Access for Hemodialysis

- AVF-arterio-venous fistula
- AVG-arterio-venous graft
- Catheter-temporary or permanent
Dialysis Accesses

- The Fistula is the patient’s own natural vein that has been attached to a near-by artery via an anastomosis.

- It takes 1-3 months for an AVF to mature and become strong enough to use a large gauge needle and achieve quality BFRs.
An anastomosis is a surgical connection. In a vascular access, the anastomosis is the spot where a vein and artery are joined to form a fistula, or where the artificial vein is joined to the patient’s artery and vein for a graft. Dialysis needles should not be inserted into the area of the anastomosis.
Dialysis Accesses

Pros

- The AVF is the ‘GOLD Standard’ for hemodialysis accesses.
- It lasts longer
- Has fewer infections
- Has fewer complications like rejection, stenosis, and clotting.
Dialysis Accesses

- **Cons**
  - The main disadvantage is that the AVF takes 4-6 weeks to mature and sometimes longer.
  - Some fistula fail to mature at all, but it is not often.
  - Side veins off of the AVF (accessory veins) can reduce pressure in the fistula causing it to fail.
  - The chosen vessel may be too small (<2mm) and unable to develop.
Dialysis Accesses

- How far must you stick away from an anastomosis?
  - Two finger breadths from the anastomosis
Dialysis Accesses

What is an arteriovenous graft (AVG)?
Dialysis Accesses

- An AVG is an artificial blood vessel used to connect an artery and a vein.

- There are many types of materials that can be used for AVGs.

- These materials can be divided into biologic and synthetic materials.
Dialysis Accesses

Biologic Materials

- Human and animal materials have been used for AVGs, but are rarely used today
- Human AVGs were made from a vein from the patient's leg
- Veins from the umbilical cords of newborn infants were also used, but had a high rate of infection and aneurysms
Dialysis Accesses

- Examples of a human graft materials that have been used for AVGs.
Bovine (cow) and Ovine (sheep) carotid arteries are also used for grafts and must be treated to remove proteins that would cause the human body to reject them.

These biologic grafts can also have a high rate of infection and aneurysms.
Can you name any of the synthetic types of materials used for AVGs?
Dialysis Accesses

- **ePTFE (polytetrafluoroethylene) Grafts**
  - Venaflo – combines the ePTFE material with the well known material properties of IMPRA Carboflo vascular graft to reduce platelet adhesion (clotting).
  - Carboflo – In pre-clinic studies, Carboflo’s are Carbon lined to significantly decreases platelet accumulation by as much as 6 times greater than standard ePTFE grafts.
  - Distaflo – Used mainly for arterial bypass grafts and is shown to improve patency of the graft over other materials.
Dialysis Accesses

- Examples of ePTFE grafts
  - Distaflo - upper left
  - Venaflo – right
  - Impra Carboflo – lower left
Dialysis Accesses

- The AVG is has two anastomosis’ because it is surgically attached to both the artery and vein.
- The Graft can be straight, looped, or curved.
Dialysis Accesses

Pros

- The AVG takes about 2 weeks to heal and be ready for cannulation.
- Graft size and blood flows don’t depend on maturation.
- Grafts can start out with larger gauge needles and obtain better BFRs sooner.
- The AVG is a good access for those patients who cannot maintain a fistula.
Dialysis Accesses

Cons

- The biggest problems with all grafts are infection and thrombosis.
- Grafts are more likely to develop stenosis than AVFs.
- Grafts are more likely to clot than AVFs.
- Grafts have an increased risk of infection over the AVF.
Central Venous Catheters

- **Long term**
  - Tunneled, cuffed catheter

- **Short term**
  - Urgent dialysis
Hemodialysis Catheters

Non-tunneled, non-cuffed catheters

Tunneled, cuffed catheters
Catheters

Pros

- Can be used immediately
- Hidden under clothing
- Hands and arms can be moved freely
- No needles
Catheters

Cons

- Increase risk of infection
- Foreign body can cause inflammation and clotting
- Lower blood flows decreased adequacy