Central Venous Catheter (CVC):
Initiation of Dialysis
(Approved Aug 15, 2011)

Vascular Access Guideline

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### 1.0 Practice Standard

**Skill Level (Nursing): Specialized**

Registered Nurses and Licensed Practical Nurses who have completed the required hemodialysis (HD) specialty education and who provide nursing care in a BC In-Centre and/or Community Renal Program may perform this procedure.

**Need to Know:**

1. Standard/routine precautions are used for CVC connect procedures to reduce the risk of transmission of blood-borne and other pathogens.
   - Wash hands before and after manipulation of the CVC and administration lines. If hands visibly soiled, wash with antimicrobial soap; if not, may use either an antimicrobial soap or alcohol hand sanitizer.
   - Wear gloves (non-sterile to remove the dressing and sterile for the rest of the procedure), non-sterile gown and non-sterile mask/face shield during connect procedures. If institution policy is for a clean “no touch” procedure, then may wear non-sterile gloves and change as indicated.
2. Medical/clean aseptic technique is used for CVC connect procedures, with additional precautions as follows:
   - Use sterile equipment and supplies and a “no touch” technique when handling the catheter and catheter ports and caring for the exit site. Maintain a sterile drape under the catheter ports.
   - Use a sterile antiseptic solution (see #3 for a list of recommended antiseptic solutions) and sterile gauze to clean catheter hubs (“hub scrubs”).
   - Use a sterile syringe and sterile normal saline to flush the catheter lumens.

3. Recommended antiseptic solutions, in order of priority:

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<th>Solution</th>
<th>Required Drying Time</th>
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<tr>
<td>Chlorhexidine gluconate 2% with alcohol</td>
<td>30 seconds (persistent antimicrobial activity, up to 48 hours)</td>
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<tr>
<td>Chlorhexidine gluconate without alcohol</td>
<td>2 minutes</td>
</tr>
<tr>
<td>Sodium hypochlorite 0.11% (ExSept Plus®)  or Amuchina 10%</td>
<td>2 minutes</td>
</tr>
<tr>
<td>Povidone-iodine 10% (Betadine)</td>
<td>2 minutes</td>
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4. The hemodialysis locking solution must be withdrawn from each of the arterial and venous lumens prior to initiating dialysis. The volume of each lumen of the catheter is stamped on the lumen or lumen clamp (hemodialysis catheters are available in variable lengths and therefore the lumen volumes differ).

5. Each of the arterial and venous lumens is flushed with normal saline prior to initiating dialysis.

6. Air embolus is a potential catastrophic complication of CVCs and the relative risk while accessing a CVC is high.

   Ways to reduce the risk:
   - Place the patient supine in Trendelenberg position, or flat if the Trendelenberg position is not tolerated.
   - Never leave catheter ports unattended and open to the air; clamp ports when not being used.

7. When connecting CVCs, check the catheter is secure:
   i. Non-tunnelled (temporary) catheters: secured by at least one suture when the catheter is in-situ.
   ii. Tunneled (cuffed) catheters:
      - Neck sutures are removed on DAY 7 post insertion (or as per institution policy).
      - Anchoring sutures are removed on WEEK 6 post insertion (or as per institution policy).
8. Do not use HD catheters for blood drawing or applications other than HD except under emergency circumstances (consult a nephrologist).

### 2.0 Equipment

- Non-sterile gloves
- Non-sterile gown
- Non-sterile mask/eye protection (2)
- Sterile gloves (2 pair)
- Sterile dressing tray
- Sterile drape/gauze (or sterile 4x4)
- 4 x 4 sterile gauzes (several)
- Antiseptic solution, preferably chlorhexidine gluconate 2% with alcohol
- 2x10 mL sterile syringes to withdraw locking solution
- 2x10 mL sterile syringes to check blood flow
- 4 x 10 mL sterile syringes or 2x 20 mL sterile syringes filled with normal saline for flush
- 4 safety needles if using 10 mL syringes (2 if use 20 mL syringes)
- 1x3 mL sterile syringe filled with an anticoagulant bolus (if part of unit policy)
- Patient specific dressing (gauze or transparent)
- Garbage receptacle

### 3.0 Assessment & Interventions

**Preparation:**

1. Wash hands with antimicrobial soap.

2. Prepare 4x10 mL or 2x20 mL sterile syringes filled with normal saline and, if part of unit policy, 1x3 mL sterile syringe filled with an anticoagulant bolus.

3. Don non-sterile gown (staff).

4. Don non-sterile mask (staff and patient).

5. Wash hands with antimicrobial soap.

6. Open sterile tray and add supplies. Supplies to include syringes prepared in step 3 and, if part of unit policy, syringe with an anticoagulant bolus (note: place syringes on the outer aspect of the sterile field but not in the sterile tray).

7. Place the patient supine in Trendelenberg position, or flat if the Trendelenberg position is not tolerated.
If scheduled for a dressing change:
8. Refer to procedure CVC: Exit Site Care & Dressing Change.

Clense ports, clamps and limbs:
9. Don sterile gloves or clean gloves if using no-touch technique.

10. Using a sterile 4x4 gauze soaked in an antiseptic solution, cleanse each port, clamp and limb using friction scrub for 30 seconds (use a new piece of gauze for each port). Unclamp, move clamp, clean under clamp segment, and re-clamp. Discard used gauze.

11. Place catheter limbs on a fresh, dry, sterile 4x4 drape/gauze. Air-dry (see point #3 under “need to know” for drying time).

Withdraw locking solution:
12. Ensure port clamps are closed. Remove arterial port cap and discard.

13. Hub-scrub (i.e., cleanse the outer hub of the catheter to remove blood and contaminants that collect on the hub over time) port with sterile 4x4 gauze soaked in an antiseptic solution. Discard 4x4 gauze used for the hub-scrub.

14. Attach a 10 mL empty sterile syringe to arterial port.

15. Open arterial port clamp and withdraw locking solution (volume of lumen plus 0.5 mL of blood). Close clamp. Remove and discard syringe.

16. Repeat steps 14 - 15 using the venous port. Pre-dialysis blood work using unit protocol can be drawn at this time.

Check blood flow:
17. With a new 10 mL syringe attached, open arterial port clamp and check for adequate blood flow using a “withdraw and instill” motion. Clamp lumen. Remove 10 mL syringe.

18. Repeat step 17 for venous lumen.

Flush lumens with normal saline and, if using anticoagulant, instill as per unit policy:
19. Attach a 10 or 20 mL sterile saline syringe to the arterial port. Flush lumen using a “push/pause” method (i.e., short repetitive pushes on syringe plunger). Clamp lumen. Repeat if using 10 mL syringe. Remove empty syringe from arterial port and discard.

20. Repeat step 19 for venous lumen.

21. If using anticoagulant, instill now as per unit policy. Clamp lumen.
CVC: Initiation of Dialysis

Connect blood lines and initiate dialysis:
22. Remove syringe from the arterial port and discard. Ensure there is no air in the arterial blood line. Connect the arterial blood line to the arterial lumen. Ensure connections are secure. Open arterial clamps (ensure saline line is clamped). If using the “direct method,” go to step 24.

23. Turn on blood pump at 100 mL/min and allow blood to fill arterial chamber, dialysis line, dialyzer and venous chamber. Stop pump.

24. Remove syringe from venous port and discard. Ensure there is no air in the venous blood line. Connect the venous blood line to the venous lumen. Ensure connections are secure. Open venous clamp.

25. Initiate dialysis and open clamps on both arterial and venous lumens and blood lines as per unit protocol.

26. Turn blood pump on at 100 mL/min.

27. Unless contraindicated, increase blood pump speed to 200 mL/min. Record arterial and venous pressures and pump speed on the HD log.

28. Secure lines to patient clothing before securing to bed/chair with tape and or clamps (so catheter will not be pulled out if patient moves).

29. Adjust dialysis parameters to obtain maximum dialysis adequacy.

4.0 Patient Education & Resources

- Try not to touch the catheter (can lead to infection).
- Keep dressing clean and dry – a tub bath is the best way to wash.
- If the dressing peels off or gets wet, wash hands well and remove what is left of the dressing. Put on a clean, dry 4x4 gauze and tape in place. Come to dialysis unit to have a proper dressing applied unless given explicit instructions from health care team on changing own dressing.
- Do not use sharp objects like scissors or a razor near the catheter tubing.
- If the catheter develops a hole or leak or the cap falls off, make sure that the catheter is clamped off between the problem area/catheter tip and the body (move the catheter clamp up the catheter towards the body; if no clamp, kink the catheter with fingers to close the catheter off). Call 911.
- If the HD catheter falls out or slips partially out, apply firm pressure with a clean piece of gauze and go to the hospital Emergency Department immediately.
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- Do not open your catheter (if part of the home HD program, doctor or nurse will provide specific instructions). Both the end caps and clamps of catheter should be kept tightly closed. Only a dialysis nurse or physician should remove the caps or clamps.
- Notify kidney doctor (nephrologist) or dialysis unit for any of the following:
  - Redness, warmth, or pain along the catheter.
  - Oozing or drainage from catheter exit site.
  - Noticeable swelling or itching around catheter or neck.
  - Feverish and any of the above symptoms.
  - Part of the catheter that is outside the skin seems to be getting longer.
  - Catheter is accidentally pulled and there is bleeding around the exit site.
  - If the gauze around the ports is damp for an unknown reason.

Resource: Care of Your Catheter
- http://www.bcrenalagency.ca

5.0 Documentation

- Document CVC hook-up, exit site status, presence or absence of the anchor suture and observations requiring attention (e.g., redness, bleeding, infection, or blockages in either or both lumens) as per unit protocol.

6.0 References


### 7.0 Developed By

1. BCs Vascular Access Educators Group (VAEG).
2. Adapted from Fraser Health Renal Program guidelines/standards.

### 8.0 Reviewed By

1. British Columbia Renal Educators Group (BCREG)
2. BC Provincial Renal Agency – Medical Advisory Committee (MAC)