blocking up) and developing further arterial disease. You should also be taking a statin which reduces the cholesterol level, as well as your blood pressure medication. All of these medications are aimed at reducing the risk of more problems due to arterial disease.
Sometimes blood pressure medication may need to be changed after the operation. Your doctors will look at this before you go home.

**Are there any risks with the procedure?**

Some minor bruising or swelling around the groin wound is common after the procedure and this may take several weeks to settle down. Very occasionally, an extra stitch is required to repair the hole in the groin artery.

A rare complaint called 'Cranial Reperfusion Injury' can occur after the procedure. If you have any extreme headaches within the first month of the procedure you need to seek **urgent** medical advice. Severe headache can be a symptom of reperfusion injury which can develop as the blood flow is restored to the brain.

You may notice some bruising around the groin incision but this is normal and will settle down.

Very occasionally the puncture site can become infected. It is important that you observe the area and check for signs of infection. You may notice that the area is red, hot and swollen. If this happens you should contact your GP surgery as you may need a course of antibiotics. It is better to shower rather then bathe for 48 hours after the procedure.

As already mentioned, although this procedure aims to reduce your chance of a future major stroke, there is a small risk that this could occur during or just after the procedure. A severely disabling stroke may occasionally endanger your life.

**When can I drive?**

The DVLA recommends that you do not drive for 7 days following an arterial puncture in the groin. The DVLA also has a guide of medical standards for fitness to drive. TIA and stroke are both covered within this and restrictions for driving do apply. Please speak to your specialist or
GP who will be able to advise you on when you can drive following a TIA or stroke.

**How long before I can resume normal activities?**

You should avoid lifting anything heavy for the first week after the procedure to prevent pressure on the groin incision.

**Are there any other things I should do?**

Because you have had a special contrast or dye during the procedure, it is very important that you drink plenty of fluids for the next few days. The contrast can affect the way your kidneys work and extra fluids will help this. These can be any kind of a drink including tea or coffee. Alcohol should be avoided. If you are diabetic you should keep to your usual diabetic drinks.

**Will I need to come back to hospital for a check up?**

Yes, you will be seen in the outpatient clinic about 4 weeks after discharge.

**How can I help myself?**

The procedure usually gives a good long-term reduction in the risk of stroke. You can also help by improving your general health by taking regular exercise, stopping smoking, reducing the amount of fat in your diet and eating more fruit and vegetables. Advice and support on stopping smoking is available from your GP or the hospital. All these things will help reduce the chances of further trouble from arterial disease.
What should I look out for when I go home?

Please seek urgent medical advice if you experience any of the following:

- Any bleeding or expanding lump in the groin
- Any limb weakness, altered sensation, slurred speech or visual problems
- Sudden onset of severe headaches within 1 month of the procedure

Also be aware of:

- A rash - this may be related to the X-ray dye, usually mild and settles, but if more severe please seek medical advice.

What if I think there is something wrong when I get home?

If you think there is something wrong once you are at home, you should contact the ward from which you were discharged. This is likely to be:

- Firth 2: 0114 271 4603 / 0114 271 4686

Other useful numbers

DVLA

- 0870 240 0010
- www.dvla.gov.uk

NHS Stop Smoking Helpline

- 0800 169 0169
- www.nhs.uk/smokefree