



The inserter will use an ultrasound machine to locate the jugular vein in your neck

SEBASTIAN POPETZ/ZEFA/CORBIS

What I tell my patients about temporary neckline access for haemodialysis

What is a neckline?

A neckline is a special plastic tube, about the length of a pencil, which is inserted into a large vein in the neck called the internal jugular vein. The line is often placed on the right side of the neck but it can be placed on the left if the vein on that side is more suitable. The tip of the line lies in a large vein that enters the heart (see Figure 1 on page 16). A typical neckline consists of two separate tubes that join as the line enters the body, but remain two separate channels within the line, one to bring blood out of the body to the dialysis machine and one to return blood to the bloodstream.

Why do I need a neckline?

Haemodialysis is necessary to purify your blood when your own kidneys are not functioning adequately. It is a therapy that requires regular access to the bloodstream. A neckline (this term is

commonly used to describe a haemodialysis catheter) allows your dialysis nurses to take your blood from your bloodstream, pass it through the haemodialysis machine and the artificial kidney that will purify it and then return it to you. Necklines are only a temporary measure but can be used for several weeks if necessary.

Overview of different types of vascular access

There are various types of vascular (blood vessel) access available for haemodialysis and most renal patients will use each type at some stage. They all have a range of benefits and disadvantages.

Temporary line

Temporary lines can either be placed in the neck or in the groin. Temporary lines allow immediate access to the bloodstream for haemodialysis. A temporary line placed in the

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neck can stay in for up to three weeks; however, a line in the groin can only stay in for two or three days if it is needed for haemodialysis.

Tunnelled line

A tunnelled line is sometimes known as a semi-permanent or permanent line. Tunnelled lines are used to allow access to the bloodstream in patients who are having haemodialysis who do not have an arteriovenous fistula (AVF). Tunnelled lines differ from temporary lines in that they can stay in for a number of months, sometimes years. Tunnelled lines are inserted using radiological guidance during a minor surgical procedure. X-ray and ultrasound are used to ensure that the tips of the catheter are placed at the point where the vein enters the heart. The other ends of the catheter are tunnelled under the skin and emerge on the wall of the chest; this means that the lines are not visible in the neck. To prevent infection, the line inserter will wear a sterile gown and gloves and will use surgical drapes to cover the patient's chest and face. You will usually remain awake during the procedure and will be given local anaesthetic; a light sedation can also be given if needed. Usually patients will only require admission as a day case to have the line inserted. However,

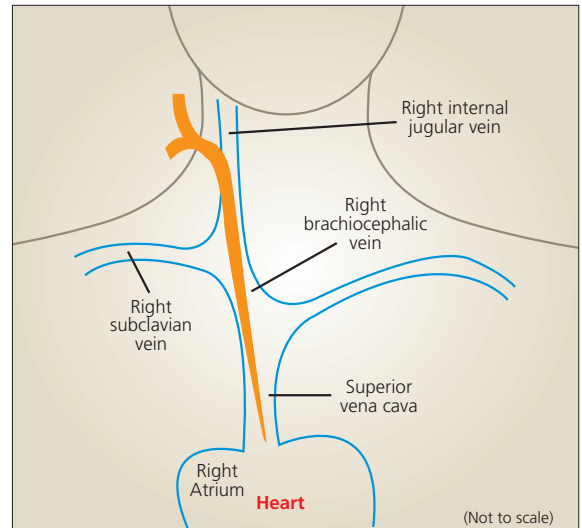


Figure 1. The tip of the haemodialysis line (coloured red in the diagram) lies in a large vein that enters the heart

occasionally it may be necessary to stay overnight after the procedure. The tunnelled line may be uncomfortable for the first day or so after insertion and simple painkillers, such as paracetamol, can be taken. There will also be a few (maybe four or five) stitches in the neck following the insertion of the line – these will be removed after ten to 14 days.

The tunnelled line has two sides to it – a red side and a blue side – and it is used in the same way as a temporary line.

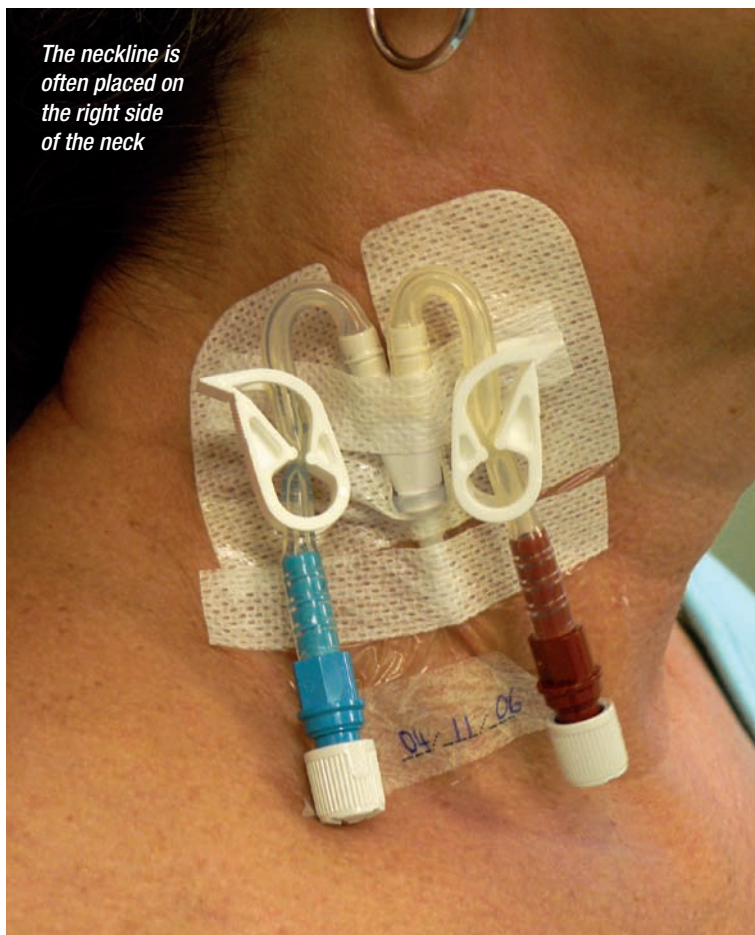
Early complications that may occur when the tunnelled line is inserted are similar to those described in the temporary neckline section.

As these lines are tunnelled underneath the skin they are much less likely than temporary lines to become infected. They also sit more comfortably on the chest and can be taped to the skin or tucked into clothing to prevent movement.

The two major disadvantages of tunnelled lines are infection and narrowing of the central veins. Patients experiencing any of the complications detailed for necklines in Box 1 (page 17) are encouraged to contact their renal unit instantly. Their doctor will prescribe antibiotics, which will either be given orally or intravenously, to treat any infection. Occasionally, the catheter cannot be saved as the infection is too serious or does not get better with antibiotics. The line will need to be removed and replaced with a new one. Narrowing of the central veins may make the formation of an AVF more challenging.

Arteriovenous fistula

This is the most advantageous type of haemodialysis access as an AVF is less likely to clot or to become infected than a line. However, a



fistula requires that you have suitable veins and arteries for formation and needs six to 12 weeks to 'mature' before it can be used, so planning is required to have the fistula formed and ready to use when you need to start dialysis.

The surgeon will create the AVF by connecting a vein to the side of an artery. When the artery and vein are connected, more blood flows into the vein and it will enlarge and get stronger. Needles can then be inserted into the fistula for haemodialysis. You will probably be awake during surgery to form the fistula and you will have a local anaesthetic (although you may be given a general anaesthetic). The surgery is often done as a day case, although some patients may need an overnight stay. A level of discomfort is usual after the surgery, although paracetamol is usually sufficient to ease the pain.

There are complications associated with the surgery, but they are rare. They include:

- The new AVF not working
- The new AVF working too well
- The new AVF stealing the blood supply from the hand.

These complications will require further surgical assessment. Bleeding occasionally occurs and can be controlled with compression.

You will have an opportunity to discuss these issues with the surgeon before the surgery.

Care of your AVF

Following its formation, you will be taught to touch the fistula and feel a buzzing sensation – called 'the thrill' – caused by the arterial blood in the vein. If the thrill disappears, this may mean that the fistula has become blocked. You should check for the thrill twice a day and contact the renal unit immediately if the thrill is absent – it may be possible to get the fistula working again.

You will be taught to protect the AVF by:

- Keeping it clean at all times
- Only allowing the fistula to be used for dialysis (intravenous drugs should be given into the veins in the back of the hands or the front of your elbow. This applies to both arms, as you may need a fistula in your other arm in the future. The fistula should not be used for giving intravenous drugs except in an emergency)
- Not bumping, bruising or cutting the fistula
- Avoiding blood pressure measurements on the fistula arm
- Avoiding wearing tight clothes or a watch over the fistula site
- Avoiding lifting heavy objects or putting pressure on the fistula arm.

How is the temporary line inserted?

The procedure will usually be performed in the ward's treatment or clinic room. You will be asked to lie on a couch or bed that will be tilted so that your head is lower than your feet. This makes the insertion procedure easier. You will have someone with you throughout the procedure.

To reduce the risk of infection, the person inserting the line will wear a gown and gloves and your chest and neck will be thoroughly cleaned with an antiseptic solution – this will feel cold as it is applied. It is also necessary to cover the area with sterile drapes; these will be placed to maintain your comfort as much as possible.

You will remain awake and a local anaesthetic will be injected into the area, and you may have light sedation if you wish. Local anaesthetic numbs the area but it does sting slightly as it is injected. Once the skin is numb, the only sensation you should feel is a pushing sensation as the line is placed in the vein.

The person inserting the line will use an ultrasound machine to locate the vein in your neck. This is achieved by applying a smooth probe to your skin and you will feel only gentle pressure from it on the surface of your skin. Once the vein has been located, a small needle is inserted into it. A guide wire is then fed through the needle into the vein, after which the needle is removed. The line can then be passed over the wire and into the vein in your neck.

The neckline will be stitched into place using two stitches, which will prevent the line falling

Box 1. Complications associated with the neckline procedure

- 1. Bruising** – Sometimes bruising can occur around the site of insertion and, occasionally, it may spread onto your chest. You may feel uncomfortable for a day or two – you can take a painkiller, such as paracetamol, if necessary
- 2. Abnormal heart rhythms causing palpitations** – If you feel palpitations or feel faint as you are having the line put in you must tell the inserter
- 3. Bleeding** – It is usual, and unavoidable, to lose some blood during the neckline procedure
- 4. Pneumothorax (air in the chest)** – This is a rare complication. The procedure can cause part of the lung to deflate. Before the line is used for dialysis you will have a chest X-ray to check that this has not happened. The X-ray will also confirm that the line is in the right position
- 5. Artery puncture** – This is uncommon as the inserter uses the ultrasound machine to locate the veins. If the artery is punctured, firm pressure will need to be applied to the site for at least ten minutes
- 6. Rupture of major veins feeding the heart or the heart itself** – These are very rare complications and require urgent treatment



Box 2. Taking care of your neckline

Your dialysis access is very important and there are several things that you can do to help care for the line

1. Do not pinch, poke, bend or pull your neckline
2. Do not use sharp objects, such as scissors, around your neckline
3. Do not get your neckline wet in the shower
4. You must telephone your dialysis unit or the renal ward immediately, day or night, for advice if you experience any of the following:

- a) You feel unwell with a high temperature, chills, shivering or sweating. These are symptoms of infection, which must be treated promptly. The line will have to be removed and you will need to be given antibiotics
- b) Pain, redness, soreness or swelling around the exit site of the line, which may indicate infection. Again, you may need antibiotics
- c) The stitches holding the line in place break. The line will be more likely to fall out if the

- stitches break or become dislodged. If the line does fall out you must apply firm pressure to the exit site (hole) until the bleeding stops. Do not worry – the bleeding will stop
- d) The neckline falls out. If this happens, apply pressure to the exit site to stop any bleeding
 - e) One of the caps comes off the end of the line. The clamp on the line must be clamped off at all times to stop blood flowing out of the line

out. A dressing will then be placed over the site where the line enters your neck.

During the procedure your heartbeat will be monitored. To do this, three sticky pads are placed on your chest and are then connected to an electrocardiogram (ECG) machine. If you feel any palpitations during the procedure you must tell the inserter immediately. Box 1 on page 17 details possible complications of neckline insertion.

It usually takes between 25 and 40 minutes to insert the neckline, although this may vary from patient to patient.

You will be able to eat and drink normally before and after the neckline is inserted.

How will my neckline be used?

The red side of your neckline is used to take blood from your bloodstream to pass it through the artificial kidney so that it can be purified. It is then returned via the blue side of the line. When your dialysis has finished, the nurse will flush the two channels using normal saline. Heparin, which stops any blood in the line clotting, will be left in the lines until the next dialysis session, when it will be removed before the dialysis commences.

Alternative access sites

Necklines are used as an immediate and temporary access to the bloodstream when a patient needs dialysis. A very similar catheter can be inserted into your groin area to allow access to the bloodstream. This is called a femoral line. Because of the position of this catheter the risk of infection is higher than with a neckline. Femoral lines can be used as an alternative to necklines. They can be inserted before haemodialysis and then removed afterwards or they can be kept in for two to three days if it is thought that haemodialysis will be needed daily. However, having a femoral line means that you will not be able to walk around or go home as the line will damage the vein when your leg moves, and is more likely to fall out.

Understanding the complications of neckline insertion

There are complications associated with the insertion procedure. You will be asked to sign a consent form before the procedure takes place. It is important to discuss the insertion procedure, the complications and their treatment with your doctor or the inserter before you give consent.

Taking care of your neckline

You will need to keep your neckline and exit site clean and dry at all times. Although the dialysis nurses will clean the exit site at each dialysis treatment as necessary and apply a waterproof dressing, you should avoid getting it excessively wet when you bathe or shower. Box 2 lists things you can do to help care for your line.

If in doubt

We tell all our patients to ring the unit should they have any concerns at all about their neckline ■



If you would like to receive additional copies of this feature, please send your request to BIRM Patient Information, Hayward Medical Communications, The Pines, Fordham Road, Newmarket CB8 7LG.

Key points

- Haemodialysis is necessary to purify your blood when your own kidneys are not functioning adequately.
- A neckline is a special plastic tube, about the length of a pencil, which is inserted into a large vein in the neck called the internal jugular vein.
- Necklines are used as an immediate and temporary access to the bloodstream when a patient needs dialysis.
- Although the dialysis nurses will clean the neckline exit site at each dialysis treatment as necessary and apply a waterproof dressing, you should avoid getting it excessively wet when you bathe or shower.