



Assessment and Monitoring of the Newly Placed AV Fistula for Maturation

Purpose:

1. To assess and monitor for maturation on all newly placed AV fistulas.
2. To provide timely interventions for AV fistulas which are failing to mature.
3. To facilitate the removal of the catheter when AV fistula is deemed mature and is used to provide hemodialysis.

Physical Examination:

1. All newly placed AV fistulas require a baseline assessment done by an “expert” nurse cannulator or an experienced dialysis nurse with AV fistula experience. Assessment should be documented in patient record, as well as in patient’s individualized plan of care (POC).
2. Assessment should include the noting of current catheter (if present), its condition and plan for coordination for removal. This information should be noted on the POC and patient record.
3. At each subsequent HD treatment examine the AV fistula, including the surgical incisions, to determine changes from baseline, with focus on maturation/development of AV fistula, and to detect problems that require immediate notification of the attending physician:
 - Changes in the extremity when compared to the opposite extremity (edema, swelling);
 - Steal Syndrome (pain or numbness in fingers or hand indicating a shortage of blood to the hand, discoloration, cold to touch, delayed nail bed capillary refill);
 - Skin integrity (waxy, sores, draining from incisions);
 - Bruising/hematoma;
 - Collateral vein distension (veins in access arm close to AV fistula becoming larger);
 - Complaints of pain or numbness; and
 - Check to see if the surgical incision is intact and free of evidence of infection (drainage, redness, tenderness at incision site, fever)
4. EXAMINATION should include:

Beginning at the anastomosis (the point where the artery and vein are surgically joined):

 - LISTEN to the bruit using a stethoscope at each hemodialysis treatment to assure that the AV fistula has blood flow. A continuous low-pitched bruit should be present. If it has disappeared or changed in tone, the attending physician should be notified immediately. The bruit has the same significance as the thrill and should be continuous and low pitched. A definite diastolic component should be present.
 - FEEL for the thrill. A thrill (purring or vibration) indicates blood flow through the AV fistula. A continuous thrill should be present, extending through both systole and diastole. It will diminish in strength as you move farther away from the anastomosis.
 - FEEL for a pulse. The anastomosis should be easily compressible. Avoid forceful compression of the AV fistula with the examining finger. Remember that a strong pulse is not good and suggests a downstream obstruction.



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The body of the AV fistula:

- Determine if the AV fistula is visible and/or palpable.
- Assess its diameter and depth.
- Assessment can be done with a tourniquet **lightly** applied near the shoulder
- Palpation (feel) again is important as previously described.
- Elevate the arm above the patient's head, the AV fistula should collapse. Collapsing of the AV fistula indicates that there is no obstruction in the draining veins.

Evaluate the AV fistula inflow:

- Check pulse augmentation. This is done by first feeling of the intensity of the pulse within the AV fistula (it should be very minimal). Then, compressing the body of the AV fistula in its midportion in order to completely occlude flow with one hand, determine how much the pulse has increased (augmented). There should be a major degree of increase in the pulse intensity. The strength of this augmentation is directly related to the quality of the inflow.

5. Documentation:

- All assessment and physical findings should be recorded in the patient's medical records (i.e., progress or nurses notes).
- Report any abnormal findings to the nephrologist immediately.

Teach the Patient (teaching should include the basic components of thrill vs. pulse):

1. To feel the AV fistula for the thrill daily to ensure patency.
2. To report absence or change in thrill immediately to the dialysis staff.
3. To examine incision sites for signs and symptoms of infection.
4. To keep access clean and dry to prevent infections.
5. That use of their access is only for hemodialysis. Do NOT allow anyone other than dialysis staff to draw blood samples or stick their access.
6. Do not allow any blood pressure readings and/or cuffs be placed on their access arm.
7. To avoid extended pressure on their access arm, such as...
 - Tight clothes or jewelry (i.e., watches) over their access.
 - Sleeping with their access arm under their head or body.
 - Carrying heavy items (i.e., backpacks/purses or groceries) on their access arm.

Supportive Information:

1. AV fistula maturation is the process by which an AV fistula develops and becomes suitable for cannulation on a routine basis. The FFBI definition of a fully matured AV fistula is one that can sustain 3 consecutive 2-needle cannulations with no infiltrations at the prescribed needle gauge and blood flow rate (Qb).
2. The mature AV fistula must be superficial enough, large enough (in diameter), thick-walled, straight enough, and have sufficient blood flow to permit routine and safe 2-needle cannulation.



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3. Ongoing assessments by the most experienced dialysis staff or 'expert' nurse cannulators, is the most effective way of determining if an AV fistula is maturing adequately.
4. Maturation towards use of the AV fistula should occur at 4 to 6 weeks with a basic AV fistula. Transposed or superficialized AV fistulas may require more time to develop and use should be directed by the surgeon.
5. If the AV fistula is not maturing adequately, notify the nephrologist and contact the surgeon to discuss the plan of action. Aggressive evaluation should be employed if the AV fistula has not matured enough to sustain cannulation. Surgical interventions may include duplex ultrasound or fistulogram. Surgical findings must be conveyed to the dialysis staff.
6. A newly placed AV fistula is suitable for use when the vein's diameter is sufficient to allow successful cannulation, and the vessel is thick enough, in the judgment of an experienced dialysis nurse or expert nurse cannulator, but not sooner than 1 month after construction. However, there are instances in which earlier cannulation is possible (e.g., when a graft has been converted to an AV fistula).
7. **MATURATION:** If the AV fistula can sustain 3 consecutive 2-needle cannulations with no infiltrations at the prescribed needle gauge and blood flow rate (Qb), it should be classified as mature. The KDOQI rule of 6's is an objective measure that may be utilized to assess maturation:
 - A minimum of 6 mm in diameter with discernible margins with a tourniquet in place.
 - A depth of less than 6 mm (below the skin surface).
 - A blood flow greater than the prescribed blood flow rate measured by an accepted method, i.e., an indicator dilution technique or ultrasound.
8. An AV fistula that cannot be successfully cannulated by 90 days post-operatively should be considered a failed AV fistula.