Vascular Access: What the Dialysis Technicians Need to Know and Do to Prolong the Life of a Vascular Access

Deborah Brouwer-Maier RN, CNN

ADC 2020
Technician Program Sunday 2/9/20
4:30 to 5:15pm
Disclosure

Employee of Transonic
• Pre and Post cannulation evaluation – One Minute Check
• Cannulation – methods and tips for success including new endo AVF’s
• Communication- how to escalate an issue and new KDOQI ESKD Life Plan
• Best Practices
Access Monitoring: Used Pre-cannulation Every Treatment
One Minute Check Toolkit

For Professionals

Vascular Access Planning Guide for Professionals

For Patients

Lifeline for a Lifetime:
Planning for Your Vascular Access
One Minute Check

Document One Minute Check Findings

Go Green Findings Pre-cannulation can move to cannulation

Stop Red Findings Pre-cannulation do not move to cannulation until the finding is escalated to the Charge Nurse!

https://esrdncc.org/en/resources/lifeline-for-a-lifetime/
It only takes a minute to save your patient’s lifeline.

Dialysis Care Team:
- Perform access check at each treatment or when patient reports a change.
- Reinforce importance of daily access checks to patient.
- Listen to the patient.

Look  Listen  Feel  Arm Elevation Test (AVF Only)  Augmentation Test (Optional)

Were there any abnormal findings during the access check?

No
Document that there were no abnormal findings.

Yes
Document findings and refer to expert clinician.

Expert Clinician:
Assess each access monthly or more often if problems are reported.

www.esrdncc.org

This material was prepared by the End-Stage Renal Disease Network Coordinating Center (NCC), under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy.
CMS Contract Number: HHSM-500-2013-00002C.
Look

The skin over the access is all one color and looks like the skin around it.

There is redness, swelling or drainage. There are skin bulges with shiny, bleeding, or peeling skin.

GO

Good to go!

STOP

Contact expert clinician if any “stop” signs noted.

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Listen (Stethoscope Bruit)

The hum or buzz should sound like a “whoosh,” or for some may sound like a drum beat. The sound should be the same along the access.

No sound or decreased sound. Change noted. Sound is different from what a normal BRUIT should sound like.

GO

Sounding good!

STOP

Contact expert clinician if any “stop” signs noted.

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**Feel**

**Thrill:** a vibration or buzz in the full length of the access.

**Pulse:** slight beating like a heart-beat. Fingers placed lightly on the access should move slightly.

**Pulsatile:** The beat is stronger than a normal pulse. Fingers placed lightly on the access will rise and fall with each beat.

**GO**

Good to go!

**STOP**

Contact expert clinician if any “stop” signs noted.

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[esrdncc.org](http://www.esrdncc.org)

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Arm Elevation Test

Upper Arm AVF
The AVF outflow vein partially collapses when the arm is raised above the level of the heart. It may feel “flabby” when palpated.

Lower Arm AVF
The AVF outflow vein collapses when the arm is raised above the level of the heart.

Upper Arm AVF
The AVF outflow vein does not partially collapse or become “flabby” after being raised above the level of the heart.

Lower Arm AVF
The AVF outflow vein does not collapse after being raised above the level of the heart.

GO
Good to go!

STOP
Contact expert clinician if any “stop” signs noted.

www.esrdncc.org
Augmentation Test

Place your fingers on the out-going vein, feel the pulse, press down until no blood is flowing through the access. Keep your finger on the vein and feel for the pulse on the lower part of the access.

Pulse should be “strong and bounding” and may cause your finger to rise and fall with each beat.

Pulse does not become more forceful or “strong and bounding”.

**GO**

Good to go!

**STOP**

Contact expert clinician if any “stop” signs noted.

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arteriovenous Fistula First

AVF — The first choice for hemodialysis.
Post Dialysis

- Check & document thrill after needles pulled, sites held and post bandage applied
- Document any prolonged bleeding
- Document dressing applied
- If a nursing home patient ensure the nursing home has instructions to care for the access and post bandage (when to remove the bandage, One Minute Check, what to do should the access bleed)
Catheter One Minute Check

- Professional and Patient
It only takes a minute to check your patient’s catheter. Check before you connect.

**GO**

**Look**
- Look at the CATHETER to make sure:
  - There are no cracks in the catheter tubing.
  - The caps are on the ends of the catheter tubes.
  - The catheter cuff is not coming out of the skin.
- Look at the EXIT SITE to make sure there is no:
  - Redness
  - Drainage
  - Bleeding
  - Exposure of catheter cuff
  - Check the skin over tunnel for redness.
- If you think there is a problem with the catheter tubing.
- If the catheter hubs are exposed or dirty.
- If the catheter cuff is coming out of the skin.
- If the exit site is red, draining or bleeding.
- If the cuff is exposed.
- If a stitch is still in place: Check to see if it can be removed
  - The skin over the tunnel is red.

**Listen**
- Listen to the patient and be sure to ask:
  - If they think they might have a fever.
  - If they have noticed anything different with their catheter since the last dialysis treatment.
- If the patient reports or has a fever.
- If the patient reports something that is different with their catheter.
- If the patient reports a problem with their catheter.

**Feel**
- Press lightly on the area over the tunnel away from the exit site.
  - There should be no:
    - Pain
    - Drainage coming from the exit site
  - The area over the tunnel should not feel warmer than the area around it.
- If there is:
  - Pain and/or drainage from the exit site when you press lightly on the area over the tunnel.
  - If the area over the tunnel is warmer than the area around it.
Patient Daily One Minute Check

It only takes a minute to check your catheter.

A Bridge to Your Lifeline

Look
Look at your catheter dressing in the mirror.
- It is clean and dry, and it covers the exit site (the place where the catheter comes out of your skin) **GO**
- The dressing does not cover the exit site, it is wet or dirty, there is blood or pus on the dressing **STOP**

Feel
Feel over the catheter dressing. Do not remove the dressing!
- The dressing is dry and there is no pain in the area under the dressing. **GO**
- The dressing is wet, you have pain in the area under the dressing, something feels different, or you think you may have a fever. **STOP**

If you notice any of the red “stop” signs during your daily catheter check, follow these instructions IMMEDIATELY:

Contact: ____________________________________________
During regular facility hours _______________________________________
After hours ______________________________________
Post Dialysis

• Document the Catheter caps, clamps and dressing are intact
• If a nursing home patient ensure the nursing home has instructions to care for the access (One Minute Check, what to do if the dressing falls off, dressing gets wet, clamps or caps open)
## CMS Conditions for Coverage: Vascular Access

<table>
<thead>
<tr>
<th>V Tag</th>
<th>Regulation</th>
<th>Interpretive Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>511</td>
<td>Evaluation of access type</td>
<td>Referrals for access creation</td>
</tr>
<tr>
<td>550/551</td>
<td>IDT provide access monitoring and referrals need to create and sustain</td>
<td>Clinic must have on-going monitoring and surveillance program</td>
</tr>
<tr>
<td></td>
<td>vascular access</td>
<td>Plan of Care for the Dialysis Access</td>
</tr>
<tr>
<td>456</td>
<td>Patient to be informed and participate in all aspects of their care</td>
<td>Self-cannulation needs to be an option</td>
</tr>
<tr>
<td>512</td>
<td>Eval patients desired level of participation in the dialysis care process</td>
<td>Support patients active role in care such as access care</td>
</tr>
<tr>
<td>455</td>
<td>Privacy &amp; Confidentiality of Medical Records</td>
<td>HIPAA release is NOT required to share protected health information for continuity of care</td>
</tr>
</tbody>
</table>

U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services (2008), Part 494 Conditions For Coverage for End-Stage Renal Disease Facilities, Interpretive Guidelines
CMS Conditions for Coverage: Vascular Access

Monitoring

• One Minute Check
• Clinical parameters (prolonged bleeding, changes in AP/VP, decrease in Kt/V, persistent swelling of the arm, presence of collateral veins)

Surveillance

• Access Flow (Transonic AF or Fresenius OLC)
• Vasc-Alert
• Duplex ultrasound
One Minute Check Used Weekly

AV Graft Healing

OR

AV Fistula Maturing
Dialysis Professional

“Ready, Set, Go” The Steps to Catheter Freedom
Week 1: Graft Healing & Readiness Check

- Perform graft healing check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily graft checks.
    - Listen to the patient.

Look

Listen

Feel
Dialysis Professional
“Ready, Set, Go” The Steps to Catheter Freedom
Weeks 2-3: Graft Healing & Readiness Check

- Perform graft healing check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily graft checks.
    - Listen to the patient.

Look
Listen
Feel

Augmentation Test

Perform once. If normal, no need to repeat.
Dialysis Professional

“Ready, Set, Go” The Steps to Catheter Freedom
Week 4: Graft Healing & Readiness Check

- Perform graft healing check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily graft checks.
    - Listen to the patient.

Look  |  Listen  |  Feel

Augmentation Test

(Optional)
Dialysis Professional

“Ready, Set, Go” The Steps to Catheter Freedom
Weeks 1-2: Fistula Maturity Check

- Perform fistula maturity check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily fistula checks.
    - Listen to the patient.

Look

Listen

Feel
Dialysis Professional

“Ready, Set, Go” The Steps to Catheter Freedom
Week 3: Fistula Maturity Check

Access Placed
Weeks 1-2  Week 3  Week 4  Weeks 5-6  Weeks 7-10  Week 10

- Perform fistula maturity check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily fistula checks.
  - Listen to the patient.

Look  Listen  Feel  Arm Elevation test (AVF Only)
Dialysis Professional

“Ready, Set, Go” The Steps to Catheter Freedom
Week 4: Fistula Maturity Check

- Perform fistula maturity check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily fistula checks.
    - Listen to the patient.

Look  Listen  Feel

Arm Elevation test (AVF Only)

Augmentation Test

Perform once. If normal, no need to repeat.
## Dialysis Professional

### “Ready, Set, Go” The Steps to Catheter Freedom

**Weeks 5-6: Fistula Maturity Check**

<table>
<thead>
<tr>
<th>Access Placed</th>
<th>Catheter Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks 1-2</td>
<td>Week 3</td>
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<tr>
<td></td>
<td>Week 4</td>
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<tr>
<td></td>
<td>Weeks 5-6</td>
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<td></td>
<td>Weeks 7-10</td>
</tr>
<tr>
<td></td>
<td>Week 10</td>
</tr>
</tbody>
</table>

- Perform fistula maturity check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily fistula checks.
  - Listen to the patient.

### Arm Elevation test

**AVF Only**

- **Look**
- **Listen**
- **Feel**

**Arm Elevation test (AVF Only)**
Dialysis Professional

“Ready, Set, Go” The Steps to Catheter Freedom
Weeks 7-10: Fistula Maturity Check

- Perform fistula maturity check at each treatment or when patient reports a change.
  - Reinforce to patient the importance of daily fistula checks.
    - Listen to the patient.

Look  Listen  Feel

Arm Elevation test  (AVF Only)
Cannulation

Methods and tips for success including new endo AVF’s
Rope Ladder Cannulation

Arterial & Venous cannulation sites move up and down like the rungs of a ladder
Same 2 to 4 cannulation sites used for the Arterial & Venous cannulation sites. Sharp needles create the tunnel tracts. Blunt needles used for long-term cannulation.

New KDOQI Guidelines will be recommending limited use due to high infection rates.
Area Puncture - NOT To BE USED

Same small area used for repeated cannulation sites

Most common cannulation method actually used by dialysis staff
Images of Mature Endo AVF’s

Images from Dr. Rob Jones
Interventional Radiologist
Queen Elizabeth Hospital
Birmingham, UK
EndoAVF

The Ellipsys® Vascular Access System
WavelinQ™ 4F EndoAVF System

- System used determines the target vessels and the cannulation zones
- Please document the system in the EMR
Surgical vs. Endovascular Created AV Fistulas

**Surgical AVF**

- Surgical scars as landmarks for the anastomosis site

**Endovascular AVF**

- No surgical scars to help identify the location or even existence of an AV fistula

**Impact:**

Risk of IV or blood draws
EndoAVF not recognized - could lead to non-use, extended use of CVC or referral for access placement
Vessels Used

Surgical vs. Endovascular Created AV Fistulas

**Surgical AVF**
- Radiocephalic AVF (Brescia-Cimino)
- Transposed Basilic Vein AVF
- Radial artery to forearm cephalic vein (snuff-box AVF)
- Proximal forearm AVF with an end to side anastomosis between a perforating branch of the cephalic or median antecubital vein and the proximal radial artery (Gracz fistula).

**Endovascular AVF**
- Ellipsys: Proximal radial artery and the deep communicating vein in the proximal forearm (similar to the Gracz AVF or Proximal forearm AVF)
- WavelinQ: Ulnar Artery to Ulnar Vein

**Impact:**
*EndoAVF may develop vessel that cross the antecubital fossa*

Ellipsys: Median cephalic vein and cannulation zone may cross the antecubital fossa
WavelinQ: Split flow into basilic and cephalic vein, Cephalic vein Dominant
Surgical vs. Endovascular Created AV Fistulas

**Bruit & Thrill**

**Surgical AVF Bruit & Thrill**
- One Minute Check for the physical examination will have a typical look, listen (bruit) and feel (thrill).

**Endovascular AVF**
- One Minute Check The thrill and bruit may be diminished slightly from a typical AVF

**Impact:**
Blood flow may be a split flow and thus decrease the bruit and thrill that is present in each of the vessels.
Surgical vs. Endovascular Created AV Fistulas

Surgical AVF
- Lower Arm Access Flow 300 ml/min to 800 mL/min
- Upper Arm Access Flow 300 mL/min to 3000 mL/min

Endovascular AVF
- EndoAVF reported ranges are 400 mL/min to 800 mL/min

Impact:
Access surveillance that utilizes Access Flow measurements may need individualization of the low Access Flow threshold.

Note Access Flow measurements with clearance Access Flow or ultrasound dilution methods require the arterial and venous needles be in the same vessel. Needle placement into split vessels will impact the measurement accuracy.
Blood Flashback with Cannulation

Surgical vs. Endovascular Created AV Fistulas

**Surgical AVF**
- Dry AV fistula needle cannulation will see a strong flashback in the arterial needle.

Note a very strong or change in blood flashback can be an indication of upstream stenosis.

**Endovascular AVF**
- Dry AV fistula needle cannulation may see a muted flashback in the arterial needle and venous needles. This is related to lower access flow.

**Impact**
Dialysis staff need to be educated on the flow differences as the flow within the access will impact the quality of blood flashback.
Surgical vs. Endovascular Created AV Fistulas

**Surgical AVF Arm Positioning**
- Arm positioning for lower arm cannulation: arm extended only for the cannulation.
- Once the needles are secured any movement at the elbow will most likely not cause a needle infiltration.
- Upper arm cannulation is typically done above the elbow so the same applies as the lower arm.

**Endovascular AVF**
- Arm positioning may require the elbow to be fully extended for cannulation. If the needle entry site or tip of the needle cross any section of the antecubital fossa, the elbow may need to remain extended or movement limited during the hemodialysis session.

**Impact**
If the elbow must remain fully extended or movement restricted, care must be taken as not to restrain the patient’s arm as in the United States the use of restraints must comply with local legal requirements and follow the use of restraints facility policy and procedure. CMS CoC Vtag 452
Arm Positioning for Cannulation

Neghae Mawla, MD @NMawlaMD · Nov 7
4 endoAVF cannulations this week, 2 Ellipsys, 2 WavelinQ. More lining up. The Creation is just half the issue. @ASDINNnews
#EndoAVFChallenges #EndoAVF #pAVF #Ellipsys #WavelinQ #dialysisaccess #withoutascalpel
**Staff Positioning for Cannulation**

Standing to cannulate: not at the level of the access, leaning forward while inserting the needle with a downward motion.

Sit on a Stool to be at the level of the access and more stable.
Surgical vs. Endovascular Created AV Fistulas

**Surgical AVF**
- Self-cannulation of the AVF is to be offered to all patients as part of their involvement in their own care CMS CoC Vtag 456

**Endovascular AVF**
- Self-cannulation of the pAVF should be offered to the patient same as a surgical AVF

Impact
- Self-cannulation of the pAVF may also reduce the risk of cannulation related issues.
**Cannulation Map Checklist**

Ultrasound should be utilized to create a cannulation map

Due to lack of ultrasound at dialysis: the map should be created by the interventionalist or surgeon

<table>
<thead>
<tr>
<th>Ultrasound Finding</th>
<th>Impact on Cannulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel/vessels name and locations</td>
<td>To identify the location of the access EndoAVF- no scars so can’t easily find</td>
</tr>
<tr>
<td>Flow and flow direction in the vessel/vessels at various points</td>
<td>Flow impacts ✓ Bruit &amp; Thrill quality ✓ Blood flashback with a dry needle cannulation ✓ Flow measurements may need individualization of the low Access Flow threshold ✓ Flow direction impacts needle placement</td>
</tr>
<tr>
<td>Target arterial and venous cannulation zones</td>
<td>Use for AVF or AVG In endoAVF the needle direction may impact the needle placement in relationship to the antecubital fossa and may impact the movement of the elbow. <strong>Thus, the needle direction should individualized for each fistula.</strong></td>
</tr>
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Ultrasound should be utilized to create a cannulation map due to lack of ultrasound at dialysis: the map should be created by the interventionalist.

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</tr>
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</table>
| **Depth from the skin to the top of the vessel** | Used to adjust angle of needle insertion and needle length.  
✓ Very shallow vessel may benefit from the use of the shortest needle length 3/5”  
✓ Very deep vessel may benefit from the use of the 1 ¼” needles |
| **Target cannulation zone vessel intralumenal diameter** | Impacts needle gauge advancement  
✓ The needle when fully inserted should not totally fill the vessel lumen (internal vessel diameter) and allow blood flow around the needle. |
| **If skin marker is used to outline AVF or AVG document image** | The cannulation map used for  
✓ Initial cannulation  
✓ Any new cannulator |
Life Plan

Communication Plan for Each Patient
End Stage Renal Disease (ESRD) remains the official CMS term

End Stage Kidney Disease (ESKD) is the new term the National Kidney Foundation is utilizing in the new KDOQI Guidelines
ESKD Life Plan

• Patient-Physician Shared Documentation of the patient’s choice of renal replacement therapy and the dialysis access plan to accommodate the patient’s choice

• Modality 1\textsuperscript{st} then Access to meet that modality 2\textsuperscript{nd}
**Missing Team Members of the ESKD Life Plan**

**Dialysis Team**

Dialysis Facilities required by CMS to have a Interdisciplinary Clinical Care documentation that includes the modalities and dialysis access – unsure how this will overlap

**Transplant Team**

Transplant status is already part of the required CMS Interdisciplinary Clinical Care documentation - unsure how this will overlap

**Family/Support System**

Exclusion of the family/support system can greatly impact success of a selected modality
Modality Plan: PD, HD and Transplant
**Access Strategy for Each Modality**

Patients can move between the modalities

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Access Strategy

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Documentation of Consent

Requires Signatures

I gave input into my ESKD Life-Plan, understand it and agree to it.

I have discussed the RRT options and associated dialysis access strategies with the patient and answered their questions to their satisfaction and understanding.
**Annual and Update if Changes**

Update with dialysis access interventions or changes and transplant status changes

This is an annual update: □ Yes □ No

Has the ESKD Life-Plan changed since the last review: □ Yes □ No

If YES, the ESKD Life-Plan has changed, fill out a new ESKD Life-Plan document
Best Practices

✓ One Minute Check- AVG/AVG & Catheter
✓ One Minute Check used for healing AVG or maturing AVF
✓ Commutate and escalate any Stop findings before cannulation
✓ Utilize the Rope Ladder Cannulation
✓ Buttonhole cannulation method in select patients such as self-cannulation
✓ NEVER AREA PUNCTURE for cannulation!!!
✓ Be aware of the new endovascular AV fistulae
✓ ESKD Life Plan for modality and then dialysis access to support that choice
Deborah Brouwer-Maier

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