

# UNDERSTANDING YOUR HEMODIALYSIS ACCESS OPTIONS





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What is a vascular access? A vascular access is a place on your body close to a vein and artery. This place on your body allows “access” to your blood stream using two needles which connects to the kidney “replacement” machine which allows removal of “bad” and return of “good” blood to your body. The job of the kidney machine is to clean your blood. This clean blood goes back into your body through your vascular access. About 15 tablespoons of blood is cleaned and returned

(about the size of a small bottle of water) each minute of your treatment. Your vascular access is like a conveyor belt that keeps the kidney machine running and keeps you healthy!

This brochure describes common kinds of vascular access. AAKP divides this brochure into two sections. The first section describes long-lasting kinds of vascular access. The second section describes short-term vascular access. This brochure also tells you how doctors make your vascular access. This brochure includes the benefits and challenges of each kind of vascular access.

AAKP hopes this brochure will help you understand more about the different kinds of vascular access. After learning about vascular access, you can help your doctor decide what kind is best for you. Your doctors may recommend HEMODIALYSIS, to treat your end-stage kidney disease (ESKD).

End stage kidney disease is a medical term meaning your kidneys don't work well enough to keep you healthy.

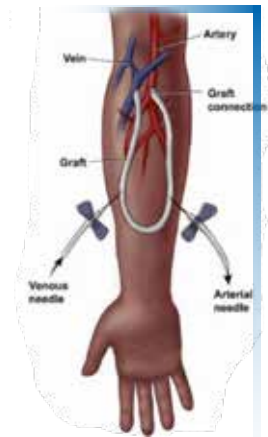
During HEMODIALYSIS, the artificial kidney machine pumps your blood from your body to the artificial kidney through a flexible, plastic tube which is connected to your vascular access site. Your blood is cleaned while in the dialysis machine. The dialysis machine returns your cleaned blood to your body through a separate tube. When a drop of blood leaves your body, another drop of blood comes back to your body after it is cleaned. Some people call the vascular access site “your lifeline.”

# YOUR DOCTORS CAN MAKE TWO KINDS OF VASCULAR ACCESS FOR HEMODIALYSIS

The first kind is completely COVERED by your skin. The second type is a plastic tube going from one of your large veins THROUGH your skin.

## *The Two Kinds “Covered By Your Skin”*

Doctors often select which type of access is going to be made by using a machine called an ultrasound which helps measure and “map” blood vessel sizes and flow. They use this information to select the best artery and vein to connect. You and your doctors can choose from two kinds of “under-your-skin” vascular access.



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## ARTERIOVENOUS FISTULA

The first choice of “under-your-skin” access is called an “AVF.” AVF means “Arterio-Venous Fistula.” The word “fistula” means a “connection.” This option is generally felt to be the best choice. This procedure can now be performed in one of two ways.

The first way is for a surgeon to make a small surgical incision over the artery and vein and then sew them together. The joining of these blood vessels is called an AVF (fistula).

Until recently, surgery was the only way to create an AVF and sometimes that could lead to delays. Now, a second way to perform this operation may be used without needing “surgery” and avoiding needing to go to

an operating room. This newest method of joining the blood vessels is called a “percutaneous” fistula. Instead of a cut, a special device is used to join the blood vessels together through a small needle stick or sticks. For many people who can get this type of access it is often safer and faster. It can usually avoid a skin incision and lessen the normal discomfort that may occur from an “traditional” operation. You should ask if your doctor offers this type of surgery.

## ARTERIOVENOUS GRAFT

The other kind of “under-your-skin” vascular access is called a “graft.” This kind of vascular access is not a direct connection between your artery and vein. Instead, doctors connect one of

your arteries to one of your veins by using an artificial tube or bridge called a “graft.” The graft is an artificial blood vessel usually made from soft, rubbery plastic, but can be made from specially prepared blood vessels. A graft is like an AVF. Both are “under- the skin.” A graft is different from an AVF because a graft is an artificial blood vessel. An AVF is made entirely from your own blood vessels. Artificial grafts are more prone to get plugged with clots or get infected.

Both AVFs and grafts require some time to heal before they can be used for dialysis treatments. The healing times vary from days to months. AVFs take longer to “mature” and become ready to use for dialysis.

Both grafts and AVFs require putting two needles through your skin, into the “Under-the-Skin” vascular access. This is done for every dialysis treatment. One needle takes blood out of your body for cleaning. The other needle returns cleaned blood back to you. Few people like the thought of having needles through their skin for every dialysis treatment. But it turns out that temporary needles are much, much safer than having a plastic tube that sticks through your skin 24 hours per day, 7 days per week. Anything that sticks through your skin all the time is much more likely to let germs (bacteria) into your blood stream. Infection in the blood stream is very serious and can require hospitalization and can even be fatal.

## THE KIND OF VASCULAR ACCESS THAT “STICKS OUT” THROUGH YOUR SKIN

### CATHETER

When you have kidney disease, dialysis can mean the difference between life and death. More than 850 million people around the world have chronic kidney

disease. In the United States, nearly 50 million patients have chronic kidney disease. There are more than 700 thousand patients who have end stage kidney disease and more 500 thousand patients are treated with hemodialysis, and

many start dialysis using a special type of catheter called a tunneled central venous catheter.

Healthcare professionals all agree that an AVF (fistula) should be the first choice for a dialysis access, followed by an AVG (graft) as a second choice. However, when those access types aren't an option, the use of a catheter for hemodialysis is necessary.

A catheter is a y-shaped tube made of soft plastic that sticks out of the skin on the neck, chest or leg. There are two openings, one for removing your blood and the other for returning the cleaned blood to your body in the same way as a fistula or graft. A doctor or other healthcare provider places the end of the catheter into a large vein.

These types of hemodialysis catheters are known as CVC's (central venous catheters) and are most often used as a temporary way to access the bloodstream to begin dialysis treatments.

Sometimes a CVC is also used in people who have a new AV fistula or graft, but need to start dialysis before the fistula or graft is ready for use. Once the fistula is "mature," the catheter should be removed.

In some rare cases, a catheter is used for a longer period if there are no other options for a permanent access such as when a patient's blood vessels are not healthy enough for a fistula or a graft.

Dialysis patients who use hemodialysis catheters have a higher risk of death, infection, and heart problems than patients using other access types and it is very important to talk to your healthcare provider about your permanent access plans.

Some dialysis patients prefer catheters to other accesses, usually because catheters don't require needles to connect to the hemodialysis machine or because they believe their kidney function will return in a few months. It's important to understand why a permanent access plan is safer for you. There are several reasons for this. First, part of the catheter is outside the body and so it is at high risk for infections. Clots can form inside the opening of the catheter or form on the outside of the catheter and block the opening. Blood flow through a catheter may be at a lower than the rate prescribed by your doctor which means your dialysis treatment will be

incomplete or require a much longer treatment time to remove toxins and fluids that have built up between treatments. Infection can occur even with a good blood flow rate because catheters are a type of plastic and have no ability to fight infection the way your own body does. Any infection of a catheter can injure or even destroy the heart valves which is a very serious emergency which can become fatal. Catheters can seriously injure and scar the veins that drain blood to the heart which may cause irreversible damage preventing future permanent dialysis access options. Because of these risks, you cannot safely get a catheter wet, and showering and bathing can become impossible.

Unfortunately many people who need to start unplanned dialysis or short term dialysis will need a catheter. Also, some dialysis patients will need one if their fistula or graft needs to be repaired. It's important to realize that of the three main access options, catheters are the most prone to infection.

Here are some very important things to remember. If you have a catheter you are 4 times more likely to have an access related

infection than those with an AV fistula or an AV graft. Compared with patients with who have fistulas, those using hemodialysis catheters have a 50 percent higher risk of dying, a 40 percent greater risk of developing a major heart problem and more than twice the risk of developing a deadly infection.

By avoiding catheters as an initial or ongoing dialysis access, you can lower your risks for death, infections and heart trouble. If you must use a hemodialysis catheter, switching to a fistula or graft can help you avoid life threatening complications and may even save your life.

*The following guidelines can help make all types of vascular access work better and work longer:*

**Wear a Medical Alert bracelet.** A Medical Alert bracelet can notify health care providers you are on dialysis and the location and type of your vascular access.

**Ask nurses and doctors not to take blood pressures in the arm with the graft or AVF.** Ask people who take your blood not to take blood from the veins in the same arm as the graft or AVF. If they



don't listen to your request, you should kindly refuse to let them take your blood pressure or take your blood. Ask to speak to a supervisor if you need to. Be kind but be firm.

**Pay attention to the machine during dialysis.** Your vascular access may not be working well enough if the blood flow speed is too slow to allow for good cleaning. If the pressure in the vascular access is too high (like a moving car trying to squeeze through a tunnel that is too narrow), the blood cleaning may

not be good enough to keep you healthy. Ask your dialysis staff what the flow rate and pressure in the vascular access should be for good blood cleaning. By keeping informed you can understand why the dialysis machine makes an alarm noise when these flow rates and pressures are not good enough to allow a good blood cleaning. If the alarms happen too often or can't be improved, then you can help make decisions about how the vascular access can be improved to allow for good blood cleaning.

# SUMMARY OF BENEFITS AND CHALLENGES OF THE DIFFERENT KINDS OF VASCULAR ACCESS:

AV FISTULA	
BENEFITS	CHALLENGES
<ul style="list-style-type: none"> <li>• Considered the best vascular access</li> <li>• Less chance of infection than other types of access</li> <li>• Often lasts many years</li> <li>• Fast blood flow, allows the best blood cleaning</li> </ul>	<ul style="list-style-type: none"> <li>• Visible under the skin on the forearm</li> <li>• May take weeks to months to develop</li> <li>• AVF placement requires long term planning, care of arm veins, early surgery to be ready for use when you need to start long term dialysis</li> <li>• May require a catheter while fistula heals and develops</li> <li>• Need to watch for bleeding after needles are removed</li> <li>• Some fistulas may fail to mature or grow correctly.</li> <li>• It's important to get AVF surgery months before you need to start dialysis and as soon as possible if you already have begun dialysis with a catheter.</li> </ul>

GRAFTS	
BENEFITS	CHALLENGES
<ul style="list-style-type: none"> <li>• Can be easily placed like AVF's.</li> <li>• Predictable performance</li> <li>• Can be used sooner after surgery than an AV fistula (within days to 3 or 4 weeks)</li> <li>• If a graft stops working well, often it can be converted to an AVF further up the arm (even if an AVF could not be placed originally).</li> </ul>	<ul style="list-style-type: none"> <li>• Increased potential for clotting</li> <li>• Increased potential for infection</li> <li>• Does not usually last as long as an AV fistula</li> <li>• Survival of graft patients is lower than fistula patients</li> </ul>

# CARE FOR FISTULA AND GRAFTS

Find out if your vascular access is an AVF or a synthetic AV Graft. You need to know the direction the blood is flowing in your access. You also need to know which area the dialysis staff is using for the arterial and venous needle placements. The arterial needle takes blood out of you. The venous needle returns blood to you. You need to make sure the dialysis staff person inserts the needles in the proper direction to the blood flow. The staff person must also connect the bloodlines red to red and blue to blue.

Learn how to properly hold the patches after the staff person removes the dialysis needle. Also, learn how to put pressure on a needle site in case it bleeds after dialysis. Keep an emergency supply of gauze dressings and tape in your pocket or purse. Reapply a clean dressing if the needle sites bleed on the way home from dialysis.

If blood leaks out of a needle site at home, apply pressure on the site with a dressing below the bleeding site. Call 911 immediately.

Wash the skin over the access with soap and water daily and before dialysis. Ask how your skin should be cleaned before the needles are inserted. Make certain

the staff is using proper ways to prepare your skin before inserting the needles into the access. Ask if you can learn to wash and clean your own skin and then follow what you are taught. Ask if you can learn to clean your skin AND put your own needles into your vascular access. Thousands of people place and remove their own needles. It might sound difficult or scary now. It won't be difficult or scary once you learn how and practice with a nurse or technician helping you. Medical studies show it is better to put in and take out your own needles than having other people do it. If you learn to place and remove your own needles, you will always have the person who knows your vascular access the best doing the job ... YOU!

## **Watch for signs of infection.**

These may include redness, tenderness or pus, or you might feel a fever or chill. Cleanliness is one of the most important ways to prevent infection. Dialysis staff will teach how to do this. Report any signs of infection to your doctor or nurse immediately. If you think there is a problem with your dialysis access do not wait to have it examined by a dialysis team member or your doctor. You should never rely on someone else to make the best decision for you or your family.

## FEEL — LISTEN — LOOK

Your dialysis staff will teach you the following tricks for monitoring your vascular access.

- Feel your access with your fingertips and check for a “thrill” (vibration) every day. Check also after you experience low blood pressure, dizziness or light-headedness. If you cannot feel a “thrill”, listen to your access for a “bruit” (swishing sound – pronounced “bru-eee”) with a stethoscope if you have one. Some people can hear the “bruit” just by holding the arm to their ear. If you do not think your access is working, contact your dialysis unit or doctor immediately. They will arrange to have the surgeon or radiology specialist look at you to be sure that you get the support and treatment you need.
- Try not to carry heavy items draped over the access arm or wear tight fitting clothing over the access arm or leg. It is important to try not to sleep on top of the access arm or leg. In other words, the arm with the vascular access should not be under your body when you sleep.
- If your fistula or graft develops an aneurysm (looks like a small balloon like you might see on an old bicycle tire), tell your doctor or nurse immediately. You may need surgery or simply to be closely watched for a while.
- Your dialysis staff should change the needle site each dialysis treatment to prevent an aneurysm from forming or enlarging. Do not allow putting a needle through an aneurysm, due to danger of bleeding.

Develop a close relationship with your patient care technician and nurse. Don't be afraid to remind them to change needle sites for each treatment. Be kind, but if necessary, be firm. If there is a disagreement, ask kindly to speak to the nurse in charge, the director of nursing, or the dialysis administrator. You can learn a lot about caring for your access from your healthcare team. You may even want to learn to put your own needles in for each treatment – called self-cannulation.

# CATHETERS

CATHETERS	
BENEFITS	CHALLENGES
<ul style="list-style-type: none"><li>• Dialysis can be performed immediately</li><li>• Easily inserted as an outpatient procedure</li><li>• Can usually be removed and replaced</li><li>• Avoids the need for needle sticks</li></ul>	<ul style="list-style-type: none"><li>• Poor option as a long-term blood access and should be a transition to a more permanent option when possible.</li><li>• High infection rates</li><li>• May not provide enough blood flow to allow for adequate blood cleaning</li><li>• May cause narrowed veins that can prevent future placement of AVFs or grafts</li><li>• Swimming and taking baths are not recommended because of infection risks</li></ul>

## CARE OF CATHETERS

Your dialysis staff will teach you all of the following ways to care for your catheter.

- Your catheter exit site should be cleaned with each dialysis treatment. Place clean dry gauze on it. You must wear a surgical mask over your mouth and nose for the dressing change. The right kind of mask will be given to you by your dialysis staff every time you need to wear a mask. Also, wear the mask when connecting or disconnecting the catheter to the machine tubing.
- You should wear a mask any time your dialysis catheter's screw cap is removed. Ask your dialysis staff what the catheter cleansing and dressing procedure is for your unit. Also, ask how you should care for the catheter at home.
- Some catheters have "cuffs". Others don't. For non-cuffed catheters, the sutures (stitches) must remain in place for as long as you have the catheter. For tunneled (tunneled under your skin for several inches before sticking out of your skin) and cuffed catheters, your doctor should remove

the stitches once the catheter is in place and healed. This will help decrease the risk of a skin infection around the catheter.



Pictured above is a catheter clamp.

- Your catheter caps must remain on your catheter. The dialysis staff are the only ones to remove them. The clamps must remain closed at all times, unless the catheter is attached to a dialysis machine and the dialysis has begun. The dialysis staff are the only people who should use your catheter unless your doctor says otherwise. If the clamp comes undone, close the clamp immediately. If a catheter cap becomes loose and falls off, make sure the catheter remains clamped. Go directly to your dialysis center or emergency room. You should get this taken care of immediately.



Pictured above is a catheter clamp.

When the cap is off, you could get an infection or air could get into your bloodstream and cause a serious complication. If any part of the catheter develops a hole, leak or part separation you must make sure the catheter is clamped off above the problem area. The catheter clamp may be movable and can be slid up on the body of the catheter to close off the catheter, or you may need to kink the catheter with your fingers to block the catheter and then call 911. If blood leaks out, air can enter and cause an air embolism. You need immediate help to prevent serious injury. Don't worry, your dialysis staff can teach you about all of these things as often as you want.

# GLOSSARY

**Access Site** - The site on your body where blood is removed and returned during dialysis.

**Aneurysm** - An abnormal enlargement of a blood vessel. Aneurysms may occur around an access site in the form of what appears to be a small balloon.

**Arterial** - Characterized or related to the function of the arteries.

**Arteriovenous** - Term used in dialysis to refer to a connection between an artery and a vein. An arteriovenous connection is used to create fistulas for hemodialysis treatment.

**Bruit** - Any of several abnormal sounds produced by an artery.

**Catheter** - Used for exchanging blood to and from the hemodialysis machine from the patient.

**Exit Site** - The site where the catheter comes out.

**Hemodialysis** - A treatment where a dialysis machine is used to filter wastes, salts and fluid from the body when your kidneys can no longer do it adequately. It is the most common way to treat advanced kidney failure.

**Jugular** - Related to the jugular vein, located in the region of the neck or throat.

**Native Fistula** - A type of vascular access created by connecting a patient's own artery to his own vein using no artificial parts.

**Occlude** - To close or obstruct.

**Stenosis** - A narrowing in the width of a blood vessel.

**Subclavian** - Related to the subclavian artery or vein, located beneath the clavicle.

**Suture** - Material used to surgically close a wound or join tissues

**Thrill** - A tremor or vibration in the circulatory system.

**Tunneled Catheter** - A specialized type of catheter that is "tunneled" or placed under the skin.

**Vascular** - Related to the arteries or veins.

**Venous** - Characterized or related to the function of the veins.



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