

Arterio-venous (AV) fistulae for haemodialysis

This information sheet explains about the arterio-venous fistula method of access for haemodialysis and what to expect when your child comes to Hospital. It may also be a useful reference for others looking after your child – for instance, teachers or youth club leaders.

What is an arterio-venous (AV) fistula?

A fistula (plural = fistulae) is made by a small operation to join an artery to a vein. The blood vessels of the arm are chosen, either at the wrist or the elbow. The blood from the artery goes straight into the vein, which then becomes bigger and firmer. This means that it is possible to put two needles into the enlarged vein so that blood can be taken out of the body, sent through the dialysis machine and then returned through the second needle.

Why do we recommend an AV fistula?

An AV fistula is the best means of access to the blood stream for long-term haemodialysis. It means that there is no plastic dialysis line to become infected. This is particularly important as infections damage the lining of the blood vessel and cause it to become narrow. This may mean that a line cannot be placed into the same blood vessel again. Obviously the number of blood vessels we can use is limited so we do not want them to 'run out' because they have been damaged. Sometimes our radiologist can rescue some vessels by putting a tube inside them (called a stent) to keep them open, but we would rather prevent this happening by creating a fistula as soon as possible. We particularly prefer to avoid putting plastic lines into the veins that are in the groin as the line then goes into the main vein that drains the body into the heart. If this gets blocked, transplantation may become difficult. Sometimes, if the main vein draining the arm becomes blocked, a fistula becomes impossible in the future. Also, if a plastic line in the heart becomes infected, it can cause infection on the heart valves causing them long-term damage.

Are any investigations needed before an AV fistula can be created?

The surgeon has to know that no narrowing has already developed in the blood vessels before he or she can do the operation. A venogram, which is a scan where dye is injected into a hand vein and its path is followed up the arm into the heart using X-rays, will show any narrowing. This also identifies the best vein to choose. If possible, the fistula is created in the non-dominant arm, that is, the one not used for writing.

What does the operation involve?

Your child will need an operation to create the fistula, which will be carried out under general anaesthetic and generally takes around two hours. The surgeon will make an incision (cut) in your child's arm. This can either be towards the wrist or on the inside of the elbow. The incision will be about two centimetres long if the wrist is used or about four centimetres long if the inside of the elbow is used. Your child will come back to the ward with a dressing on his or her arm.

Are there any risks?

Every anaesthetic carries a risk of complications, but this is very small. Your child's anaesthetist is an experienced doctor who is trained to deal with any complications. After an anaesthetic, some children feel sick and vomit, have a headache, sore throat or feel dizzy. These effects are usually short lived. Any surgery carries a small risk of infection or bleeding. The fistula will not mature for about six weeks and during this time you may notice changes in the circulation in the arm. You should report any sign of loss of circulation, like blue fingernails or coldness to your doctor. The arm may also feel numb for a while after the operation. Sometimes, the surgeon will not be able to create a fistula from the veins in your child's arm. If this is the case, a section of vein will need to be grafted from elsewhere or an artificial blood vessel used to create the fistula. The fistula will still function in the same way, but the operation may take longer.

Looking after the AV fistula

A fistula must be looked after carefully. After surgery, the arm is wrapped in soft dressing to keep it warm. The nurses will check that the blood is flowing well through it by feeling for a 'buzz' or 'thrill' or listening to the blood flow using a stethoscope. We will increase your child's 'dry weight' slightly on haemodialysis so that he or she do not become dehydrated, which can lead to the development of clots that might block the fistula. Your child may be given aspirin, which also decreases the chance of clotting in the fistula. We will teach you how to look after the fistula before you go home.

Going home with an AV fistula

The fistula must be checked regularly during the day. Get into the habit of checking it on waking, at meal times and before going to bed. If you cannot feel or hear the fistula, ring the hospital immediately. Be prepared for an admission and possible surgery. If the fistula seems faint, give your child a drink of 100 to 200mls and check it again, then telephone the hospital for advice.

Dialysis using the AV fistula

It usually takes about four to six weeks for the vein to become big enough to use. Once the fistula has settled down, it can be used to access your child's blood system for each dialysis session. Sometimes we start with just one needle and then use two when the fistula is ready (mature).

The nurses will put some local anaesthetic cream on your child's arm to help minimise the discomfort when inserting the needles. These needles will then connect your child's blood supply to the machine. Varying the site of needle insertion prevents weakening of the blood vessel wall causing blowouts called aneurysms. At the end of the session, the needles will be removed and the access points covered up with plasters.

Remember

- Take anti-clotting medicines as prescribed (aspirin or warfarin)
- Avoid becoming dehydrated during illness, exercise and hot weather. Check with the hospital if you are concerned about fluid intake.
- Avoid tight clothing on the fistula arm
- Wear jewellery or wristwatches on the other arm.
- Avoid blows and injury to the fistula.
- Good hygiene is important to prevent infections
- Do not take part in contact sports such as rugby and judo.
- Keep the arm warm especially in cold weather.
- Gently exercise the fistula arm to promote blood flow.
- Never let anyone take blood from the fistula arm or put a cannula in it.
- Only a dialysis nurse can needle fistulae.
- Blood pressure must not be taken on the fistula arm.

You must ring the hospital immediately if:

- **The fistula stops buzzing** – You will be given a stethoscope to place on the skin above the fistula where you will hear a distinct 'whoosh' noise. This sound should be present continually. You should also be able to 'feel' the pulsation of the blood as it flows through the fistula over the area where the incision was made. This is called the 'thrill' or 'buzz'. The nurses will show you how to assess the fistula in these ways. If you are in any doubt about the fistula, contact the hospital for advice straightaway, as the fistula will need immediate attention.
- **The fistula becomes red or painful** – This may indicate infection so contact the hospital immediately. Take your child's temperature and be prepared to come into hospital as an infected fistula needs urgent treatment.
- **Your child feels dizzy, faint or 'dry' or has diarrhoea and/or vomiting** – This may cause dehydration leading to reduced flow of blood through the fistula and possible clotting. Your child will need to increase his or her fluid intake in order to prevent dehydration. Admission for rehydration with IV fluids may be necessary.
- **The appearance or feel of the fistula, skin or arm alters** – For example, damaged skin, any abnormal lumps, swollen or painful area, altered sensation in the arm. Any of these signs should be reported to the hospital immediately.

To the child on dialysis, the fistula is a lifeline and must be looked after carefully. An AV fistula usually has a longer lifespan than other forms of permanent haemodialysis access. There are no permanent bulky dressings and infection is rare. With good care, including an ultrasound check every six months, the fistula can last for years.

If you have any concerns or would like advice about any aspect of your child's AV fistula care, please call:
Dialysis Unit – Monday to Friday 9am to 5pm –
Renal Ward – Any time –

