CVC Care: Connect and Disconnect - Scrub the Hub to Prevent Infection
Hemodialysis Central Venous Catheter (CVC) Care

- Assess or check the vascular access and surrounding area by physical exam prior to every CVC connection
- Use a catheter care protocol (e.g. such as CDC tool kit) for exit site and hub care to reduce the risk of catheter related bloodstream infection
- Use a catheter protocol for the treatment of catheter dysfunction
- Mask and use aseptic technique when manipulating, connecting or disconnecting the catheter
- Cleanse the catheter hub (“scrub the hub”) with chlorhexidine
  - if chlorhexidine is not possible (e.g. allergy), use povidone-iodine (preferably with alcohol)
- Use a topical antiseptic or antibiotic barrier at the catheter exit site, in addition to cleansing, until the exit site is healed
- Dressing should be changed at least once per week (with greater frequency if clinically indicated)
- Catheter dressings should be protected against wet and dirty environments, especially if the exit site is not yet fully healed (i.e. patient should be educated to avoid swimming or showering)
Available Tools

- CDC Tool kit is to be used by US based dialysis faculties & audited by CMS related inspections
- Nephrologists Transforming Dialysis Safety (NTDS)
  - Nephrologists act as team leaders to “target zero infections” by pursuing the elimination of preventable infections in dialysis facilities.
- CDC Infection Prevention Project
  [https://www.cdc.gov/dialysis/](https://www.cdc.gov/dialysis/)
- [https://www.asn-online.org/ntds/](https://www.asn-online.org/ntds/)
KDOQI Aligns with and Supports CDC approach to preventing catheter-related infections (CPGs 11.9-11.16)

CPG 11.9-11.16
KDOQI also suggests wearing a mask with catheter connect & disconnect

**CPG 11.10**

**Hemodialysis Central Venous Catheter Scrub-the-Hub Protocol**

**Definitions:**
- Catheter refers to a central venous catheter (CVC) or a central line.
- Hub refers to the end of the CVC that connects to the blood lines or cap.
- Cap refers to a device that screws on to and occludes the hub.
- Limb refers to the catheter portion that extends from the patient’s body to the hub.
- Blood lines refer to the arterial and venous ends of the extracorporeal circuit that connect the patient’s catheter to the dialyzer.

**Connection Steps:**
1. Perform hand hygiene and don new clean gloves.
2. Clamp the catheter (Note: Always clamp the catheter before removing the cap. Never leave an uncapped catheter unattended).
3. Disinfect the hub with caps removed using an appropriate antiseptic (see notes).
   - a. (Optional) Prior to cap removal, disinfect the caps and the part of the hub that is accessible and discard the antiseptic pad (let use a separate antiseptic pad for the next cap).
   - b. Remove the caps and disinfect the hub with a new antiseptic pad for each hub. Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood).
   - c. Using the same antiseptic pad, apply antiseptic with friction to the catheter, moving from the hub at least several centimeters towards the body. Hold the limb while allowing the antiseptic to dry.
   - d. Use a separate antiseptic pad for each hub catheter limb. Leave hubs ‘open’ i.e., uncapped and disconnected for the shortest time possible.

**Disconnection Steps:**
1. Perform hand hygiene and don new clean gloves.
2. Clamp the catheter (Note: Always clamp the catheter before disconnecting. Never leave an uncapped catheter unattended).
3. Disinfect the catheter hub before applying the new cap using an appropriate antiseptic (see notes).
   - a. (Optional) Disinfect the connection prior to disconnection. If this is done, use a separate antiseptic pad for the subsequent disinfection of the hub.
   - b. Disconnect the blood line from the catheter and disinfct the hub with a new antiseptic pad. Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood).
   - c. Use a separate antiseptic pad for each hub. Leave hubs ‘open’ i.e., uncapped and disconnected for the shortest time possible.
4. Always handle the catheter hubs aseptically. Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces.
5. Attach sterile syringe, unclamp the catheter, withdraw blood, and flush per facility protocol.
6. Repeat for other limb (this might occur in parallel).
7. Connect the ends of the blood lines to the catheter aseptically.
8. Remove gloves and perform hand hygiene.
Recommendations on the use of specialized connectors have changed over the years due to changing evidence and practice patterns.
Sample Steps for Catheter Connect/Disconnect (CPG 11.9-11.16)

Table 11.2. Example of CVC Connect and Disconnect Procedures

<table>
<thead>
<tr>
<th>Suggested Method to Access CVC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Explain the procedure to the patient. Ask him/her to minimize talking and turn the head the opposite direction of the CVC.</td>
</tr>
<tr>
<td><strong>Step 2:</strong> Perform hand hygiene. Remove any gauze or tape securing the CVC or covering CVC limbs.</td>
</tr>
<tr>
<td><strong>Step 3:</strong> Ensure that both limbs of the CVC are clamped. Place clean or sterile pad/towel under the CVC so that the limbs are on top of the pad/towel.</td>
</tr>
<tr>
<td><strong>Step 4:</strong> Perform hand hygiene and prepare supplies, maintaining sterility. Put on gloves.</td>
</tr>
<tr>
<td><strong>Step 5:</strong> Ensure clamp on CVC is closed. Remove the Luer lock cap and clean the hub (“scrub the hub”)(^{297}) with chlorhexidine (or povidone if chlorhexidine not tolerated). Ensure that the disinfected hub does not touch nonsterile surfaces. If closed system, high-flow, needleless-style caps are used; follow the manufacturer’s recommendations and CVC care for cleaning and changing of caps. Repeat with the second port. (\text{Optional for Step 5:}) Before removing the Luer lock cap, disinfect the caps and part of the hub with an antiseptic pad, using a separate antiseptic pad for each hub or catheter limb.</td>
</tr>
<tr>
<td><strong>Step 6</strong>(^{\text{a}}): Attach syringe, unclamp CVC, and aspirate 2 to 5 mL of blood and CVC locking solution from lumen. Reclamp CVC. Detach syringe and attach to dialysis circuit. Repeat with second port. (\text{Optional for Step 6:}) If no resistance is felt with aspiration of blood and CVC locking solution, attach a 5- to 10-mL syringe of 0.9% normal saline and flush lumen using turbulent flushing technique.</td>
</tr>
<tr>
<td><strong>Step 7</strong>(^{\text{a}}): Initiate dialysis.</td>
</tr>
<tr>
<td><strong>Step 8:</strong> Discard the syringe and used materials.</td>
</tr>
</tbody>
</table>
Suggested Method to Disconnect CVC

**Step 1:** Explain the procedure to the patient, retransfuse patient’s blood as per unit protocol, perform hand hygiene, and prepare supplies for CVC locking.

**Step 2:** Close the clamp on the CVC lumens and bloodlines. Disconnect 1 bloodline from 1 CVC lumen and clean the CVC hub.\(^c\)

**Step 3:** Attach a 5- to 10-mL syringe with 0.9% normal saline to CVC lumen, unclamp CVC, and flush lumen.

**Step 4:** Remove normal saline syringe from lumen, attach syringe with CVC locking solution to lumen, and instill locking solution volume as per unit CVC care protocols.\(^d\)

**Step 5:** Close clamp on lumen, remove syringe, clean the hub, and apply sterile Luer lock cap.

**Step 6:** Repeat steps with second lumen.

**Step 7:** Discard used supplies.

Abbreviation: ANTT, aseptic no touch technique; CVC, central venous catheter.

\(^a\)If limbs do not aspirate or flush freely, ensure clamps are open and rule out external causes of resistance (kink in CVC limb or patient position).\(^3\) If problems persist, the CVC may indicate fibrin or thrombus formation or CVC tip malposition (Guidelines 22 and 24). A gentle back-and-forth motion (irigate) may promote CVC patency. After irrigation, flush lumen (eg, with 10 mL of normal saline) using turbulent flushing technique to ensure that blood is cleared from the CVC lumen (optimize line patency). Observe for bleeding if anticoagulant (locking) solution cannot be removed (aspirated).

\(^b\)If line reversal is necessary to initiate dialysis treatment, follow unit protocols and practices for next steps. If patency is established, initiate dialysis.

\(^c\)Follow “scrub-the-hub” protocol.\(^2\) Locking solutions may include anticoagulants, antiseptic/antibiotic, or thrombolytic locks and their combinations. Caps must be replaced every time the catheter is accessed and de-accessed. If closed-system, high-flow needleless caps are used, follow unit protocols and manufacturer’s recommendations.
Checklist: Hemodialysis catheter connection

- Wear mask (if required)
- Perform hand hygiene
- Put on new, clean gloves
- Clamp the catheter and remove caps
- Scrub catheter hub with antiseptic agent
- Allow hub antiseptic agent to dry
- Connect catheter to blood lines aseptically
- Remove gloves
- Perform hand hygiene
Checklist: Hemodialysis catheter disconnection

- Wear mask (if required)
- Perform hand hygiene
- Put on new, clean gloves
- Clamp the catheter
- Disconnect catheter from blood lines aseptically
- Scrub catheter hub with antiseptic agent
- Allow hub antiseptic agent to dry
- Attach new caps aseptically
- Remove gloves
- Perform hand hygiene
### CDC Dialysis Collaborative

Day: M W F Tu Th Sa Shift: 1st 2nd 3rd 4th
Observer: Location within unit:

#### Audit Tool: Catheter connect/disconnect observations

(Use a "✓" if action performed correctly, a "☒" if not performed. If not observed, leave blank)

<table>
<thead>
<tr>
<th>Procedure observed, C=connect D=disconnect</th>
<th>Discipline</th>
<th>Mask worn properly (if required)</th>
<th>Hand hygiene performed</th>
<th>New, clean gloves worn</th>
<th>Catheter removed from blood line aseptically (disconnection only)</th>
<th>Catheter hub scrubbed</th>
<th>Hub antiseptic allowed to dry</th>
<th>Catheter connected to blood lines aseptically (connection only)</th>
<th>New caps attached aseptically (after disconnecting)</th>
<th>Gloves removed</th>
<th>Hand hygiene performed</th>
</tr>
</thead>
</table>

KDOQI also suggests wearing a mask with connect & disconnect

**Discipline:**
P=physician, N=nurse, T=technician, S=student, O=other

**Duration of observation period =** minutes

**Number of procedures performed correctly =**

**Total number of procedures observed during audit =**

**ADDITIONAL COMMENTS/OBSERVATIONS**