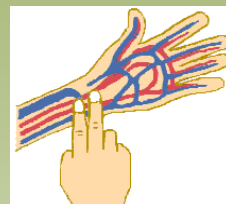
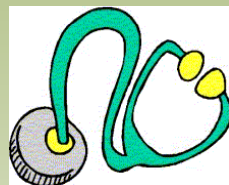
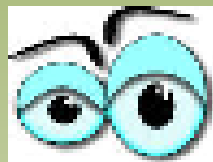


Forward to the Future: Cannulation Training & Techniques to Achieve 90% AV Fistula Rates

ESRD Network of Texas Annual Meeting

Lynda K. Ball, MSN, RN, CNN



Cannulation - Definition

The insertion of a dialysis needle into the center of the blood vessel where you achieve low arterial and venous pressures, maximum blood pump speeds, no machine alarms, and never have to flip the needle.

Cannulation is all about feel
Prevents the need to flip needles
Leads to more accurate cannulations

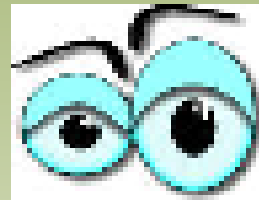
Assessment

The Dialysis Access

Look, Listen and Feel Every Time

Look for:

Swelling, aneurysms, flat spots, infection, open areas, previous sticks, color changes in skin



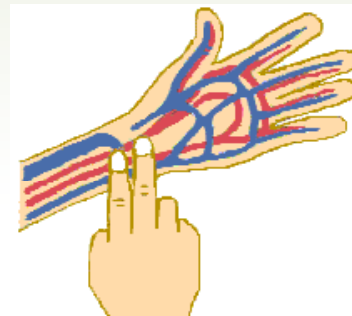
Listen for:

Bruit – continuous, low pitched; direction of flow



Feel for:

Thrill – purring or vibration, not strong pulse; temperature; flat spots; vein diameter



Cannulation of Grafts vs. Fistulae

Grafts

- Little variation in diameter
- Can be configured in different ways (loop, straight, curved)
- Very stable and firm when cannulating
- Little skill is necessary to cannulate

Fistulae

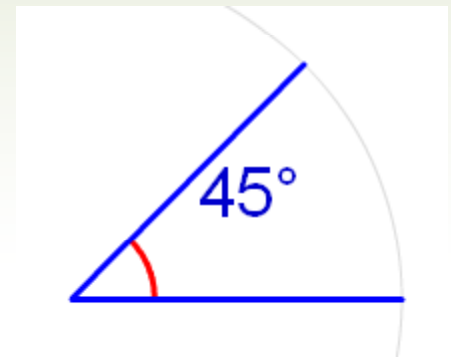
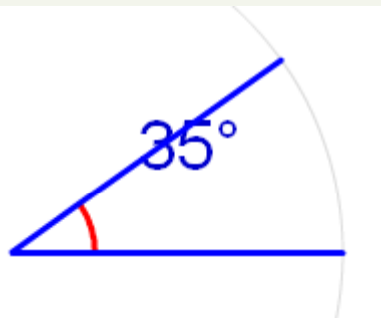
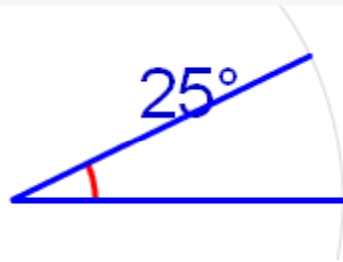
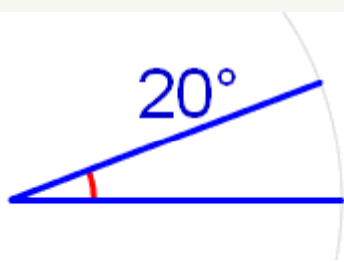
- Great variation in diameter
- Configuration is random and based on venous structure
(tortuous, straight, deep, superficial)
- Requires tourniquet to stabilize, visualize, and determine angle of entry
- High level of skill is required to cannulate

Cannulation Review – Needles

- Anastomosis
 - ~Stay 1.5" away if using antegrade
 - ~Stay 2" away if using retrograde
- Cannulation Sites
 - ~Place needles at least 1" apart
 - ~Must be visible at all times
 - ~NEVER cannulate an aneurysm

Angles of Entry

- It is not one angle for every fistula
- The angle of entry is based on the depth of the access
- Depth is determined by assessing the fistula with a tourniquet on and feeling how deep below the surface of the skin the access is
- Before cannulating an AVF, you should already know the angle of insertion



Use of Tourniquets

- **Tourniquets should be used on all AVFs regardless of age**
 - ~Firms the access, helps prevent rolling
 - ~Allows you to see it better
 - ~Allows you to feel it better
- **Place in the axilla area (armpit) lightly**
 - ~displaces pressure along entire vein
 - ~prevents chance of infiltrate in thin-walled fistulas
- **Never leave on during dialysis**
 - ~access problems require fixing

Cannulation Complications

- Aneurysms
- Pseudoaneurysms
- Stenosis

Aneurysms

- Repeated sticks in the same general area
- Weakens vessel wall and pressure of blood flow pushes weakened area out
- Skin becomes thinner – could rupture
- Patients sometimes request cannulation there because it hurts less
- NEVER stick an aneurysm



Courtesy of P. Cade

Pseudoaneurysms

- Found in grafts more than fistulae
- Wall is made up of nonvascular tissue
- Hematoma – collection of blood outside of the graft, into the tissue

Pseudoaneurysm – the real thing



Photos courtesy of Dr. Mike Silva

Stenosis Formation



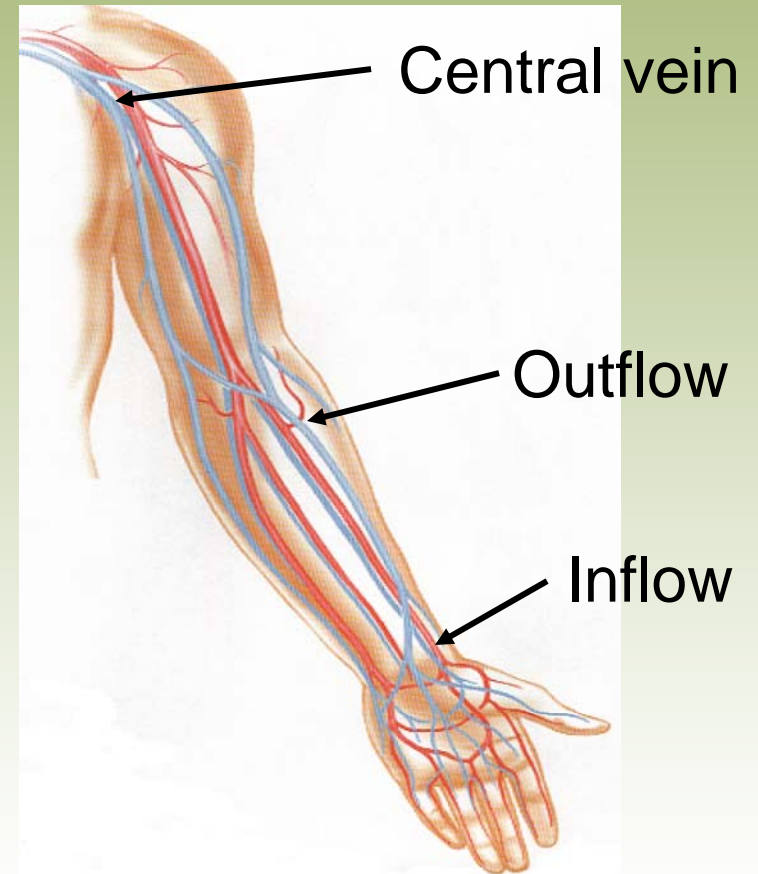
Photo: University Hospital of Cleveland

Causes

- Vessel wall injury
 - ~cannulation
 - ~surgery
 - ~catheters
 - ~aneurysms
- Disease state
- Trauma

Major Locations of Stenoses

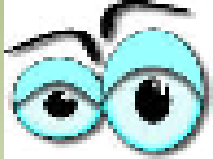
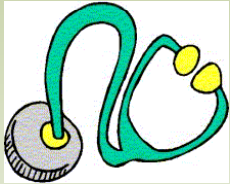
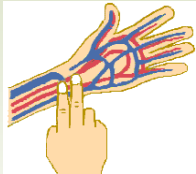
- Inflow
 - ~Juxta-anastomotic
- Outflow
- Central vein



Stenosis – How Do You Know?

- Edema of the access extremity
- Discoloration
- ↑ Venous pressures
- Recirculation
- ↓ Blood pump speeds, KT/V and URR
- Blood squirting around needles when cannulating
- Difficulty with hemostasis post dialysis

Response to Stenosis

-  for new aneurysms, and increased venous pressures
-  for changes in the bruit
-  for changes in the thrill, and enlargement of aneurysms

Cannulation

The new arteriovenous fistula

Yes, there is a difference

New AV Fistula vs. Mature AV Fistula



The newborn baby

vs.



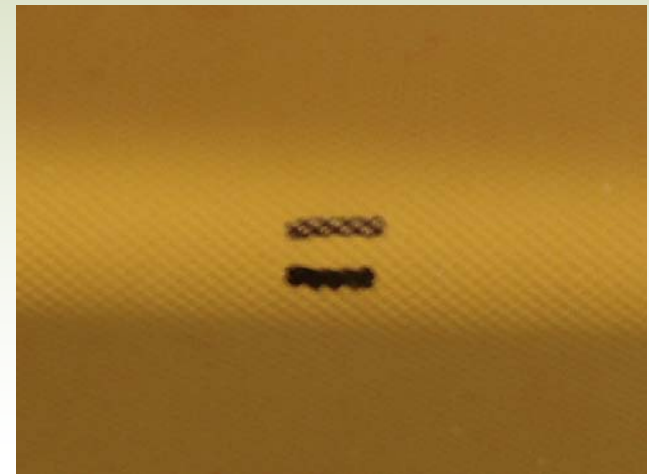
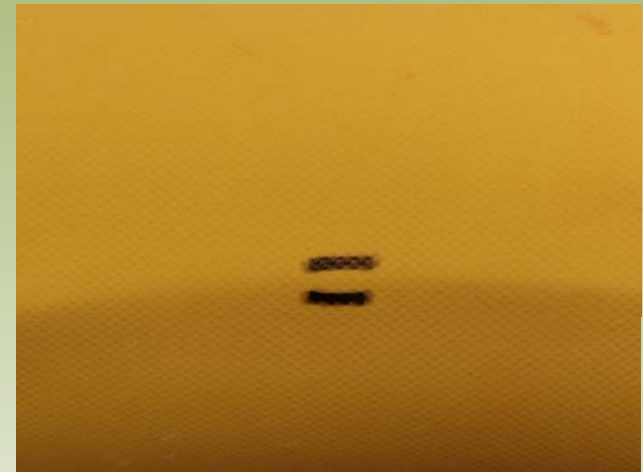
The 2-year old

New AVFs – Ready or Not?

Maturity characteristics:

- Soft and pliable → springy and firm
- Diameter of vessel increasing (2mm → 4-6 mm)
- Thrill – strong, non-pulsatile
- Bruit – low pitched; continuous

**IF IN DOUBT –
DON'T STICK IT!**



Causes of Non-Development

- Location, location, location
- Diseased vessels
- Poor cardiac output
- Accessory veins
- Juxta-anastomotic stenosis

Cannulation

The new access on the block

Determining Direction of Flow

- Compress at the curve of a graft or middle of an AVF
- Blood is dammed up when compressed, so flow will only be on one side
- Listen for side with the bruit – that's the arterial side

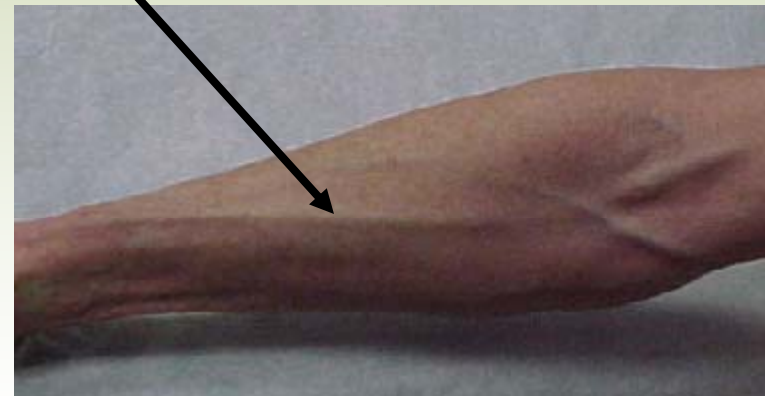
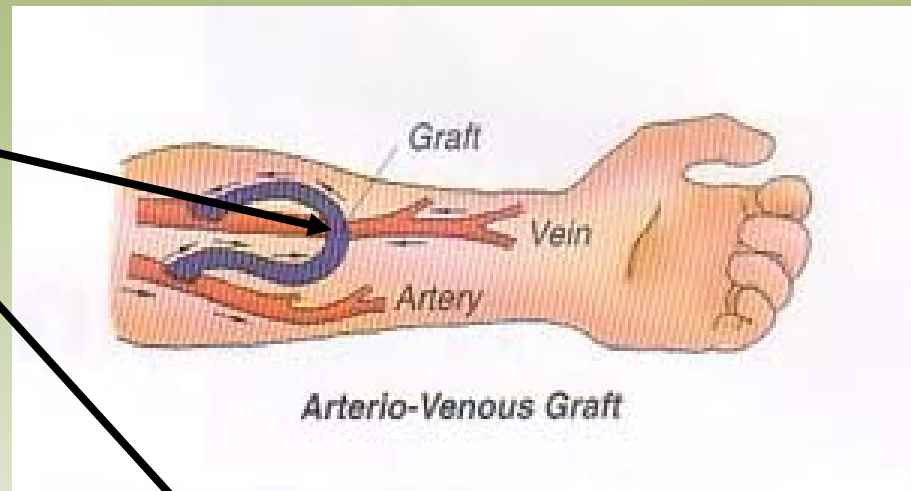
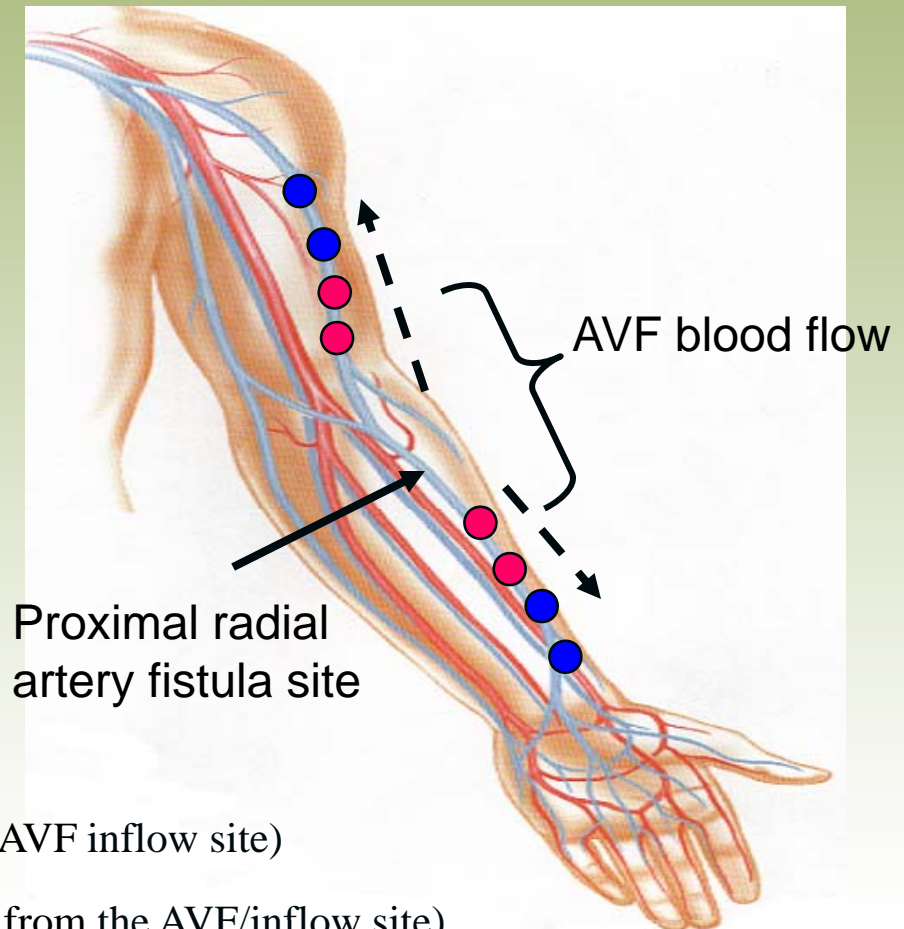


Photo courtesy of Dr. Vo Nguyen

Reverse Flow - Proximal Radial Artery AVF

- Some fistulae have flow in the opposite direction
- Get drawing post surgery
- Compress fistula in the middle and auscultate



- Arterial puncture sites (closer to the AVF inflow site)
- Venous puncture sites (down stream from the AVF/inflow site)

Questions?

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206.923.0716 (fax)

www.nwrenalnetwork.org/fist1st/ffcannu.htm and

Also visit:

www.fistulafirst.org - Change Concept #8