

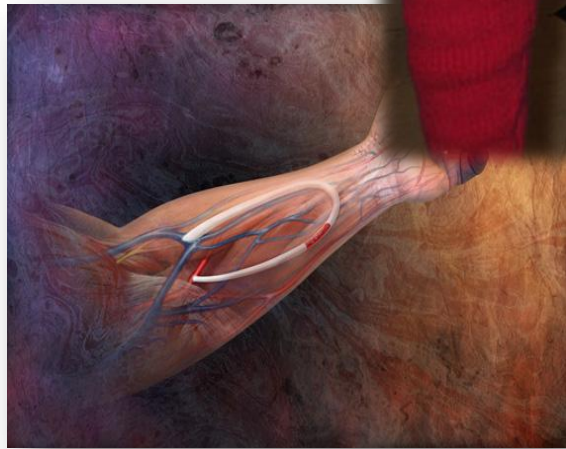


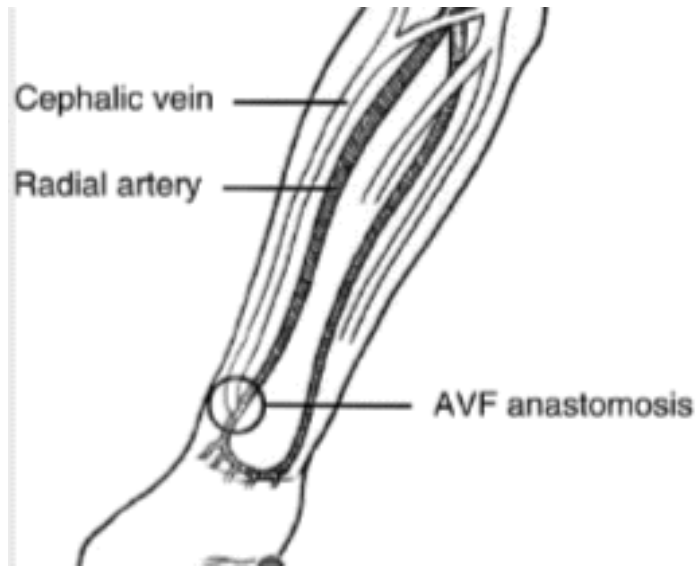
AV Fistula, Just the Basics

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Objectives

- What is an AV Fistula
- When to consider an AV fistula
- Advantages and Disadvantages
- Fistula Assessment
- Fistula Access Techniques
- Patient Teaching/Complications





Arteriovenous Fistula (AVF)

Definition:

A surgically created opening between an artery anastomosed to an adjacent/nearby vein to allow high pressure arterial blood flow into the vein to cause engorgement, enlargement, and wall thickening.

Pathophysiology

Normal blood flow in the brachial artery is 85 to 110 milliliters per minute (mL/min). After the creation of a fistula, the blood flow increases to 400 to 500 mL/min immediately, and ideally to 700 to 1,000 mL/min within 1 month. Both the artery and the vein dilate and elongate in response to the greater blood flow and shear stress, but the vein dilates more and becomes "arterialized".

This will result in maturation of the vessel and eventually allow for cannulation.

When Should a Fistula Be considered?

- Long term access is needed
 - Fistulas should be considered first followed by alternate forms of access
- After failure of a treatment due to complications of obtaining peripheral access
 - Keep in mind, alternate access must be used until the fistula has matured. A dialysis catheter should not be placed on the same side as the maturing fistula (if possible)

Fistula Placement

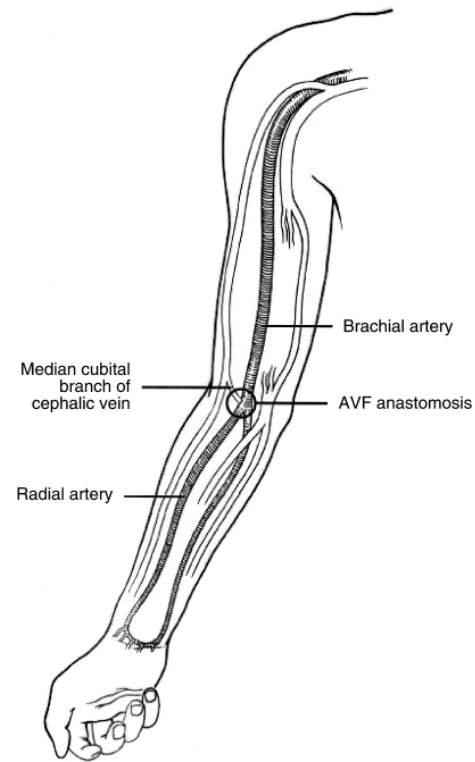
- The site for creation of the fistula is limited by the patient's suitable vasculature and the skill of the clinicians creating and caring for the fistula
- Placement is determined by assessment of the patient vasculature by the team placing the fistula

Placement In Order Of Priority

3. Brachial-basilic fistula

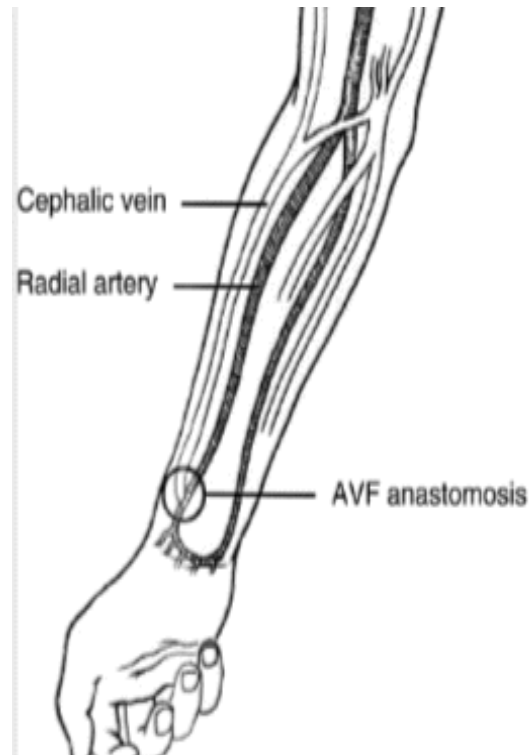


2. Brachial-cephalic fistula



Placement In Order Of Priority

1. Radial-cephalic fistula (preferred site)



Advantages with AV Fistula

- Lower risk of infection
- Lower rate of thrombosis
- Allows greater blood flow which decreases overall treatment time
- Remains functional longer than other types of vascular access
- Usually less expensive to maintain
- Alleviates potential for allergic response to synthetic materials

Advantages with AV Fistula

- Outflow veins are autogenous tissue which seals and heals itself after cannulation vs. fibrin plug formation with synthetic grafts
- Buttonhole technique can be utilized to access the vessel

Disadvantages of AV Fistula

- The vessel may fail to enlarge or increase wall thickness (i.e., fail to “mature”)
- Long maturation time (6 weeks up to several months) required resulting in the necessity for alternative access until maturation is achieved
- Fistula creation and cannulation require different skill sets than grafts and may be more difficult to cannulate

Disadvantages of AV Fistula

- Thrombosed fistulas may be more difficult to restore flow
- The enlarged vessel may be visible especially in the forearm and may be perceived as cosmetically unattractive by some individuals
- Hypertrophied outflow vein may increase cardiac output and myocardial load and may cause *steal syndrome* in patients with compromised peripheral vasculature



Fistula Assessment

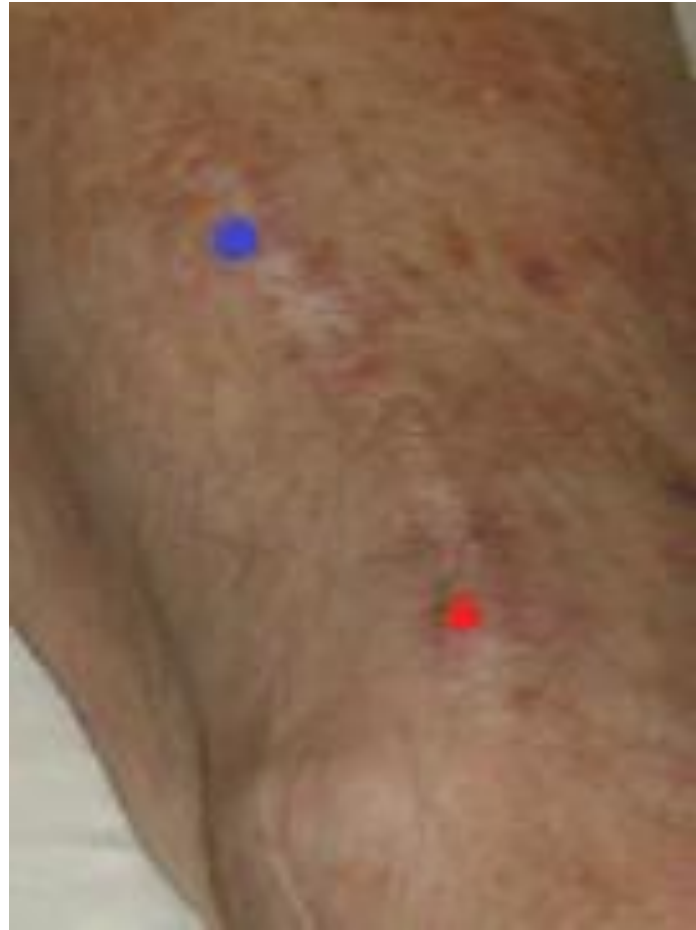
Before each treatment examine the fistula (including the surgical incisions) to determine changes from baseline. Focus on maturation/development of AV fistula and detect problems that require immediate physician notification.

**LOOK, LISTEN,
and FEEL**

Cannulation

- Good cannulation technique will help preserve the life of the fistula by lowering the incidents of complications
- ALWAYS perform proper site preparation prior to cannulation (wash with soap and water then clean with antiseptic solution, do not palpate area prior to needle insertion)
- There are 2 different strategies for using a needle on a fistula
 1. Ladder Technique: the fistula is “stuck” in a different place along the length of the vessel every time
 2. Buttonhole Technique: the needle “stick” is limited to one site which is used repeatedly

Cannulation



Cannulation

Ladder Technique

- Cannulation sites are rotated
- Site of at least 1" in length
- Avoid aneurysms
- 1.5" away from anastomosis
- 1.5" apart
- 2 new needle sites required for each treatment

Buttonhole Technique

- One/same cannulation site for access/return
- Only one person cannulates the vessel until buttonhole site develops
- Blunt tip needle used after site develops
- 1" to 1.5" minimum between needle tips
- Scab must be removed prior to cannulation

Cannulation



Cannulation

- Dialysis team is the best resource for training proper cannulation techniques and cannulation troubleshooting.
- Patients who have undergone treatments in the past with either dialysis or apheresis may be able to self-cannulate the fistula and are a great resource for gauging if there is something wrong with the cannulation

Potential Complications

- Failure to mature
- Stenosis (narrowing of vessel)
- Aneurysm
- Thrombosis
- Infection
- Steal Syndrome

Patient Teaching

Change in physical appearance of the arm is expected

- How to care for the fistula
- Signs and problems
- Who to report issues and ask questions

Patient Teaching

- Cleanliness: The skin over the access must be kept clean
- Pulse, Thrill and Bruit should be assessed every day
- Make sure the nurse/technician assess the fistula prior to EVERY treatment (look, listen, feel)
- NO blood pressures, IV's or blood draws on affected arm
- Only use the fistula for your apheresis/dialysis treatments

Patient Teaching

- Protect the arm from injury (avoid bumping, cutting, etc.)
- Maintain unrestricted blood flow
 - Avoid tight clothing or jewelry that places pressure on the access area
 - Do not carry purses, bags, or heavy items on the affected arm
 - Do not sleep with affected arm under the pillow or parts of the body.

Patient Teaching

- EXERCISE your fistula, this may encourage the development and maturation of the fistula which will make it easier for staff to access it for treatments
- Exercises can begin when pain from surgery has subsided

Patient Teaching

- Forearm Fistula Exercises:
 - BALL SQUEEZE: Squeeze and release a stress ball rapidly for 10 minutes 6 times/day. Upper bicep may be squeezed with opposite hand to create increased pressure and blood in the vein to dilate the forming fistula.
 - Clothes-pin Grasp: Squeeze a clothes-pin open and allow to close repeatedly for 5 minutes 6 times/day
 - Finger Tip Touches: touch each finger to the tip of the thumb, opening the hand completely after each touch for 5 minutes 6 times/day

Patient Teaching

- Upper Arm Fistula Exercises:
 - Hammer Curls: hold a 1 to 3 pound weight with the affected arm and pump the arm up and relax down slowly (in the same motion as hammering a nail) for 10 minutes 6 times/day
 - Bicep Curl: Hold a weight (or can of vegetables) and curl your arm slowly up and down for 10 minutes 6 times/day

Patient Teaching

- **Immediately report**

- Redness, swelling, pus, warmth/pain at the incision site
- Stiches come apart
- Bandage soaked with blood
- High temperature (100.6+)
- The thrill is gone
- Bulging in the access that was not previously there

- **SEEK CARE IMMEDIATELY** if

- Cold, blue, or numb fingers on affected arm
- The fistula starts to bleed (apply gentle pressure)
- Sudden trouble breathing or chest pain occurs

SUMMARY

- AV Fistulas provide access with the longest patency rates and need for fewest interventions
- Fistulas are typically placed in the lower and upper arm
- Proper cannulation and care will help lengthen the life of the fistula
- Fistulas must be assessed each treatment by the staff and daily by the patient
- Patient teaching is a must
- Utilize local dialysis unit/clinic as a resource for training and troubleshooting.

Summary

- DOCUMENT, DOCUMENT, DOCUMENT
 - All assessments (subjective and objective)
 - All access attempts and technique used
 - Any changes in appearance or treatment related issues
 - All Interventions and troubleshooting
- Your dialysis team is your friend
 - Consult/refer to them for questions, training, etc.

For More Information

- **National Kidney Foundation**
30 East 33rd Street
New York, NY 10016
Phone: 1-800-622-9010
www.kidney.org
- **American Association of Kidney Patients**
3505 East Frontage Road, Suite 315
Tampa FL 33607
Phone: 1-800-749-2257
www.aakp.org

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