GUNDERSEN/LUTHERAN ULTRASOUND DEPARTMENT POLICY AND PROCEDURE MANUAL

SUBJECT: AV Fistula Sonographic Evaluation
SECTION: Vascular Ultrasound
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Indications for Exam:

- Difficult cannulation
- Thrombus aspiration
- Clinical signs and symptoms of AV access insufficiency such as the following
    - Access collapse suggesting poor arterial flow
    - Poorly matured fistula
    - Loss of thrill
    - Distal limb ischemia
    - Clinical signs of infection
    - Perigraft mass, aneurysm, or pseudoaneurysm

Questions to Ask

1. Fistula or graft?
2. Where located? If graft, what material was used?
3. Currently being used for dialysis? Is it not working well?
4. Any prior complications with this graft?
5. Any signs or symptoms of hand ischemia?

***If Determining AVF/AVG Maturity:** Scheduled a few weeks after surgery

Exam Protocol:

Physical exam

- Palpate thrill – should feel/hear normal buzzing
- Palpate graft or fistula along its course to help provide a mental image

Patient position: supine with arm (or leg) externally rotated

Imaging Protocol:

Central Venous Outflow: Upper extremity DVT study including innominate, subclavian, and axillary veins

Arterial inflow: measure PSV and diameter of artery

- 2 cm proximal to fistula or graft
- Radial artery distal to the fistula or graft
- Ulnar artery distal to the fistula or graft

Access vein or Graft

- Measure diameter of anastomosis (1 for fistula, 2 for graft) and 1-2 samples along access vein
- Document length of accessible graft/fistula (The venous segment close to skin surface)
- Document distance of access vein to skin at several points along access vein
- B mode, color, and spectral Doppler at anastomosis
- B mode, color, and spectral Doppler with flow volume along the graft approximately every 3 cm, at fistula – label as: arterial end to venous end

Puncture Sites (if working fistula/graft): B mode, color, and spectral Doppler

Venous outflow: measure diameter and PSV

- Venous outflow – document entire length of outflow vein with B mode, color, and spectral Doppler with flow volume

Document any area of abnormal luminal narrowing, increase in velocity, abnormal turbulence

Document any aneurysm

Document any perigraft/perifistula fluid collections or abnormal soft tissue

Draw a picture of the AVF/AVG with labeled inflow artery and outflow vein, mark areas that were sampled

Diagnostic Criteria:

FOR MATURITY
Flow volume measurement

- Typical range 800-1200 mL/min
- <500 mL/min: impending graft failure
- >1400 mL/min: possible congestive heart failure

Access vein and anastomosis

- i. > 4 mm diameter
- ii. Anastomosis 3-4 mm (increased diameter increases risk of steal)
- iii. Access vein should be > 8 cm in length, <6 mm from skin surface

FOR STENOSIS
>50% luminal stenosis

- PSV>400 cm/sec
- Velocity ratio >2-3: max PSV/PSV of the inflow art