

Arterial Bypass Grafts to the Legs and Femoral Endarterectomy

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 these operations, and also about more serious problems which can just occasionally occur. The sections of this booklet headed *“What other after effects will there be?”* and *“What problems can occur after the operation?”* describe these, and we would particularly ask you to read them. Headings from these sections of the booklet may be included on the consent form which you will be asked to sign before your operation.

What is an arterial bypass graft?

An arterial bypass graft is a tube which is used to get blood past blocked arteries. This tube is joined at its top end to the artery above the block and at its lower end to a smaller artery below the block. Bypass grafts may be prosthetic (man-made) or one of your own veins. The veins we use as bypass grafts are ones from just under the skin, which you can manage without. They are usually the veins from the inside of the thigh and calf; occasionally we use arm veins instead.

Prosthetic (man-made) bypass grafts are used for bypasses to arteries at the groin and sometimes to the artery in the lower thigh. For bypasses further down the leg (femoropopliteal and femorotibial bypass grafts) we generally prefer to use vein, if possible, because vein grafts are more successful.

As vascular surgeons we carefully balance your symptoms against the risks of treatment. Bypass grafts have risks of failure and of serious

complications, so we tend to use them only for patients who are very badly troubled and who are willing to accept the risks of surgery. Control of “risk factors” for disease in the arteries may be the safest option, rather than a bypass graft. These include: not smoking, taking tablets to “thin” the blood and to reduce cholesterol, good treatment of diabetes and high blood pressure.

Why might you need an arterial bypass graft to the leg?

Blocked arteries in the leg can produce different symptoms depending how seriously the blood flow is affected. Medically the least serious symptom is pain in the leg muscles (usually the calf) on walking a certain distance. This is called intermittent claudication and is described in another leaflet which we will give you. Bypass grafts are only done for intermittent claudication if symptoms are so bad that the patient feels strongly they would like an operation to walk further. We do not normally perform bypass grafts for claudication unless your own vein looks suitable.

If the blood flow is more seriously reduced then the toes or foot may become painful, particularly at night. Painful ulcers or cracks may develop on the foot. When the blood flow becomes worse still, areas of gangrene may develop. This is called critical ischaemia. When things get this bad there is a risk of an amputation of part of the leg if the blood flow cannot be improved.

Bypass grafts are occasionally used for people who develop ballooned arteries (aneurysms) in the legs or who suffer an injury to an artery.

What types of operation are there?

The type of operation you might need depends on which arteries are blocked. There are three main reasons why operations may need to be done:

1. For blocked arteries above the level of the groin

Bypass grafts may be used to take blood to the arteries at the groin from:

- **The aorta in the abdomen (aorto-biiliac or aorto-bifemoral bypass).** This is similar to the operations done for aortic aneurysms: if this is necessary we will give you a separate booklet.
- **The iliac arteries in the pelvis (iliofemoral bypass).** This is done through an incision in the lower abdomen and an incision in the groin.
- **The femoral artery in the opposite groin (femorofemoral bypass).** This is done through an incision in each groin. A bypass graft is burrowed deeply from one groin to the other, so that “the good leg lends some blood to the bad leg”. This avoids the more major surgery that might otherwise be needed to take a bypass from the aorta or iliac arteries, in the abdomen or pelvis.
- **The axillary artery (the main artery to the arm – axillofemoral bypass).** Like a femorofemoral bypass, this avoids the more major surgery that might otherwise be needed to take a bypass from the aorta in the abdomen. It involves an incision just below the collarbone (clavicle) and an incision in the groin.

2. For blocked or narrowed arteries at the groin

Common femoral endarterectomy (and profundaplasty). The common femoral artery is the main artery in the groin. Just below the groin it divides into the superficial femoral artery (the main artery which continues straight on down the leg) and the profunda femoris artery (the main artery to the thigh muscles, which can supply blood to the whole leg when other arteries are blocked).

The common femoral artery is not usually suitable for treatment by balloon angioplasty: when it becomes blocked or badly narrowed it is best treated by a surgical operation called “endarterectomy”. This means opening the artery and clearing out the material which is blocking it. The artery is then closed using a gusset patch, to avoid any narrowing. This is done using either a synthetic (man-made) patch or a piece of your own vein or artery and is often referred to as a “profundaplasty” (because it is used to keep the profunda femoris artery widely open).

Sometimes femoral endarterectomy is done in addition to a bypass graft or balloon angioplasty.

3. For blocked arteries in the thigh or lower leg - Femoropopliteal and femorotibial bypass grafts.

These are bypass grafts from the femoral artery at the groin to arteries further down the leg. Femoropopliteal bypass grafts are to the popliteal artery, either just above or just below the knee. Femorotibial bypass grafts are to smaller arteries further down the leg or near the ankle.

These operations are done through a number of incisions on the leg. For a vein bypass graft there are usually several incisions over the vein and over the arteries to which it is joined (typically 3 – 6 incisions). Either your vein will be left in place (in situ) or taken out and reversed.

For a manmade bypass graft there may only be a need for two incisions (one in the groin and one near the knee or lower on the leg - each usually about 10-15cm long).

What needs to be done before a bypass graft?

If you are a smoker, then by far the most important preparation for a bypass graft is to stop smoking and never to start smoking again. Smoking cigarettes makes symptoms worse (and your symptoms may improve through just stopping smoking, to the extent that no further treatment is required); it increases the risks of heart and chest problems at the time of an operation; and it causes bypass grafts to block.

We would not normally offer a bypass graft to a patient who is continuing to smoke.

You should be taking a tablet to “thin” the blood - clopidogrel or low dose aspirin (75mg) each day - and a statin tablet to lower blood cholesterol. We will also advise you about any other medical problems which need to be dealt with before bypass grafting.

You will need either scanning (by duplex ultrasound, magnetic resonance - MR - or both) or x-ray pictures of your arteries to show how bad the blocks are and whether a bypass graft looks possible and sensible. This is often done by a special x-ray (an arteriogram) during which a needle or fine tube is passed under local anaesthetic into an artery in the groin. An injection is then given into the arteries which shows them up in detail on x-ray pictures.

We will show you these pictures and explain the pros and cons of a bypass in your particular case. If it looks possible to improve blood flow using balloon treatment or stenting under local anaesthetic then we will usually advise this in preference to a bypass graft.

Sometimes a combination of balloon treatment and bypass grafting is the best solution.

What happens when you come into hospital?

You will come into hospital on the morning of your operation having been previously seen in the “Pre-assessment clinic”. If we are considering use of your own vein for a bypass you may have a scan during which the skin of your leg will be marked with an indelible felt tip pen to show exactly where the vein is.

After the operation you will have a drip in one arm, and usually a catheter is inserted into your bladder and left there for a day or two after the operation. Occasionally, we will use one or more fine plastic drains which remove blood or fluid from the areas where the operation has been done, and which are usually removed within a day or two. Rarely a blood transfusion is necessary during or after the operation.

What can you do after the operation?

You will do no harm by starting to move your leg and foot about in bed as soon as you wish after the operation. We encourage you to get moving as quickly as you can. We will usually try to get you out of bed on the day after the operation. It does no harm to try to walk on the leg although you are likely to find this uncomfortable to start with. You will do no harm and we will give you painkillers to help. The pain from the operation usually settles quite quickly and you should be walking about slowly but well within the first few days.

How long will you be in hospital?

You will need to stay in hospital until you are sufficiently confident walking about; until we are sure that you will be able to manage at home; and until we are satisfied that your wounds have healed well enough. In some cases this may be as short as four or five days, but often people are in hospital for a week or so after this kind of operation. If the foot was seriously short of blood and had become damaged before the operation then you may need to stay in hospital longer but we will discuss this with you in detail.

When can you bath or shower?

Usually you can start to bath or shower about three or four days after the operation, but we will advise you about this.

What happens when you go home?

You can be as active as you like when you get home. It is important that you try to walk about fairly frequently during the day. You are likely to become easily tired to start with, but the more often you can walk about and the more active you can be, the more rapidly you will get back to normal.

Your incisions may be closed with stitches under the skin, stitches which need to be removed, or small metal clips which need to be removed. We will advise you in detail about this. If clips or stitches need to be removed we will arrange this with the community nurses.

What other after effects will there be?

Discomfort and pain

The wounds are likely to be uncomfortable to start with, particularly as you get up and about. You should take painkillers as you need them. Your leg will be quite stiff but this will improve as you gradually get moving.

Bruising and haematoma

There is often a fair amount of bruising in the area of the operation and sometimes a large collection of blood (haematoma) can form beneath one of the wounds. This will settle gradually on its own as the body digests the blood clot. Very occasionally a second operation is required to control bleeding around the graft or to remove a collection of blood.

Swelling

Swelling of the leg is quite common after femoropopliteal and femorotibial bypass grafts. This happens for a variety of reasons:

- The tiny tubes which carry tissue fluid back from the foot and leg (the lymphatics) are disturbed by the operation.
- Some of your own veins may have been used for the surgery or tied off.
- A degree of swelling is normal after any operation.
- If your leg and foot have been very short of blood then improvement in blood flow makes the tissues swell.

This swelling usually settles over a period of a few weeks but some people are left with a slightly swollen leg in the long term.

Nerve damage

Damage to small nerves under the skin can lead to numbness of areas of skin on the leg. This can affect the skin on the thigh, below the groin scar, and sometimes the inner side of the lower leg, ankle or foot. The feeling often comes back but there may be an area which remains numb. There is often a feeling of pins and needles or tingling as nerves recover. Damage to nerves which move the leg is also a possible problem, but this is very rare indeed.

What other problems can occur after the operation?

Infection

Sometimes problems develop with the wounds. Infection can occur, particularly in the groin. This can cause inflammation, opening up of part of the wound, or discharge of pus. If part of the wound opens up (or if it needs to be opened to let infection out) then this area will be treated by regular cleaning, packing and dressings. It will usually heal up slowly in this way. Very occasionally infection can involve the bypass graft or patch and this is particularly serious if we have used a prosthetic (man-made) bypass. The bypass graft (or patch) may then need to be removed, and serious infection can lead to amputation. We take a lot of precautions to prevent infection, including the use of antibiotics at the time of surgery.

Blockage of the bypass graft

This is always a risk, and affects as many as one graft in ten during the first month or so after the operation, for femoropopliteal and femorotibial bypass grafts (the risk is lower for grafts taking blood to the arteries at the groin). After that time there is still a risk that grafts may block - depending on the kind of graft we use and the state of your own arteries, but on average the risk is about one in three over the first two years after the operation (in other words there is generally a two in three chance that a graft will continue to work well after two years). The risks of blockage are higher when narrow bypass grafts have to be taken a long way down the leg towards the foot and when arteries beyond the bypass graft are poor.

We will advise you about this in detail before the operation.

Amputation

If a bypass graft blocks there is a chance that your leg may remain improved, but it is most likely that you would “go back to square one” with symptoms just like those before the operation. There is a chance of about one in four that your leg would be worse, and even a small chance that you would require an amputation of the leg because the blood flow becomes so bad. This chance is small, but it is important that everybody understands this risk before embarking on a bypass graft. The risk is highest for femoropopliteal and femorotibial bypass grafts.

The risks of the anaesthetic

Bypass grafts can be done under a general anaesthetic or under epidural (spinal) anaesthesia with sedation. General anaesthetics have some risks, which may be increased if you have chronic medical conditions, but in general they are as follows:

- **Common temporary side-effects** (risk of 1 in 10 to 1 in 100) include bruising or pain in the area of injections, blurred vision and sickness (these can usually be treated and pass off quickly).
- **Infrequent complications** (risk of 1 in 100 to 1 in 10,000) include temporary breathing difficulties, muscle pains, headaches, damage to teeth, lip or tongue, sore throat and temporary difficulty speaking.
- **Extremely rare and serious complications** (risk of less than 1 in 10,000). These include severe allergic reactions and death, brain damage, kidney and liver failure, lung damage, permanent nerve or blood vessel damage, eye injury, and damage to the voice-box. These are very rare and may depend on your whether you have other serious medical conditions.

Epidural or spinal anaesthetics

These makes the body numb from the waist downward, so that pain cannot be felt. They are often combined with sedation for bypass grafting operations (and epidural anaesthesia may be combined with a general anaesthetic). These types of anaesthesia have an extremely rare risk of damage to nerves or to the spinal cord.

How do you know if your graft has blocked?

There will usually be fairly sudden and obvious signs of reduced blood flow - a cold, pale, and often numb or painful foot. If the reduced blood flow is less serious then you may simply get a sudden return of calf pain on walking.

What should you do if you think your graft has blocked?

Do not delay. If your foot is cold and pale, you should return to hospital immediately via the Accident and Emergency department where you will see the duty surgical team who will contact the vascular surgeons. If you have simply developed calf pain again when walking the situation is less urgent, but we would still like to see you within a day or two. It is often easiest to approach your doctor urgently, who will then contact the vascular surgical team.

What can you do to protect your bypass graft from blocking?

It is essential that you do not smoke. Continuing to take clopidogrel or aspirin each day gives protection against grafts blocking (an anticoagulant such as warfarin is an alternative, which some patients need to take for other reasons). Taking a statin to reduce cholesterol also protects against progression of disease in the arteries, which can cause grafts to block.

Monitoring vein grafts by ultrasound scans

For vein bypass grafts we arrange scanning in the Department of Clinical Measurements during the first year after the operation to check that narrowings are not developing. We will advise you whether this is necessary in your case.

The National Vascular Register

Vascular surgeons are required to submit details of all major operations to the National Vascular Register, as a public record of their practice and to provide information about vascular surgery for the UK. All these records are anonymous: at no stage is any patient's name out on record. If you have any arterial operation we would like to submit information about it to the National Vascular Register and will do so unless you express a clear wish not to have your details submitted. It is very important both for us and for national statistics that information is gathered about all operations so that there is a complete record, and none are missed out.

The Trust cannot accept any responsibility for the accuracy of the information given if the leaflet is not used by RD&E staff undertaking procedures at the RD&E hospitals.

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