

NEPHROLOGY ASSOCIATES OF MICHIGAN

VASCULAR ACCESS FOR HEMODIALYSIS: PATIENT EDUCATION GUIDE

Introduction:

You are likely reading this because either you or a close family member or friend has a diagnosis of chronic kidney disease and may need to start dialysis therapy at some time in the future. Over 350,000 people in the United States are currently receiving dialysis.

What is hemodialysis?

Dialysis is a treatment that cleans toxins and excess fluid out of your blood through use of an artificial kidney when your natural kidneys are no longer able to do this adequately.

How is blood delivered to the artificial kidney?

A vascular access must be surgically created to use as a pathway for blood to enter the artificial kidney for cleaning. Blood is removed, cleaned then returned to the patient.

Is there more than one type of vascular access for hemodialysis?

Yes, there are three types of vascular access for hemodialysis.

1. Fistula

- a. A fistula is created by a vascular surgeon who uses your own natural vein and connects it to an artery. Fistula's are usually created in your right or left arm.
- b. After the surgery, increased blood flow through the vein increases the size and strengthens the walls of the vein. Increased size and strength of the blood vessels allow for repeated use of the access and sufficient blood flow for dialysis treatments.
- c. A fistula is completely under the skin. There are no tubes or catheters sticking out from your skin.
- d. Blood is accessed through needles, similar to having an Intravenous line placed (IV). A line is started and connected to the artificial kidney.
- e. The fistula is the preferred dialyses access due to a lower rate of infection other complications. It has also been shown that people with fistulas live longer in comparison with other accesses.

2. Graft

- a. A graft is created by a vascular surgeon who surgically connects a gortex (synthetic) tube connecting an artery to a vein. The surgeon may choose to create a graft instead of a fistula based on the size or condition of your blood vessels.
- b. A graft is completely under the skin. There are no tubes or catheters sticking out from your skin.

- c. Blood is accessed through needles, similar to having an intravenous line placed (IV). A line is started and connected to the artificial kidney.
- d. A graft is next in line to the fistula. It is a good access but does not usually last as long as the fistula and has a higher risk of complications.

3. Catheter

- a. The catheter is a device that is surgically inserted into a neck vein and viewed as a temporary dialysis access.
- b. The catheter enters the blood vessel through the neck or upper chest region. The tip of the catheter extends into one of the chambers of your heart.
- c. Two catheter tubes hang out of the body about 6 inches long and remain there as long as you have the catheter.
- d. The two catheter tubes outside of the body are attached to the artificial kidney as an access to your blood.
- e. The catheter has the highest rate of complications when compared to the fistula or graft. The most common risk is infection.
- f. Catheters are associated with decreased survival rates.
- g. The catheter is viewed as a temporary dialysis access and to be used as needed until a permanent access such as a fistula or graft is ready for use.

Planning for a Permanent Dialysis Access (Fistula or Graft)

What are the steps?

1. Protecting your blood vessels.

- a. The patient may be asked to protect his or her's blood vessels in case a dialysis access is required. This is usually asked when kidney function is around 35%.
- b. To protect the blood vessels the patient will be asked to avoid blood pressure checks, blood draws and intravenous lines in their non-dominant arm. For example if the patient is right handed, you would protect your left arm.
- c. Blood draws, intravenous lines and blood pressure checks can damage the blood vessels.

2. Vein mapping is the next step towards creation of a permanent vascular access.

- a. When kidney function is less than 20% the patient will be sent to a vascular access center for a vein mapping performed by a certified interventional nephrologist.
- b. Blood pressures will be checked in both arms.
- c. A test using ultrasound technique will be performed on both arms to determine the size and depth of your veins and the strength of your pulses.
- d. A dye will be injected into the veins of both arms and a special x-ray taken to see inside the veins for additional information.
- e. Based on test results permanent access recommendations will be made and sent to the surgeon.
- f. Vein mapping results helps the surgeon decide the best place to put the access and the type of access placed (fistula or graft).

3. Surgical evaluation.

- a. After the vein mapping an appointment will be made for the patient to see a vascular surgeon
- b. The surgeon will review the vein mapping report and recommend the best access for the patient.
- c. Surgery will be scheduled. A preoperative history and physical is required and provided by the vascular surgery department.

When it is time to have a dialysis access placed?

It is best if a fistula or graft is placed and ready for use when the patient is in need of dialysis. The nephrologist must therefore begin vascular access planning before the patient needs dialysis with the following considerations:

- a. Optimally, the patient should be referred for a permanent access such as a fistula or graft several months before the start of dialysis.
- b. Fistula's usually required 6 to 8 weeks for healing and vein development before it can be used.
- c. A graft usually requires 4 weeks for healing and readiness for use.
- d. A catheter can be placed in an emergency situation if dialysis must be started before a fistula or graft is ready for use.
- e. Early placement of a fistula or graft helps to avoid the need for catheter placement.
- f. The patient does **not need** to start dialysis when the permanent access is healed and ready for use.

The Surgery, Vascular access Placement.

What does the surgery involve?

Placement of a fistula is usually an outpatient surgery; however, in some cases patients may be admitted overnight.

1. The Fistula
 - a. The surgeon will make a small incision on the patient's arm close to the artery.
 - b. The selected vein is then attached to the artery.
2. The Graft
 - a. The surgeon makes an incision in the arm over an artery and a vein.
 - b. The synthetic tubing (piece of gortex plastic) surgically connects the artery to the vein.

Do patients have pain after the surgery? How is the pain managed?

Yes, patients will likely feel mild or moderate pain after the surgery. The vascular surgeon will provide the patient with a prescription for pain pills to help with post surgical pain. Keeping the arm elevated on pillows and applying ice packs after the surgery helps to reduce surgical pain and swelling.

How is the access cared for after the surgery?

1. The surgeon will provide the patient with postsurgical discharge instructions.
2. A surgical dressing is usually placed on the new access at the end of the surgery. Discharge instructions state when the bandage should be removed. Bandages are frequently removed by a nurse during the first post surgical office visit.
3. Signs of infection should be reported immediately to the surgeon. These signs include fevers, chills, redness, heat, swelling or drainage.
4. Keep all recommended appointments with the surgeon and kidney doctor for follow up.

What are the signs that the dialysis access is ready for use?

1. **The Fistula**
 - a. Increased blood flows through the fistula gradually increase the size of the vein over 5 to 6 weeks. This is called fistula development and most often referred to as maturation of the fistula. When the fistula has “matured” it is ready for use.
 - b. The vein of a matured fistula can be felt and sometimes observed under the skin.
2. **The Graft**
 - a. A graft is ready for use after the surgical site has completely healed.
 - b. The graft does not increase in size.
 - c. Mild Swelling over the graft site is common and should resolve over a few weeks.
3. **Healing:** The vascular surgeon, vascular nurse and kidney doctor will monitor fistula maturation surgical healing, and determine when the access is ready for use.

After the fistula or graft is placed, and healed how does the patient care for the access? Why is access care important?

It is important for the patient to monitor their access daily and observe for complications. Early detection and treatment of problems help to avoid missed dialysis treatments. and improve quality of life for the patient.

Patient Responsibilities for their access Include:

1. **Look at the access daily.**
 - a. Look for changes in skin color, swelling, redness, drainage and bumps or ballooning out of the blood vessels.
 - b. If the access is in use and the patient is on dialysis, scabs may be present from the needle sticks. These scabs should remain in place and not forcibly removed. In some cases scabs will be removed by the dialysis staff at your treatment.
2. **Listen (stethoscope required)**

A low pitched, continuous whooshing sound should be heard using a stethoscope. This sound is called a **bruit**.

- a. Place the stethoscope over the incision line and move up the entire length of the access.
- b. The sound should be strongest at the incision and gradually fade as you move along the access.
- c. If you hear a high pitched or whistling noise this is not normal.**
- d. If a stethoscope is not available listen with your ear opposite the side of the access.

3. Feel

Feel for a buzzing sensation over the access.

- a. Run your hand along the length of the access, starting at the incision.
- b. The thrill should be strongest at the incision and gradually fade as you move along the access.
- c. The fistula should feel soft and easily compressed
- d. A graft is firm and feels like a tube
- e. If you feel a strong pulse in the fistula or graft instead of a gentle thrill this is not normal.**

4. General fistula and graft care:

- a. Daily washing of your access with soap and water. Keep the access clean.
- b. Do not sleep on your access arm as this may reduce circulation in the arm.
- c. No heavy lifting with your access arm.
- d. No blood pressure checks, blood draws or IV lines using your access arm.
- e. Avoid tight clothing and jewelry on your access arm.

5. General care of catheters:

- a. The dressing should be kept clean and dry
- b. The dressing should only be changed by the dialysis staff
- c. Avoid use of sharp instruments like scissors or knives near your catheter
- d. The catheter should never be used for anything except dialysis. Do not allow use of your catheter for blood draws or medication administration other than at dialysis.
- e. Report fevers, chills, drainage, pain or redness from the catheter exit site to your nephrologist, nurse practitioner or dialysis nurse immediately as these are signs of infection and may require treatment.

- 6. The vascular access team includes the patient, kidney doctor, nurse practitioner, interventionalist, surgeon, nurse and dialysis technician.

Remember: a permanent access can make a difference in how you feel and lead to longer life spans.

This document is based on the document ""Patient Education Program Talking Points Vascular Access Planning, Placement and Care"" by RMS Lifeline inc. 2011.