

# What I tell my patients about creating a fistula.

**Your kidney doctor may have told you that your kidney is not working properly and that it may fail soon. One of the many functions of your kidney is to help get rid of waste products from your body. When your kidney does not work properly, these harmful waste products can be removed by the dialysis machine.**

After discussion with your kidney doctor and dialysis sister, you may have chosen to have haemodialysis. It is important that you are well prepared before you start dialysis and the process of preparation may take some time. Your kidney doctor may refer you to a surgeon to discuss forming an arteriovenous (AV) fistula for you. A fistula will provide the necessary access to your bloodstream to allow your blood to be 'cleaned up' by the dialysis machine.

## What is a fistula?

A fistula is formed when a vein is joined surgically to an artery under the skin. It is most frequently created in the upper forearm. This small operation involves the use of your own tissues (vein and artery) to form access for dialysis. No foreign body or plastic material is inserted into your arm.

Nothing sticks out of your skin after the operation - you will even be able to swim after your wound is healed. The operation is usually completed in less than an hour under local anaesthesia - you do not need to be put to sleep.

Your forearm veins are conveniently located very close to the surface of the skin and are therefore easily visible and accessible. The blood flow in the artery is more rapid than in the veins. By joining both together surgically, we are able to combine the benefits of the easier access of the forearm veins with the more rapid flow of blood in the artery. With time (6-12 weeks) the vein will get bigger as blood flowing through it becomes more rapid. It will become big enough to accommodate the size of the needles required for dialysis. A good fistula will provide a much better blood flow rate and therefore better dialysis than would catheters (see Box 1). Your fistula will be needed every time you undergo dialysis and the needles will each be connected through a tube to the dialysis machine (see Figure 1 overleaf).

The fistula is the preferred permanent access type for haemodialysis (see Box 2, for types of dialysis access).

A fistula is formed when a vein is joined surgically to an artery under the skin

## Box 1. Advantages of using a fistula

- There is less risk of infection.
- Fistulas usually last much longer than catheters or grafts.
- There are fewer problems with the dialysis access site.
- You can go swimming with a fistula.
- Fistulas provide better blood flow and therefore better quality dialysis.
- You will have fewer hospital admissions for access-related.
- Problems and therefore more time to do what you enjoy doing. They are cheaper for the NHS in the long term. They are better for long-term survival on dialysis.

## Why do I need a fistula for dialysis?

The dialysis machine is designed to 'clean' your blood by removing harmful waste products that your kidneys can no longer remove. Reliable access to your bloodstream is an essential requirement for effective haemodialysis treatment. A good fistula will allow safe, reliable, repeated and adequate access to the circulation for haemodialysis.

Sometimes, you may have to start dialysis before your fistula is ready. However, it is better for your fistula to be ready for use before you are ready to start dialysis. By having a fistula, you will avoid a dialysis catheter in your neck.

## What if I don't want a fistula or can't have one created?

You will still be able to have haemodialysis if you can't have a fistula. Access to your bloodstream for haemodialysis can also be achieved by inserting a permanent dialysis catheter under your skin in the upper chest wall and into a big vein in your neck. The other end of the catheter that comes through the skin is connected to the dialysis machine each time you dialyse (see Boxes 2, 3 and 4, overleaf).

People who have a weak heart or poor circulation to their hands or feet, as well as those who are too ill to have an operation, cannot have a fistula created for them. You can also choose not to have a fistula.



Figure 1. Your fistula will be needled every time you undergo haemodialysis and the two needles will each be connected through a tube to the dialysis machine.

### Why should I have a fistula now?

It is important that your fistula is ready before you actually need to start dialysis.

A surgically created fistula cannot be used immediately. We need to wait for the wound to heal, bruising and swelling to subside and the vein to enlarge and mature before the fistula is needled for dialysis. It may take between 4-12 weeks to mature and be ready for dialysis.

The first attempt at creating a fistula is not always successful; we may have to do the operation a few times. You should schedule your operation as soon as possible because you may have to wait a while before you can get theatre time.

### What do you want to do now?

Together with your surgeon, you need to decide what type of fistula is best for you. Your surgeon will take a short clinical history and then examine you. He will explain the details of the operation and possible complications and he will also answer any questions you may have. He will also examine your arms in order to assess the quality of the veins and arteries. Should you have good veins and arteries, he may choose to form your fistula in the wrist or forearm.

### Which arm will be used?

As much as possible, your surgeon will try to avoid putting your first fistula on your dominant hand. Elbow, or upper forearm, fistula may be the first choice in about 25% of people.

Sometimes, further tests may be necessary to confirm the quality of your veins and arteries. The test result is useful in deciding on the best site for a fistula to ensure that you have a good chance of a successful operation.

### Box 2. Types of access for haemodialysis

- Primary arteriovenous fistula (the artery and vein are sewn together).
- Artificial graft fistula (a plastic tube is used to join the artery and vein) in the forearm or leg.
- Neck lines/haemocatheters (narrow tubes are inserted into the vein between the shoulder and the neck).
- Groin or femoral lines in the leg.

### Box 3. Advantages of using catheters for haemodialysis

- They allow painless access to the circulation, no needle is necessary for access for haemodialysis
- Catheters are readily available
- They can be used immediately after insertion.
- They are useful in patients requiring short term haemodialysis.
- They do not affect your heart function adversely, especially if you have a weak heart.

Unfortunately, the sites for possible fistula formation are limited. It is therefore important to use available sites wisely. You should not allow anybody to stick a needle or cannula in any vein in the proposed fistula arm. This is to preserve the vein intended for creating your fistula. The veins on the back of your hands or the elbow opposite to the one you will be using are good alternatives for blood tests. Your veins are your assets, protect them!

### Can I use my arm as normal?

You should be able to use your arm as normal as soon as the slight discomfort of the healing skin settles. You should be able to drive in two weeks but please check with your insurance company if you want to start driving less than six weeks after your operation. Most people don't have major problems for many years after their fistula operation.

### What does the operation involve?

You maybe admitted to hospital the night before or on the day of your operation. The nurse will explain the ward routines to you and will check that you are still happy to have your operation and that you have signed the consent form. The site chosen for your fistula will be marked and your skin may be shaved in theatre. You are advised to remove any rings from the proposed fistula hand. This is to avoid discomfort if you experience slight swelling in your hand after the

operation. In theatre, you will have some local anaesthetic injected to numb the skin over the area of the proposed fistula. You may also require a drip to ensure that you are not too dry during and shortly after the operation. This is to discourage blood clots forming in your new fistula. You should not feel pain during the operation - you may even want to chat with medical staff as they work on you.

Through a small hole made on the skin, the vein is joined to an artery with stitches. You may be given a drug called heparin to thin your blood and reduce the risk of blood clots in your new fistula. The skin is closed over with dissolvable stitches to avoid the discomfort of stitch removal. Your nurse will give you painkiller tablets when you return to the ward. We may have to wait for a few days or weeks before we know if the operation was successful and you may have a little scar after your wound is healed.

### **What could go wrong during or after the operation?**

Most people have no major problems with this operation. Undue bleeding may occur during and after the operation. In the majority of people who experience bleeding, it is only mild to moderate and does not require a return to theatre. Wound infection is not commonly experienced. Problems with sensation, especially in the finger closest to the wound, could be experienced soon after the operation. This often improves as the local anaesthetic wears off. Sometimes, the loss of sensation may persist for a few weeks if tiny little nerves in the skin have been cut. Again, this often improves with time.

You may experience some coldness in your fingers over time. This problem is more common in diabetics, the elderly or those with poor circulation to the hands before creating a fistula. Sometimes, it may take longer than usual for the fistula to mature or it may not mature at all. Occasionally, the fistula may fail to work. Please let your kidney doctor know should you be concerned about any complications. He will ask the surgeon to see you again to form another fistula should the first attempt fail.

### **When will I go home?**

Should there be no complications, you may be discharged the same day. Some people prefer to spend the night in hospital and go home the following morning.

You will be taught how to feel your fistula for 'thrill' (a light buzzing) to check that it is working. You should check your fistula at least twice a day. Please call the hospital immediately if you no longer feel the thrill or feel that it has weakened. The nurse will give you the number to call.

### **Box 4. Problems associated with catheters**

- Insertion may be difficult at times.
- They are prone to infection because they are foreign bodies in contact with the skin and the bloodstream.
- Repeated infection is sometimes life-threatening, requiring use of antibiotics and hospitalisation.
- They frequently get blocked and require unblocking or replacing with a new one at the same or a different site.
- They often result in narrowing or blockage of the big veins of the neck. Should either of these happen, access for dialysis becomes difficult.
- Some people dislike a tube sticking out of their chest or neck.
- They are expensive.

### **What are the dos and don'ts?**

- Do not wear anything tight on your fistula arm.
- Do not carry anything heavy with your fistula arm as this may cause you some discomfort, especially on the stitch line; rarely, it may injure your fistula.
- Do not allow blood samples to be drawn or your blood pressure to be taken from your fistula arm.

It is important that you do not sleep on your fistula arm as prolonged pressure may cause the fistula to stop working. Avoid exposure of your fistula arm to extreme cold as this will reduce blood flow in the fistula. In addition, avoid activities that may cause injury to your fistula arm as this may result in excessive bleeding.

### **How can I help my fistula to mature?**

Increasing blood flow through the fistula may help it to develop. An exercise we recommend is described below.

First check that you can feel your fistula. Apply a soft tourniquet to the upper arm well above the scar of your fistula operation. Open and close the palm of your fistula hand or squeeze a small soft ball repeatedly for about three minutes.

Remember to remove the tourniquet each time after the exercise. You could repeat the exercise twice a day until your fistula is matured and ready to be used. The nurse will demonstrate this exercise to you before you leave the hospital. Your fistula is your lifeline - look after it.

### **Will I be the same after the operation?**

Some people say that their fistula is noisy at night and may disturb their sleep. They often get used to it with time and sleep normally afterwards. Others think that their fistula does not look very

nice after many years of use as it has developed small lumps along its length. These lumps are generally harmless but the dialysis nurse will ask the surgeon to have a look at them if either of you is concerned.

You may find it helpful to meet someone who has been dialysing with a fistula for a while and with whom you can share relevant experiences.

### **When will my fistula be ready?**

A clinic appointment may be arranged for you in six weeks. This is to see how well your fistula has matured and to find out if you are completely happy with it. Your kidney doctor will check it regularly each time you attend the kidney clinic. Your fistula is fully matured if you can have a problem-free four hours of dialysis using it. The dialysis nurse will check that your fistula is ready to be needed for your first dialysis, which is often for only two hours. Should there be a problem with your new fistula; the surgeon will be asked to see you as soon as possible.

### **Will my fistula be monitored?**

Your fistula will be checked regularly by the dialysis nurse each time you come in for dialysis. You should inform the dialysis nurse if you are concerned about your fistula. The dialysis nurse will ask the kidney doctors to examine your fistula if either of you is concerned. People who dialyse themselves at home usually have their fistula checked regularly by the visiting dialysis nurse. Your fistula is more likely to last longer if problems are detected and treated early, before it is adversely affected.

A good forearm fistula should serve you for many years. A few may last for more than 20 years. Should your fistula suddenly stop working, the vascular radiologist will be asked to unblock it for you in the X-ray department. This is often done quickly before your next dialysis treatment, so that you can avoid a temporary neck line. Should this procedure not be successful or possible, you will have a catheter put into a big vein in your neck for dialysis until your fistula is sorted out or a new one created for you is ready to be used for dialysis.

### **What problems could I possibly have after starting dialysis?**

Most good fistulas pose very little problems for many years after starting dialysis, although you

### **Box 5. Potential problems associated with a fistula**

- They may not look nice after many years of use.
- They can be 'noisy', especially at night.
- They can form swellings (aneurysms) along the affected vein.
- There is a small risk of rupture and bleeding.
- They can cause heart failure in some people.
- They may affect blood flow to the hand in certain people.
- They require needling each time you dialyse.
- They may require further surgical or radiological intervention to treat complications such as narrowing or thrombosis (clotting) of the fistula.

may not like the way it looks after many years of use. Sometimes, it may bleed from the needlepoint for longer than expected. This is readily controlled with gentle pressure to stop the bleeding. Large lumpy areas are surgically correctable should this be necessary. Infection of a fistula is uncommon. When it does happen, it can be resolved with the use of antibiotics. Sometimes the circulation to the hand is reduced by the presence of a fistula. The affected hand may feel cold and have bluish fingers or you may experience a tingling sensation or discomfort (see Box 5). The surgeon will be asked to see you should you be concerned.

### **What if I don't need a fistula after a successful kidney transplant?**

Most fistulas will not cause any problem if left alone after a transplant. Most people want to keep their fistula for a while after a successful transplant. This is because they are concerned that it may be needed again should the transplant kidney fail.

Sometimes a working fistula causes problems in people with stable kidney function. The decision as to what to do will be made jointly by you and the surgeon. Should you require advice about your fistula, please ask the doctor when you are next seen in the transplant clinic. A small operation to tie off your fistula can be arranged, should this be your wish. It is often possible to form another fistula for you in the future, if necessary.

### **Key points**

- A fistula provides reliable, long-term access for haemodialysis and is the preferred method of permanent access for patients requiring haemodialysis.
- A fistula is formed when a vein is joined surgically to an artery – most commonly in the arm.
- Efforts should be made to create a fistula before dialysis is required as it is better to start dialysis using a fistula than using dialysis catheters.