Vascular Access Fact Sheet

American Nephrology Nurses’ Association

ANNA’s Mission Statement

ANNA promotes excellence in and appreciation of nephrology nursing so we can make a positive difference for people with kidney disease.

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I. Overview

Before beginning hemodialysis, a patient will need to have a vascular access in place. The vascular access will allow entry into the patient’s bloodstream. The access will allow the patient’s blood to travel to the dialysis machine so toxins, wastes, and extra fluid may be removed before returning the blood back to the patient. There are three types of vascular accesses: the arterio venous fistula (AVF), the arterio venous graft (AVG), and the central venous catheter. Each access requires a surgical procedure. Vascular accesses can be placed in the arms, legs, neck, or chest.

A vascular access should be placed well in advance to beginning dialysis so the access will be ready. A fistula or graft will require 4 to 12 weeks to mature prior to the first use. A fistula can be accessed earlier depending on rate of maturation, but it requires an order from the nephrologist or surgeon before accessing. A person who has sudden kidney failure that will require immediate dialysis will have a central catheter placed for dialysis. The catheter will be used until an AVF or AVG can be placed and is ready for use. The catheter should always be the last access option. In some cases, a catheter may be the permanent access for dialysis.

II. Arterio Venous Fistula (AVF)

An AVF is created surgically by connecting an artery and a vein, and is usually placed in the arm. As the AVF matures, the vein will grow bigger and stronger from the blood flow of the artery. The fistula can provide good blood flow for many years of dialysis. Recent studies have shown that patients with AVFs have the least amount of complications, such as infections or clotting. Not everyone may be able to have an AVF placed due to weak veins or arteries, or other medical conditions. This is a discussion that the physician should have with the patient. The patient should ask for a fistula first. The fistula is considered the “gold standard” access:

• Lower risk of infections than other types of access.
• Lower risk of clotting than other types of access.
• Better performance than other types of access.
• Better blood flow rates.
• Longer lasting.
• Can be used for many years.

III. Arterio Venous Graft (AVG)

The AVG is similar to a fistula but has a manufactured tubing that connects the artery and the vein together. The graft is a soft material that is made from a type of Teflon® or Gore-Tex®. Transplanted animal or human vessels may be used as grafts to connect an artery and vein. The arm is the preferred site for a graft, but the leg can also be used for graft placement. An AVG made of polytetrafluoroethylene (PTFE) can be used in 14 days provided there is no edema. The manufacturer states that a vectra graft can be utilized 24 hours after insertion; however, there have been issues.
IV. Caring for a Fistula or Graft

Good fistula or graft care will help maintain the patency of the vascular access. There are measures that can be taken to prevent clotting or infection to the access. Feel the “thrill” or vibration of blood through the access, or use a stethoscope to listen to the “bruit” or “whoosh” of blood through the access and site rotation.

The access should be kept clean and free of injury. Inspect the access for signs of infection, including pain, tenderness, swelling, and redness to the area. Infections are treated with antibiotics. The access should be washed carefully before each dialysis session. The access site will need to be cleansed according to the facility protocol to prevent infection.

The access needs to be protected from injury or restriction to prevent clotting of the access.
- Avoid tight clothing, jewelry, or pressure on the access area.
- Do not carry heavy objects across the access area.
- Avoid lying on the access site when sleeping.
- Do not allow blood to be drawn from the access arm.
- Do not allow blood pressure to be taken in the access arm.

Good needle sticks keep the access working well. The arterial and venous needle tips should be at least two (2) inches apart. The needles should not be placed near surgical scars. Assess the access to determine the location of previous needle sticks; this prevents tearing of the access. Needle stick sites should be at least one-fourth inch from previous sites. Some facilities now use the “button-hole” technique for access cannulation. This method uses the same site for each dialysis session. There is a specialized training program for the patient and health care provider before using this method. Direct pressure is applied to the needle stick sites after each needle is removed.

V. Central Catheters

A catheter is a narrow, flexible tube that is used to access the blood stream. The catheter may be inserted into a large vein in the neck, chest, or groin. There will be two tubes exiting from the insertion site. One port allows for blood to be removed from the body, and the other port allows blood to return back into the body. Catheters are ready for immediate use after insertion. The catheter that is placed in the neck or chest will need to have internal placement confirmed by X-ray prior to use. Some patients use permanent catheters, but this is not the recommended access for long-term dialysis.
- Catheters have a greater chance of becoming infected or clotting.
- Catheters have a slower blood flow, thus not cleaning the blood as well.
- Catheters are not the preferred choice of access for long-term dialysis.
- Catheters can be used immediately after placement.
- Catheters are at greater risk for central vein thrombosis or stenosis.
- Catheters cause high risk for sepsis, hemorrhage, or air embolism.

VI. Catheter Care

The catheter exit site must be kept clean and dry. The patient will not be able to swim, take showers, or soaking baths. The patient will need to take care when bathing to not get the site wet. The catheter clamps must be clamped at all times when not in use. The ends of the catheter must have caps securely in place after each dialysis session. Theses measures will help to decrease the chance of infection and will avoid air from entering the vascular system. The exit site should be assessed with each dialysis session for signs of infection, including redness, swelling, pain, fever, or drainage
from exit site. The patient and health care provider should wear a mask every time the catheter is accessed to prevent microbes from the nose and/or mouth from contaminating the catheter or exit site. Always wash your hands and wear clean or sterile gloves when caring for the catheter. Blood draws from the catheter should be performed by dialysis personnel only; do not allow non-dialysis personnel to access catheter. Catheters should be placed as a bridge to dialysis while an AVF or AVG is healing. Sites preferred for tunneled catheter insertion are the right internal jugular or the right external jugular. Non-tunneled catheters (temporary catheters that do not have an internal cuff) should be used only when use will be less than 3 weeks. Placement sites are the same for tunneled and non-tunneled catheters. Catheters placed by radiology under fluoroscopy do not require a chest X-ray prior to use.

Be careful not to pull or tug on the catheter. Scissors or other sharp objects should never be used near the catheter. Catheters may be positional, which means the catheter may work better when the patient is sitting in one position. Pay attention to what position works best for the patient so he or she achieves the best possible dialysis treatment. Should the catheter become dislodged or get pulled out, or bleeding occurs at the site, apply direct pressure to the site and proceed with the appropriate medical attention.

Advanced Practice Nursing Care (Gomez, 2011) (in addition to the above items):
1. Monitor the patient’s access by:
   • Reviewing dialysis laboratory values.
   • Reviewing dialysis adequacy.
   • Reviewing venous and arterial pressures.
   • Reviewing transonic flow rates.
   • Assessing vascular access complications (i.e. ischemia, infection, bleeding, thrombosis, inadequate flows, aneurysm).
2. Educate patient about “saving the vein” or vein preservation for future access creation.
3. Order diagnostic tests (i.e. fistulogram, duplex vascular scan of access) or laboratory values as appropriate. Consult physician as warranted based on results.
4. Collaborate with nephrologist and/or formulate a vascular access team (i.e. APN, Nephrologist, Vascular Surgeon, RN, dialysis technician) to assist in evaluating the above in addition to having a plan of care for optimal dialysis access.
5. Have a plan of action for future dialysis access if current access begins to fail or fails.

VII. Resources


Other Questions:
For questions and/or concerns please contact us at _____________.

For more information about nephrology nursing, dialysis, transplantation or other renal disorders check out the American Nephrology Nurses’ Association (ANNA) Web site at www.annanurse.org.