

Preparing for haemodialysis involves a number of important choices and lifestyle considerations. **Christine Hall** and **Jeremy Crane** explain the process of haemodialysis and how you can prepare for treatment.

# What I tell my patients about preparing for haemodialysis

**T**he main functions of the kidneys are to remove waste products and excess water from the blood. When a patient has kidney failure, their kidneys are less able to perform these tasks. This can result in a number of symptoms, including swelling, due to the build-up of fluid, and itching, due to the accumulation of waste products. Eventually, once kidney function has declined past a certain point, it is necessary for the blood-filtering role of the kidneys to be replaced. This is done through renal replacement therapy (RRT).

The main types of RRT are dialysis, kidney transplantation, and haemofiltration and haemodiafiltration. Although kidney transplantation is the optimal form of RRT for many patients with long-term kidney disease, most patients with advanced kidney disease will require a period of dialysis while awaiting a transplant. Haemofiltration and haemodiafiltration are less common forms of RRT and are usually used in hospital intensive care settings.

## Dialysis

Dialysis is the most common form of RRT and exists in two forms: peritoneal dialysis (PD) and haemodialysis (HD). PD involves putting a special fluid into the space in your abdomen. The waste products and excess fluids from your blood pass out of the surrounding blood vessels and into the fluid, which is then removed. This fluid is replaced with new fluid and the process is repeated a number of times. HD involves removing blood from the body, filtering it through a dialysis machine and returning it to the bloodstream.

## Preparing for haemodialysis

Based on your underlying condition and various other factors, in particular blood tests, your doctor can usually anticipate when you are likely to start dialysis. The time before starting dialysis can then be used to support and guide you in your decision of what type of dialysis is best

**Figure 1.** Your surgeon will perform an ultrasound scan to determine how suitable your veins are for forming an arteriovenous fistula



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for you. It is important to know that it is often possible to switch between the different types of dialysis, so you should not feel that your decision is final.

In an ideal situation, a patient due to start HD will already have an arteriovenous fistula (AVF; described below), which is up and running a few months before dialysis needs to be started. It has been shown that patients who undergo dialysis education and discuss the options available to them will be more likely to start dialysis in this ideal situation.

## Types of vascular access

HD involves the removal of blood from the bloodstream, which is then passed through a dialysis machine. 'Vascular access' is the term used to describe how your bloodstream is accessed in order to get the blood to the dialysis machine. There are three types of vascular access: an AVF, a graft and a central venous catheter (CVC).

### Arteriovenous fistula

The AVF is the most common method of vascular access and is considered to be best practice (also called the 'gold standard'). An AVF is a surgically created connection between two types of blood vessels – an artery and a vein – and is performed under local anaesthetic. The high volume of blood from the fast-flowing artery causes the vein to enlarge or 'mature' over a period of weeks. Following this period of maturation, the AVF is ready to be used and can be 'needled' ('needling' is the term used to describe the process of placing needles into the AVF for dialysis to take

place). The AVF allows blood, via needles, to flow out of the body and through the dialysis machine quickly and efficiently. The main benefit of an AVF is that it does not introduce foreign material into your body, so infection and complication rates are lower than with other forms of vascular access. As there is nothing that can be seen outside of the body, you are also able to lead a more normal life and continue to shower, bathe and swim as normal. For a successful AVF, your blood vessels need to be of an adequate size. In preparation for an AVF, your surgeon will perform an ultrasound scan to determine the size of your veins and their suitability for forming an AVF (see Figure 1). Roughly three-quarters of renal patients needing dialysis are able to have an AVF.

### Graft

Sometimes an AVF is not possible, because blood vessels are unsuitable or complications arise. In such cases, a graft is a good alternative. A graft is an artificial tube that looks like a blood vessel and lies under the skin. A graft introduces some foreign material into your body and, therefore, infection can be a complication. However, once placed, a graft is concealed and, as with an AVF, allows activities such as bathing, showering and swimming.

### Central venous catheter

A CVC (also called a line or central venous line) is usually reserved for patients who need urgent dialysis and should be considered a temporary or short-term measure. Lines consist of two small plastic tubes that are inserted into the large veins in your chest under local anaesthetic. In order to access these for dialysis, a short length of tube remains outside of the body. This can interfere with everyday activities such as showering, bathing and swimming (unlike an AVF or graft). In addition, the presence of foreign material in the veins can lead to complications and poses an infection risk. A serious complication, which can arise after having a line for a prolonged period of time, is central venous stenosis. In this condition, the artificial tubes irritate the lining of the major veins leading to the heart, which causes them to narrow. This affects blood flow and can lead to swelling of the face, neck and arms. Once this has occurred, it is irreversible and can be challenging to treat. It also makes the placement of an AVF on the affected side of the body more difficult. As a CVC introduces foreign material into the body and is designed for short-term use, it requires changing periodically. For those who need dialysis for a short period of time, however, lines provide a convenient method of vascular access as a 'bridging' mechanism.

### Which mode of access is best for me?

Several factors affect which method of vascular access is right for you, and each method comes with its own set of



**Figure 2.** To preserve your key veins in the elbow creases and wrists, you should request that blood is taken from the back of your hand

advantages and disadvantages. Your surgeon or nurse can discuss these with you, but you may want to consider the following points.

#### Other medical conditions

Sometimes, other medical conditions will prevent you from having an AVF; for example, if you have heart failure, are very frail or have vascular disease (diseased blood vessels). Your doctor will be able to advise you further on this.

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#### Length of illness

If it is expected that your kidneys will recover completely and dialysis is only a short-term measure, then a line may be better for you.

#### Age

Although not always the case, the complications that arise with a line usually occur after a period of months to years. Therefore, the younger you are, the more important it is that you have another method of vascular access, preferably an AVF.

Many elderly patients have other medical conditions that prevent an AVF or graft being placed; if this is the case, a line may provide a more convenient way of dialysing.

### How do I prepare for haemodialysis?

#### Vein preservation

One of the most important things that you can do to prepare for HD is to preserve your veins. As a kidney patient,

you will undergo many blood tests and possibly require the insertion of intravenous lines. Every time a vein is punctured, a small blood clot and scar are formed. Over time, this damage builds up and results in a poor-quality, scarred vein. This can make the procedure to create an AVF more difficult and more likely to fail.

In order to preserve your veins, you must avoid any form of venepuncture (blood tests and cannulation for intravenous drugs) in the key veins in your elbow creases and wrists. You should, therefore, request that blood is taken from the back of your hand (see Figure 2). If for any reason this is not possible, you should rotate between sites; for example, if you only wish to have blood taken from your elbow crease, rotate between the two arms. This way, the damage to the veins is spread out.

Your surgeon may have mapped your veins and told you which is the best vein for creating an AVF. In such cases, this is the vein that you should protect.

Save Your Vein is a health awareness campaign supported by the British Kidney Patient Association and designed by the authors to promote knowledge and practice of vein preservation among renal patients and healthcare staff. For more information, follow the team on Facebook and Twitter (@saveyourvein).

### **Maintaining a healthy diet**

A healthy diet and exercise help to lower cholesterol levels and reduce weight. High cholesterol levels cause the build up of fatty deposits in blood vessels, leading to heart and blood vessel disease. This is especially important, as heart disease is the leading cause of death in patients with renal failure. Furthermore, heart and blood vessel disease can make the creation of an AVF more difficult and more likely to fail.

As a kidney patient, it is important that your diet is modified. As renal disease progresses, the ability of your kidneys to remove protein, phosphate and potassium is reduced and you may experience side effects from the build up of these substances. It is, therefore, important that your diet is discussed with a healthcare professional or renal dietician to ensure your diet is appropriate.

### **Maintaining a healthy weight**

Being overweight has a number of consequences. It can cause or worsen diabetes, prolong healing time after surgery and increase the risk of infection. For these reasons, patients who are morbidly obese may not be able to join the active transplant waiting list.

Your body mass index (BMI) is a calculation that uses your height and weight to determine whether you are overweight. In many groups of people, BMI should be used with care (for example, in athletes, children and the elderly); however, as a rough guide, a healthy BMI is between 18.5 and 25 kg/m<sup>2</sup>. To find out what your BMI is, you can use a BMI calculator (see [www.nhs.uk/tools/pages/healthy-weightcalculator.aspx](http://www.nhs.uk/tools/pages/healthy-weightcalculator.aspx)) or do the following calculation:

$$\text{BMI (kg/m}^2\text{)} = \text{weight (kg)/height squared (m}^2\text{)}.$$

### **Early conversations**

There is evidence that kidney patients who are involved in early education about dialysis access options are more likely to start dialysis with a successful AVF. Early conversations with your healthcare team can often enable more control over your treatment.

You should also speak with your family and friends. Dialysis is a difficult commitment and takes up a significant amount of time, so it is important to have support and discuss your options with those who are close to you. It is also important, at this stage, to discuss the possibility of live kidney donation with your friends and family. As you near the need for dialysis, you should speak with your employer, so that they can accommodate your needs.

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### **Conclusion**

Preparing for dialysis by having early conversations with your healthcare team will increase the likelihood of you starting a method of dialysis most suited to your circumstances. A healthy lifestyle, preserving your veins and seeking the support of your family and friends are key to ensuring that your treatment options are maintained and that you have a positive outcome for your future ■

#### **Declaration of interest**

The authors declare that there is no conflict of interest.

## **Key points**

- ▶▶ ‘Vascular access’ is the term used to describe how your bloodstream is accessed for haemodialysis.
- ▶▶ There are many different forms of vascular access – an early conversation with your healthcare team will ensure that you select the one most suited to you.
- ▶▶ An arteriovenous fistula (AVF) is considered the best practice (or ‘gold standard’) method of vascular access for the majority of patients.
- ▶▶ Anticipating the onset of haemodialysis will mean that, when the time comes, you will be ready and the experience may be less daunting.
- ▶▶ Vein preservation is a key factor in ensuring that your blood vessels are in a condition to allow successful AVF formation.