

The Vascular Access Experience...

Before, During & After



Network 8, Inc.

Serving the ESRD Communities of
Alabama, Mississippi, and Tennessee

Objectives

This series will help you to learn:

- 1.The different types of vascular accesses
- 2.How, when, and why vascular accesses are used
- 3.How to care for your access
- 4.Potential complications of vascular accesses
- 5.Other important information about vascular accesses

It will also tell you:

- 1.What you need to know before you get an access.
2. What will happen during the process of receiving an access.
3. What to do after you have your new access.

An Introduction to the Vascular Access

Question: What is a vascular access?

Answer: A vascular access is something that is placed in your body so you can receive a dialysis treatment.

Question: Why do I need a vascular access for a dialysis treatment?

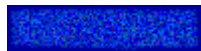
Answer: You need an access for dialysis so:

- Blood can be removed from your body,
- Cleaned by the dialysis machine, and then,
- Returned back to your body.

Types of Vascular Accesses

1. Graft
2. Fistula
3. Central Venous Catheter

Central Venous Catheters



Before,
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Before..... What Are Central Venous Catheters?

What Is a Central Venous Catheter?

- A Y-shaped tube that is placed in a vein in your neck.
- The top part of the catheter is outside the body. The bottom part is inside the body with the tip at the entrance to the heart (See Pictures #1, #2, #3, and #4).

Why is a Central Venous Catheter Used?

- This type of access is used for 3 reasons.
 1. For dialysis treatments until your graft or fistula is ready to be used.
 2. For dialysis treatments when your graft or fistula is not working.
 3. For dialysis treatments if you will not have a graft or fistula.
 - Only a small number of people on hemodialysis who have run out of other access sites (poor veins) should be using a catheter as a permanent access.
 - **It is intended to be a temporary access.**

Central Venous Catheter

How Does It Work?

- The catheter has two internal sides. One side will pull “dirty” blood out of the body and the other side will put “clean” blood back into the body. (See Pictures #1 and #2).

How Is The Catheter Put in My Body?

- The doctor will cut a small opening in your neck and place the catheter directly in a large vein.
- Once the catheter is in the vein, it will be guided to the entrance of the heart.
(See Picture #3)

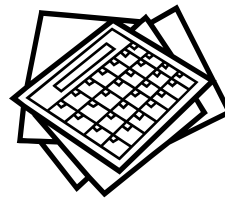
Central Venous Catheters

When Can It Be Used?



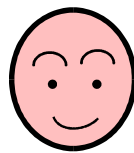
- Once the doctor inserts the catheter, it can be used right away.

How Long Will It Be Used?



- Once a graft or fistula is working, the catheter should be removed.
- It takes at least 6 weeks – 2 months for a **fistula** to be ready for dialysis treatments.
- It takes at least 7 – 10 days for a **graft** to be ready for dialysis treatments.

What Are the Advantages?



- Can be inserted and removed easily.
- Can be inserted at bedside, in the emergency room, or outpatient unit.
- Can be used immediately for dialysis.
- No needle sticks are necessary for dialysis treatments.
- Does not require surgery for insertion.

What Are the Disadvantages?



- Catheters get infected easily.
- Catheter may not work well if it gets a kink.
- Catheters may cause discomfort in the neck area.
- Catheters clot frequently, leading to a slower blood flow.
- If blood flow is slower, the amount of blood to be cleaned is decreased.
- Swimming and bathing is not recommended.
 - The water contains bacteria that could cause infection if it comes in contact with the catheter or blood.

During.....

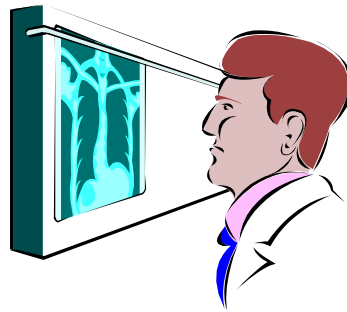
Central Venous Catheter Insertion

- The decision about where to place the catheter depends on how long the catheter has to remain in place.
- A doctor or specially-trained nurse will put the dialysis catheter:
 - in the side of your neck or
 - in your chest below the collarbone, or
 - in your groin.
- It is usually put in under local anesthesia, but general anesthesia may be used.
- You should not feel any pain when the tube is being put in, but you may feel soreness for a few days afterwards.

The Procedure:

- First, your chest is cleaned with an antiseptic solution.
- A small cut is made in the skin near your collarbone, neck, or groin. This is called the *insertion/exit site* (See Pictures #3 & #4).

- The tip of the tube is threaded into a large vein.
- The tube is then guided until the tip reaches the heart (See Picture #3).
- Sutures (*stitches*) will be in place (*at the suture wing*) to make sure the catheter does not ease out of the insertion/exit site.
- Once the tube is inserted, you will have a chest x-ray to make sure that the tube is in the right place.



- When the tube has been inserted, you will have dressings covering the insertion/exit site (See Picture #4).

- For a few days you may have some pain or discomfort where the tube has been tunneled under the skin.
- A mild painkiller will help to ease the pain or discomfort.

After..... Taking Care of Your Central Venous Catheter

Who Can Use It?

- Only the dialysis team should be using your dialysis catheter.
- Do not let anyone else, even a doctor or nurse, use your dialysis catheter unless it is an emergency.

Risk of Infection

- It is possible for an infection to develop either inside the central line or around the exit site.

- You should contact a healthcare professional if:

- The exit site becomes red or swollen or painful.
- You notice discolored fluid coming from it.
- You develop a temperature.
- You will be given antibiotics but if these do not clear the infection from the line, it may have to be removed.



Preventing Infection

- It is important to keep the catheter site clean by keeping a bandage on it all of the time.
- The staff in the dialysis clinic will change the bandage every time you dialyze.
- The exit site will also need to be cleaned at least once a week to reduce the risk of infection.
- Ask your dialysis care team to teach you how to change dressings in an emergency.
- Keep an emergency dressing kit at home in case you need to change your dressing between treatments.

- Wear a mask over you nose and mouth anytime the catheter is opened to prevent bacteria from entering the catheter and your bloodstream.
- Professionals changing the dressing should wear a mask and gloves as well.



- You should not take showers, but may take baths.
- Do not swim with your catheter.

Clothing Issues

- You should wear clothing that will not tug or pull on the catheter.
- If your catheter is in your neck or chest, wear a buttoned shirt when you go to dialysis so the staff can use the catheter without pulling on it.



Clots

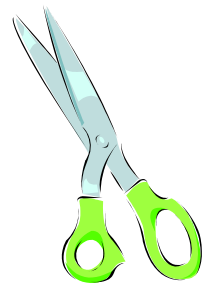
- It is possible for a blood clot to form at the tip of the line. You may be given a blood thinner to prevent this.
- When the central line is not being used there is a small risk that it may become blocked. To stop this from happening, a small amount of fluid is “flushed” into the line using a syringe. This is usually done after each dialysis treatment.
- If a clot does form, there is the possibility that the catheter will have to be removed or medicine given to remove the clot.

Air in the Catheter

- No air must be allowed to get into your central line.
- The clamps should always be closed when the line is not in use.
- The line must not be left unclamped when the caps are not in place.

Break or Cut in the Catheter

- It is important that you do not get a break or cut in the line.
- Do not use scissors or sharp objects near the line.
- If the line does get cut or split, try to clamp it between the split and the exit site (where it comes out of your body).
- The line may be repaired, but if not, it will be removed.



Problems to Report



Let the dialysis nurse or doctor know:

- 1.if your catheter is hurting you,
- 2.if you see any blood or other fluid on the bandage,
- 3.if you feel ill or have a fever.

- Let them know if you have pulled or tugged on your catheter by mistake so it can be examined closely.
- Also, tell the nurse or doctor if someone else used the catheter (even though you tried to prevent it)
- If the area around your catheter feels sore or looks red, call your dialysis care team at once.

References/Central Venous Catheters

1. Central Lines

a. Cancerbackup at

<http://www.cancerbackup.org>

2. Choosing Your Hemodialysis Vascular Access

a. *Family Focus* by Bobbie Knotek

3. Getting the Most From Your Treatment: What You Need to Know About Your Access

a. National Kidney Foundation

4. Hemodialysis Catheters: How to Keep Yours Working Well

a. National Kidney Foundation at

<http://www.kidney.org>

5. Understanding Your Hemodialysis Options

a. American Association of Kidney Patients
(booklet)

6. What is a Hemodialysis Access and How Does it Work?

a. AAKP Patient Plan, Phase 1: Diagnosis to Treatment Choice

Grafts



Before,
During & After

Before: What are Grafts?

What Is a Graft?

- A piece of man-made material that is:
 - b. Shaped like a straw or hollow tube
 - c. Rubbery
 - d. Bendable
 - e. Soft
- (See Picture #1).

How Is It Put in My Body?

- The graft is surgically placed under the skin.
- One end of the graft is attached to one of your arteries and the other end is attached to a vein (See Picture #2).
- Can be placed in the lower or upper arm but is sometimes placed in the leg.
- The surgery is often done with local anesthesia in an outpatient unit.
- Sometimes surgery is inpatient with a hospital stay.

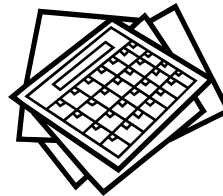
How Does A Graft Work?

- The nurse or technician will place two needles into the graft at the beginning of each treatment (**See Picture #2**).
- Blood will be pulled out of the body and through the needle that is in the artery side, then cleaned in the dialysis machine, and returned through the needle at the venous end.



When Can It Be Used?

- The graft is usually ready to be used as soon as the surgical swelling goes down
- This usually takes about 2-3 weeks.
- Some people may take up to 6 weeks depending on the condition of their arteries and veins.

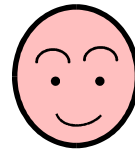


How Long Will It Be Used?

- The man-made material is not your own blood vessel (*artery or vein*), so when dialysis is finished and the needles are removed, the hole will not heal.

- As a result, there will be a lot of holes in the graft after many dialysis treatments (See **Picture #3**).
- The graft may need to be replaced once every 1-2 years.
- A graft is considered a permanent access.

What Are the Advantages?



- Shorter healing time compared to fistula.
- May be easier to stick than a poorly developed fistula.
- A good alternative if veins are blocked or too small to use a fistula.
- Can be readily implanted.
- Can be used faster than a fistula (within 3-4 weeks).

What Are the Disadvantages?



- Clots faster than a fistula.
- Grafts are more likely to get infected than fistulas.
- Grafts may require 2-3 procedures in one year for clotting problems.

- More likely to develop complications such as clotting, infection, and stenosis.
- Complications may require graft replacement or revision.
- Usually does not last as long as a fistula.

During.....Graft Insertion

- The graft is inserted under the skin in your arm (*below or above the elbow*).
- One end is attached to an artery and the other end is attached to a vein
- The graft functions like an artificial vein.
- Because the graft material is used, there are two (2) anastomosis (*connection*) sites.
- One is between the artery and the graft, called the arterial anastomosis.
- The other is between the vein and the graft.
- Blood flows from your artery through the arterial anastomosis, through the graft, through the venous anastomosis, and finally through the vein.

*******(See Picture #4)*******

After…… What Will Happen Now?

After the Operation

- Keep the access raised above your heart to reduce swelling and pain.
- Your surgeon may recommend an over-the-counter painkiller to relieve pain, if necessary.

Days After the Operation

- Keep the incision dry for at least 2 days after the procedure.
- Do not soak or scrub the incision until it has healed.

Weeks After the Operation

- Avoid lifting more than 15 pounds or other activities that stress or compress the access area, such as digging.
- Report pain, swelling, or bleeding immediately to your doctor, especially if these symptoms are getting worse.

After…… Taking Care of Your Graft

- Wash your graft with an antibacterial soap each day, and always before dialysis.
- Do not scratch your skin or pick the scab.
- Check for redness, a feeling of excess warmth or the beginning of a pimple on any area of your access.
- Ask your dialysis care team to rotate the needles when you have your dialysis treatment (*unless you are using the buttonhole technique*).
- Check the blood flow several times each day by feeling for a vibration, also called a **pulse or thrill**. If you do not feel this, or if there is a change, call your doctor or your dialysis center.
- Do not wear tight clothes or jewelry on your access arm.



- Do not carry anything heavy or do anything that would put pressure on the access.
- Do not sleep with your head on the arm that has your access arm.
- Do not let anyone use a blood pressure cuff on your access arm.
- Do not let anyone draw blood from your access arm.

- Apply only gentle pressure to the access site after the needle is removed. Too much pressure will stop the flow of blood through the access.
- If you have bleeding after you leave the dialysis unit, apply gentle pressure to the needle site with a clean towel or gauze pad.
- If the bleeding does not stop in 30 minutes, call your doctor or your dialysis center.



References/Grafts

1. Access Options for Dialysis
 - a. *Family Focus* by Randy Brieterman–White and William Nylander
2. Choosing Your Hemodialysis Vascular Access
 - a. *Family Focus* by Bobbie Knotek
3. Dialysis Access
 - a. <http://vascularweb.org> by Society for Vascular Surgery
4. Hemodialysis for Kidney Failure: Is It Right for You?
 - a. Urinary Health at <http://health.yahoo.topic/urinary/treatment>
5. How Your Access Works
 - a. National Kidney Foundation: A to Z Health Guide Item at <http://www.kidney.org>
6. Just the Facts: Vascular Access
 - a. Life Options Rehabilitation Program at www.lifeoptions.org
7. Navigating the Vascular “SEAS” – Self-Exam Access Simplified
 - a. *ESRD Network #12* by Kimberly F. Thompson, Dr. Scott O. Trerotola, and
i. Dr. Gerald A. Beathard
8. Understanding Kidney Failure and Selecting a Treatment Modality
 - a. Network 8, Inc.

Fistulas



Before,
During & After

Before: What are Fistulas?

What Is a Fistula?

- A vascular access that is created by joining together your own artery and vein. (See **Picture #1**).

How Does It Work?

- The connection between your artery and a nearby vein increases blood flow through the vein.
- With the increased blood flow, your vein stretches and becomes larger, thicker, and stronger.
- This allows a greater amount of blood to pass through the vein and allows your dialysis to proceed efficiently.

How Is It Put in My Body?

It is usually placed in your:

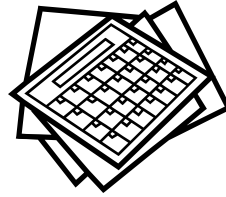
- Lower forearm (*most often*)
- Upper forearm (*used if the access in the lower forearm fails or if arteries/veins in forearm are unsuitable for a fistula.*)
- Leg

When Can It Be Used?



- It usually takes 6 weeks to 4 months for the vein to get big enough to use.

How Long Will It Be Used?



- Even though you have to wait longer to use a fistula, it is considered a permanent access.

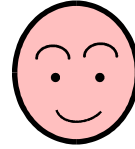
Vessel Mapping

- Vein or vessel mapping tells the surgeon:
 - where your blood vessels are located
 - how large and deep they are, and
 - if they are healthy enough to be used for a fistula.
- Vein or vessel mapping helps the doctor evaluate the flow of blood through your arteries and veins.
- Vein or vessel mapping uses ultrasound waves to make a picture of the blood going through your blood vessels.

- The doctors can then make a roadmap of your veins and arteries.



What Are the Advantages?



- Lower rate of complications such as clotting, infection, and stenosis.
- Lasts longer and works longer. Tends to last many years.
- Fewer hospitalizations related to access problems.
- Improved performance over time.
- Considered the best vascular access.
- Less chance of infection than other types of accesses.
- Needs fewer follow-up procedures to keep it working, which means fewer hospital visits.
- A fistula may only need 2-3 follow-up procedures in 20 years.

What Are the Disadvantages?



- Length of time to heal (*6 weeks – 2 months*).
- Must have adequate blood vessels for fistula to be created.
- Some patients find the enlarged fistula physically unattractive.
- May require temporary access while fistula matures (*e.g., central venous catheter*).
- Not feasible for all patients if there are other medical conditions that affect blood vessels, like high blood pressure and diabetes.
- Fistulas may fail to mature.

During.....Fistula Creation

- A fistula is created by a surgeon using a good quality vein and artery.
- The surgeon connects the artery and vein together (See Picture #1).
- The point where the connection is made is called an anastomosis (See Picture #2).
- Some of the blood from your artery flows through the anastomosis and into the vein used to create your fistula.
- The blood flowing through your artery and into the fistula is faster than the blood that the vein typically receives.
- The higher blood flow causes the vein to get bigger and walls to toughen or “thicken”.
- The thickening of the walls and the larger size of the vein is called “maturing.”
- Your fistula must mature before the dialysis needles can be used for your treatment.
- Once mature, the fistula will be able to provide enough blood flow for a successful dialysis treatment (See Picture #1).
- It usually takes 3 months for a fistula to mature, however, some may take longer.

- Please note that the artery is NEVER stuck. Only the vein/fistula is stuck with needles (See Picture #1).

After…… What Will Happen Now?

After the Operation

- Keep the access raised above your heart to reduce swelling and pain.
- Your surgeon may recommend an over-the-counter painkiller to relieve pain, if necessary.

Days After the Operation

- Keep the incision dry for at least 2 days after the procedure.
- Do not soak or scrub the incision until it has healed.

Weeks After the Operation

- Avoid lifting more than 15 pounds or other activities that stress or compress the access area, such as digging.
- Report pain, swelling, or bleeding immediately to your doctor, especially if these symptoms are getting worse.

After..... Taking Care of Your Fistula

Exercises

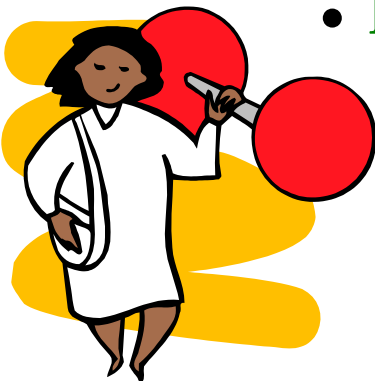
- Exercising your arm before and after surgery may encourage development and maturation of a fistula.

Exercise Examples

Forearm Fistula

- **Ball Squeeze** – squeeze a rolled-up washcloth or a “squeeze” ball. Squeeze and release rapidly for 10 minutes, 6 times a day.

Upper Arm Fistula



- **Bicep Curl** – a useful household weight is a can of vegetables. Holding the can, curl your arm slowly up and down for 10 minutes, 6 times daily. You can also use a 2-3 pound weight.

- Wash your fistula with an antibacterial soap each day, and always before dialysis.
- Do not scratch your skin or pick the scab.

- Check for redness, swelling, a feeling of excess warmth or the beginning of a pimple on any area of your access.
- Make sure your fingers stay pink and warm, that you can move them easily, and you do not have pain.



Notify your doctor or surgeon immediately if:

1. Your bruit becomes weaker or a lot stronger.
 2. Your access arm or leg begins to feel hot or cold.
 3. Your access arm or leg begins to swell.
 4. You feel pain in your access.
- Ask your dialysis care team to rotate the needles when you have your dialysis treatment (*unless you are using the buttonhole technique*).
 - Check the blood flow several times each day by feeling for a vibration, also called a pulse or **thrill**. Also check for a **bruit**, which is a sound that is heard when listening to your fistula.

- If a thrill is not felt or a bruit is heard, call your doctor or your dialysis center.
- Do not wear tight clothes or jewelry on your access arm.
- Do not carry anything heavy or do anything that would put pressure on the access, like grocery bag handles or a purse.
- Do not sleep with your head on the arm that has your access arm.
- Do not let anyone use a blood pressure cuff on your access arm.
- Do not let anyone draw blood from your access arm.
- Do not let anyone put an IV in arm or leg that has a working fistula.



- Apply only gentle pressure to the access site after the needle is removed. Too much pressure will stop the flow of blood through the access.
- If you have bleeding after you leave the dialysis unit, apply gentle pressure to the needle site with a clean towel or gauze pad.
- If the bleeding does not stop in 30 minutes, call your doctor or your dialysis center.

References/Fistulas

1. Access Options for Dialysis
 - a. *Family Focus* by Randy Brieterman-White and William Nylander
2. Caring for and Developing Your New Fistula
 - a. Heartland Kidney Network (Network 12)
3. Choosing Your Hemodialysis Vascular Access
 - a. *Family Focus* by Bobbie Knotek
4. Dialysis Access
 - a. <http://vascularweb.org> by Society for Vascular Surgery
5. Doppler Studies and Vessel Mapping
 - a. Heartland Kidney Network (Network 12)
6. Understanding Kidney Failure and Selecting a Treatment Modality
 - a. Network 8, Inc.