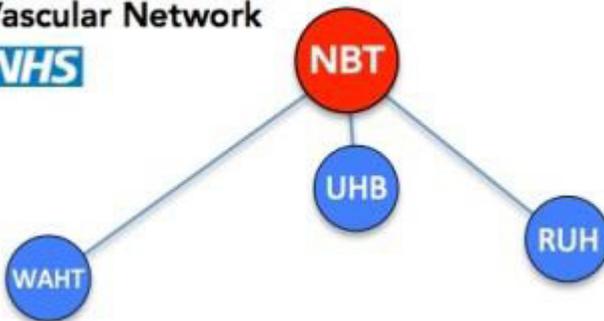


Angiogram, Angioplasty and Stents

Bristol Bath Weston
Vascular Network



Exceptional healthcare, personally delivered

Ask 3 Questions

Preparation for your Appointments

We want you to be active in your healthcare. By telling us what is important to you and asking questions you can help with this. The three questions below may be useful:



Angiogram, Angioplasty and Stents

There are two types of treatment to open up blocked ('occluded') or narrowed ('stenosed') arteries without the need for surgical incisions in the skin. These are called "balloon angioplasty" or "stenting" and can be done under x-ray guidance. They are done without the need for surgical incisions and are, usually, performed with you awake, using local anaesthetic to numb the skin.

This leaflet has been prepared to tell you about what will happen during these procedures.

You have been provided with this leaflet either to give you more detailed information about these procedures, so you can understand the risks and benefits, or because you and your vascular specialist have discussed the various options for treating your symptoms and have agreed to proceed with this treatment.

The role of the specialist and the MDT

Every patient who is being considered for angioplasty or a stent is discussed at a multi-disciplinary team (MDT) meeting. This is a meeting which involves all the specialists who may be involved in your care; that is vascular surgeons, interventional radiologists, vascular scientists, vascular specialist nurses and vascular anaesthetists.

At this meeting we discuss the investigations you have had; in particular we review the severity of your symptoms, your scans to date (pattern of arterial disease), and any other medical problems you may have. The specialist team may arrive at a clear recommendation for a specific type of treatment. Occasionally there is not clear agreement about the best way of treating your symptoms. Sometimes the MDT may be of the opinion that the risks of invasive treatment are too high or the likelihood of long term success is too low to offer an invasive procedure. Your vascular specialist should inform you about the result of the MDT discussion.

Where will the procedure be done?

Most angioplasties/stents are performed at the Major Arterial Centre, Southmead Hospital, by specialist Radiology doctors (Interventional Radiologists) who are part of the multidisciplinary team involved in treating patients with vascular disease. Unless you live alone, are frail or have certain medical problems you will usually be able to go home on the same day.

It may be appropriate for an angioplasty or stent procedure to take place at the Royal United Hospital Bath or at the Bristol Royal Infirmary, if one of these hospitals is closer to where you live. Unfortunately procedures are not performed at Weston General Hospital.

The procedure is done in a specially adapted room called a "interventional radiology (IR) room". In some patients we combine surgery with angioplasty or stenting. Such surgery is done in a specialist operating theatre which has x-ray equipment in it ('hybrid theatre').

How do I prepare for an angiogram?

Usually you will be admitted to hospital on the day of your angiogram. On the ward you will be seen by a specialist who will discuss your symptoms and the risks and benefits of the procedure with you. Sometimes you and the specialist may decide not to proceed on the day of the procedure because of the risks, or because the potential benefits will not be as great as previously thought. You will be asked to sign a **consent form**.

You may be asked not to eat for 4 hours before your examination, but in most cases you will be encouraged to continue to drink water up to the time of the procedure so that you do not become dehydrated.

As the procedure is generally carried out using the big artery in the groin, we may need to shave the skin around this area. You will also be asked to put on a hospital gown. A needle may be put into a vein in your arm so that you can have painkillers during the procedure if necessary. Once in place, this should not cause any pain.

- **If you have any allergies, you must let the doctor know.**
- **If you have previously reacted to intravenous contrast medium, the dye used for kidney x-rays and CT scanning, then you must also tell the doctor about this.**
- **If you are on any medication to ‘thin your blood’ known as an anticoagulant, you must let the doctor know.**
- **If you might be pregnant, you must let the doctor know.**
- **If you are a diabetic on Metformin tablets, you should not take these on the day of the procedure and for 48 hours after the procedure.**

You should also tell the doctor if you are diabetic and if you have previously had any problems with kidney function, asthma or blood clotting.

Who will be doing the angiogram or angioplasty?

The procedure will be performed by a team of specialists. In the majority of cases the team is led by a consultant interventional radiologist. The lead doctor may be assisted by another specialist or a doctor training in radiology or vascular surgery, and the other team members in the x-ray screening room will include radiology nurses and radiographers.

What is an angiogram?

The first stage the procedure is called the angiogram (or arteriogram). This is required to obtain a detailed map of your arteries because blood vessels do not show up on ordinary x-rays. A needle, followed by a fine plastic tube (catheter) must be inserted into your artery to do this.

What actually happens during an angiogram?

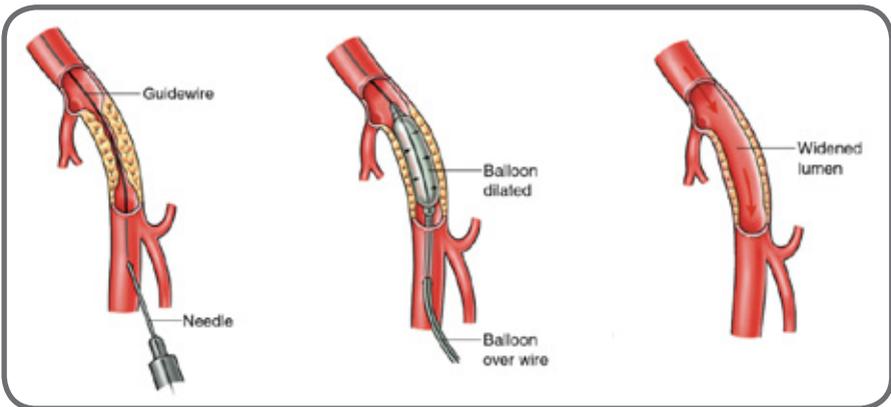
- You will lie on the x-ray table, usually flat on your back.
- You may have a monitoring device attached to your chest and finger and may be given oxygen through small tubes in your nose or a mask.
- In order to keep everything sterile the specialist will wear a theatre gown and operating gloves.
- The skin near the point of insertion, **usually the groin**, will be cleaned with antiseptic, and then most of the rest of your body will be covered with a theatre towel.
- The skin and deeper tissues over the artery will be made numb with local anaesthetic and then a needle will be inserted into the artery, often with the aid of ultrasound.
- Once the specialist is satisfied that this is correctly positioned, a fine wire is placed through the needle, and into the artery. The needle is then taken out allowing the fine plastic tube (catheter) to be placed over the wire and into the artery
- **The specialist uses the x-ray equipment to make sure that the catheter and the wire are moved into the right position and then the wire is taken out.** Dye ("contrast") is then injected into the artery through the catheter and x-rays are taken. This may make you feel very warm or even as if you have passed urine.

The specialist will then usually discuss the map of your arteries with you, and go through the pros and cons of proceeding with treatment to open up the blocked or narrow segments. Sometimes the specialist may find that the pattern of artery disease is different to that which we were expecting and that the risks of doing a procedure under x-ray guidance to improve the circulation are not advisable.

What is a balloon angioplasty?

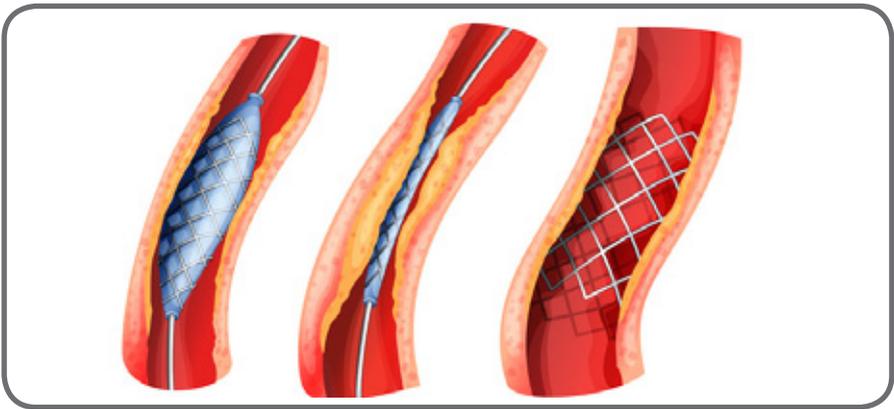
After the angiogram, a wire is inserted into the artery, usually at the same point as the angiogram has been taken. The wire must then be passed through the blockage or narrowed section of artery – **this is not always possible**. A special balloon on the catheter is then passed over the top of the wire. This balloon catheter is inflated to stretch open the blockage or narrowing and allow more blood to flow through.

Once the artery has been stretched up or “dilated” the balloon catheter is removed and an angiogram is done to look at the result.



What is a stent?

A stent is a hollow mesh tube about the size of your little finger. It is made of fine sterile metal and is used to hold open an artery. When it is used, unlike an angioplasty balloon, it is left inside the artery after the procedure is completed and remains there forever. Once it is in position, the stent does not give any discomfort or sensation, but it is important to remember it is there, and to tell any doctors treating you in the future of its presence. It can be placed in the artery using similar equipment to an angioplasty and usually requires no additional anaesthetic.



Stents are often used if there is a long blockage in a large artery. They may also be used if, after an angioplasty, the result is not as good as had been hoped for or if the artery is not smooth. Also, if with time, a narrowing successfully treated by angioplasty recurs in the same place ("re-stenosis"), a stent may be placed to decrease the likelihood of the narrowing recurring again. Narrowings can also develop within or around at stent and stents can block. If the stent blocks your symptoms may return or could even be worse.

Will it hurt?

When the local anaesthetic is injected, it will sting to start with, but this soon wears off, and the skin and deeper tissues should then feel numb. After this, the procedure should not be painful but you may feel some pressure or pushing. One of the team will be standing next to you and looking after you. If the procedure does become uncomfortable for you, then they will be able to arrange for you to have some painkillers through the needle in your arm.

As the contrast medium passes around your body, you may get a warm feeling which some people can find a little unpleasant. However, this soon passes off and should not concern you.

Some people feel a degree of discomfort during the time that the angioplasty balloon is inflated or when the stent is expanded but this generally passes off swiftly when the balloon is removed.

How long will it take?

Every patient's situation is different, and it is not always easy to predict how complex or how straightforward the procedure will be. Some procedures, for example those looking at the large arteries in the legs, are generally straightforward and do not take very long, perhaps half an hour. Other angiograms looking at much smaller vessels, may be more complex, and take longer, sometimes 2 to 3 hours.

At the end of the procedure a member of the team will often need to press on the area where the artery was punctured. This is to help the body seal up the small hole made up in the artery.

Sometimes the specialist will use a plug or "closure device" to seal up the artery that has been punctured.

What happens afterwards?

You will be taken back to the recovery area on a trolley. Nurses on the ward will carry out routine observations, such as taking your pulse and blood pressure, to make sure that there are no problems. They will also look at the point where the catheter was inserted to make sure there is no swelling around it or bleeding from it. In most cases you will be required to lie flat in bed for a few hours, until you have recovered. If the specialist has used a closure device you will be able to sit up quite soon after your procedure.

Your specialist may make recommendations about your medication following the procedure. It is common to prescribe a short course (6 weeks) of tablets to help keep your angioplasty or stent open and working well whilst the artery is repairing itself.

How soon will I recover?

If the procedure is uncomplicated, most patients come into hospital, and go home from hospital, on the **same** day. After the procedure you will need to lie flat for up to 6 hours before you are discharged home.

If you go home the same day a responsible adult should accompany you home in a car or taxi and stay with you for 24 hours. You should not drive, operate machinery or do any potentially dangerous activities for at least 24 hours, and not then until you feel fully recovered.

You should not do strenuous exercise for one to two days.

What problems can occur with the procedure?

Complications following angioplasty are less frequent than following the surgical alternatives of endarterectomy or bypass:

Some patients experience an allergic reaction to the X-ray contrast. In most cases this is minor but very rarely (1 in 3000) a reaction may be severe and require urgent treatment with medicines

The x-ray contrast can, in some patients, affect kidney function. If you are likely to be at risk of this, special precautions will be taken to reduce the chances of this problem occurring.

The Xrays used result in radiation exposure during the procedure, the risk from this is small, and the team will work to keep the dose as low as practically possible.

After the procedure it is normal to see some bruising around the area where the needle has been inserted. The majority of people who have had an angiogram notice a lump in the area, which remains after the procedure for a couple of months. This is part of the body's natural healing process, and is caused by the formation and gradual absorption of scar tissue. The lump will disappear with time.

Over time the treated segment of artery may narrow again. This can happen both following simple angioplasty or stenting. To detect this happening it may be recommended that you enter an ultrasound surveillance programme for one year following your procedure.

It is also possible over time that your arterial disease will progress and this may result in the return of your symptoms.

It is important to be aware of the serious, but **rare** complications:

- Bleeding can occur from the place where the artery has been punctured by the needle and catheter. This may result in a large painful bruise (haematoma) which requires you to stay in hospital.

- Significant haematoma
 - Angiogram: 3 patients in 100
 - Angioplasty/Stent: 4 patients in 100
- Need for surgery: 1-2 patients in 100
- The artery may be not seal up at all in the area where it has been punctured (false aneurysm 1 in 500) which may require a blood transfusion or further procedures including surgery
- Sometimes it is not possible to manoeuvre the wire through the blockage. Occasionally the narrowing or blockage cannot be opened up or the stent/angioplasty fails **immediately.**
- Small fragments from the lining of the artery can occasionally break off and lodge in an artery below the angioplasty site (“distal embolisation”). This may require you to stay in hospital for blood thinning medication and close observation or even an operation Rupture (bursting) of the artery following angioplasty occurs rarely. This can sometimes be treated in the x-ray department by putting a stent into the artery to seal the tear. If this is not possible, an operation may be required to repair the artery.
- Overall
 - There is also a 1 in 100 chance that the angioplasty will fail and **immediately make your leg worse.** In this situation you may need urgent surgery.
 - In very severely diseased arteries the risk of requiring urgent surgery is 3 in 100.
 - **If urgent surgery fails to restore blood flow to the leg, you may even need an amputation.**

How good is angioplasty or stenting?

The benefit you get from a successful procedure depends on lots of factors, especially whether you continue to smoke and the pattern of your arterial disease.

The results of angioplasty and stenting are best when used to treat:

- short sections of arterial disease
- narrowings rather than blockages
- large arteries (higher up the leg i.e thigh artery treatment is often more successful than knee artery treatment)
- patients who have single areas or “segments” in the legs with narrowings/blockages

A recent review of studies comparing stents with angioplasty for patients who have blockages in the thigh artery (the most common area treated) found that there was **no long-term difference** between the two treatments.

Most studies show that at one year, 8/10 to 9/10 angioplasty sites in the thigh remain open. By two years between 3/10 and 5/10 of patients have stents or angioplasty sites in the thigh that are still open and working. The results for arteries above the groin are slightly better and those for around or below the knee slightly worse.

Is there anything I can do to help?

You cannot do anything to relieve the actual narrowing or blockage.

You can improve your general health by taking regular exercise, stopping smoking and reducing the fat in your diet. These actions will help slow down the hardening of the arteries which caused the problem in the first place and may avoid the need for further treatment in the future.

When will I be followed up by the team?

Most patients will have telephone follow-up with a clinical nurse specialist. This is another member of the specialist team.

If you have on-going symptoms we will arrange for you to be seen in outpatients.

If you have had a stent inserted in the thigh artery or behind the knee the vascular specialist team will arrange for you to have an arterial duplex (ultrasound) done at your closest hospital around 6 weeks after the procedure. You will then be asked to attend for further scans (surveillance) at intervals over the next 12 months. Sometimes the stent can develop narrowings within it without any symptoms. Your specialist would then discuss the pros and cons of intervention (further angioplasty).

Ask 3 QUESTIONS: summary

What are the options?

Your options will depend on your symptoms and the severity and site of your arterial disease.

- Lifestyle changes, exercise and medication
Patients with claudication should always try to make these changes before considering intervention.
- Angioplasty/Stenting
- Surgery



What are the pros and cons of the options?

| Option | Life style changes Medication | Angioplasty or Stents | Surgery |
|--------|--|--|--|
| Pros | <p>Good long term relief of symptoms - only 1 in 5 patients worse over time</p> <p>Reduces your risk of heart attack or stroke</p> <p>Success entirely in your hands</p> | <p>“Quick fix”</p> <p>Done with you awake</p> <p>No need for surgical incisions</p> <p>Most cases no need to stay in overnight</p> <p>Low risk of major complications</p> | <p>Best way of measurably improving blood supply to foot and calf in the long term – but usually reserved for very short walking distances or pain at night or gangrene</p> |
| Cons | <p>Not always easy to give up smoking and exercise more</p> <p>Walking through the pain is difficult</p> <p>Medication has side-effects</p> | <p>Complications</p> <p>Groin pain, leg swelling, infection or bleeding</p> <p>Re-stenosis</p> <p>Procedure can fail in the short term, and may need to be repeated</p> <p>Need for medication (antiplatelet agents)</p> <p>Increased risk of losing your leg compared to life style changes</p> | <p>Requires general anaesthetic</p> <p>Requires one or more incisions</p> <p>Requires at least one night in hospital</p> <p>New symptoms due to the operation (wound problems/ leg swelling)</p> <p>Complications Risk of losing your leg, nerve injury, heart attack or death. 1 in 5 patients have wound problems.</p> <p>Restenosis Bypass can fail (1 in 5 at 5 years)</p> |

What help do I need to make my decision?

The team involved in your healthcare want to help you become as involved as possible in making decisions by giving you information about your options. In giving you answers to these questions and therefore understanding what's important to you, the specialist team will then be in the best position to help you make any choices about treatment.

You have been provided with this leaflet to give you information about **one** of treatment options. We are very happy to answer any queries you have having read these information leaflets.

There are always pros and cons for each choice, it is a good idea to think about what is important to you. Your specialist and the wider team may have a strong recommendation for you; however we always want to come to a shared decision for your treatment.

If you have questions, we are happy to hear from you. The best contact is via the vascular nurse specialists on 0117 414 5302, or via your Consultant's Secretary whose name and number should be on your clinic letter.

Where can I find out more about this?

We recommend the following websites for more information about vascular surgery conditions and treatments:

The Circulation Foundation

www.circulationfoundation.org.uk

The Vascular Society of Great Britain & Ireland

www.vascularsociety.org.uk

Society for Vascular Surgery (USA)

<https://vascular.org/patient-resources>

National Institute for Clinical Excellence (NICE)

www.nice.org.uk

Claudication

NHS Choices

<http://www.nhs.uk/conditions/peripheralarterialdisease/pages/symptoms.aspx>

Where can I find out more about my specialist?

North Bristol NHS Trust Website

www.nbt.nhs.uk/our-services/a-z-consultants

www.nbt.nhs.uk/our-services/a-z-services/vascular-surgery

Vascular Society of Great Britain & Ireland

www.vascularsociety.org.uk/patients/surgeons/default.aspx

Surgeon Outcomes

www.vsqip.org.uk/surgeon-outcomes/

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www.nbt.nhs.uk/vascularsurgery

If you or the individual you are caring for need support reading this leaflet please ask a member of staff for advice.

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take part...
be **involved**...
in research



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To find out more visit:
www.nbt.nhs.uk/research



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