

Central Venous Catheter (CVC): Initiation of Dialysis

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This procedure is posted on the BC Renal website:
Health Professionals ► Vascular Access ► Resources

Direct link: www.bcrenalagency.ca/health-professionals/clinical-resources/vascular-access

IMPORTANT INFORMATION

This BC Renal guideline/resource was developed to support equitable, best practice care for patients with chronic kidney disease living in BC. The guideline/resource promotes standardized practices and is intended to assist renal programs in providing care that is reflected in quality patient outcome measurements. Based on the best information available at the time of publication, this guideline/resource relies on evidence and avoids opinion-based statements where possible; refer to www.bcrenalagency.ca for the most recent version.

For information about the use and referencing of BC Renal guidelines/resources, refer to
<http://bit.ly/28SFr4n>.

1.0 Practice Standard

Skill Level (Nursing): Specialized

1. Registered Nurses (RNs) and Licensed Practical Nurses (LPNs) who have completed the required hemodialysis (HD) specialty education and who provide nursing care in a BC In-Centre and/or Community Renal Program; &
2. RNs in Intensive Care Units who have received the appropriate training.

Notes:

1. This guideline does not apply to patients who are on home hemodialysis.
2. Unless the specialty requirements above apply, RNs and LPNs should not use HD catheters for blood drawing.

Need to Know:

1. Use routine (also known as “standard”) precautions.
 - Perform hand hygiene.
 - 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 throughout the procedure and change gloves as indicated.
2. Use clean (also known as “medical”) aseptic technique, 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 an antiseptic wipe and vigorously apply mechanical friction to clean the hubs of the catheter ports (“hub scrubs”). If Tego connectors present, use antiseptic wipe and vigorously apply mechanical friction to clean the connectors.
- Use a separate antiseptic wipe for each clamp/limb/port/Tego connector.
- Allow antiseptic to dry for maximal effect.
- Leave hubs “open” (i.e., uncapped and disconnected”) for the shortest time possible
- Use *sterile* normal saline in a syringe to flush the catheter lumens.

Notes re: antiseptics:

- The Center for Disease Control and Prevention guideline (CDC, 2011) suggests the use of the following antiseptic solutions: >0.5% chlorhexidine with alcohol, 70% alcohol or 10% povidone-iodine. They conclude there is not enough evidence to recommend one antiseptic over the others.
 - The Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (ISDA) joint guideline (Marschall, 2014) suggest that alcoholic chlorhexidine may have additional residual activity (up to 24 hours) compared with 70% alcohol for this purpose.
3. The hemodialysis locking solution should be withdrawn from the arterial and venous ports/ Tegos prior to initiating dialysis. The volume of

each lumen of the catheter is stamped on the port or port clamp (hemodialysis catheters are available in variable lengths and therefore the lumen volumes differ).

4. If the cuff is visible, there are signs/symptoms of infection or the catheter appears kinked or is leaking, discuss with nephrologist/Vascular Access Nurse before initiating dialysis as an x-ray/ bloodwork may be required.
5. Air embolus is a potential catastrophic complication of CVCs and the relative risk while accessing a CVC is high.

Ways to reduce the risk:

- **Never leave catheter ports unattended and open to the air; clamp ports when not being used.**
 - Place the patient supine in as flat a position as the patient can comfortably tolerate (e.g., Semi-Fowler's position).
6. When connecting CVCs, check the catheter is secure:
 - i) Non-tunneled (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 WEEKS 6-8 post insertion (or as per institution policy).
 7. Notes about Tego use:
 - Do not use needles to access the Tego.
 - Access the Tego straight on, not at an angle.
 - When using a slip vacutainer for blood draws, only insert half way with a slight turn clockwise

into the Tego and then turn clockwise to come out.

- When injecting normal saline through the Tego, leave a minimal amount of fluid in the tip of the syringe to avoid reflux or rebound effect.
- Be sure to grasp the base of the Tego and fully unthread levers when disconnecting from the Tego.

2.0 Equipment

- Non-sterile gloves
- Non-sterile gown
- Non-sterile mask (2)/eye protection
- Sterile gloves; if Tego, only required on day Tego connector is to be changed
- Sterile dressing tray or equivalent
- Sterile drape/gauze (or sterile 4x4)
- Antiseptic wipes (several)
- 2 x 10 mL syringes to withdraw locking solution
- 2 x 10 mL syringes to check blood flow
- 4 x 10 mL syringes or 2 x 20 mL syringes filled with normal saline for flush
- 4 safety needles if syringes not pre-filled (2 if using 20 mL syringes)
- Patient specific dressing (gauze or transparent)
- Garbage receptacle

3.0 Assessment & Interventions

Preparation:

1. Place the patient supine in as flat a position as the patient can comfortably tolerate (e.g., Semi-Fowler's position).

2. Perform hand hygiene.
3. Gather supplies, including preparing 4 x 10 mL or 2 x 20 mL syringes filled with normal saline.
4. Don *non-sterile* gown (staff).
5. Don *non-sterile* mask (staff and patient) and eye protection (staff).
6. Perform hand hygiene.

If scheduled for a dressing change:

7. Measure the distance from the exit site to the top of the hub. Record. If the distance has increased from the previous measure, notify the nephrologist and VA nurse. Measure weekly.
8. Refer to procedure CVC: Exit Site Care & Dressing Change.

If Tego connector is present and connector is scheduled to be changed:

9. Refer to procedure CVC: Attaching or changing Tego Connectors.

Cleanse ports/Tegos, clamps and limbs:

10. Don *sterile* gloves or, if using no-touch technique, clean gloves.
11. Using an antiseptic wipe, cleanse each port/Tego, clamp and limb using friction scrub for 30 seconds. Un-clamp, move clamp, clean under clamp segment, and re-clamp. Use new wipes for each port/Tego.
12. Place catheter limbs on a fresh, dry, *sterile* 4x4 drape/gauze. Air-dry.

Withdraw locking solution:

13. Ensure port/ clamps are closed. If Tego connector not used, remove arterial port cap and discard.

14. Hub-scrub the arterial port/Tego with an antiseptic wipe.¹ Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood) for 30 seconds. Discard wipe.

15. Attach an empty 10 mL syringe to arterial port/ Tego.

16. Open arterial clamp and withdraw locking solution, blood and/or clots (total 5 mL). Close clamp. Discard syringe.

17. Repeat hub-scrub¹ Assess patency by attaching a new empty 10 mL syringe to the arterial port/Tego and aspirate 3 – 5 mL of blood to check for clots and the flow of the lumen. If no clots are noted, repeat aspiration/instillation (irrigation motion) 3 times to evaluate lumen flow. Clamp port/Tego.

18. If resistance is noted and Tegos are present, consider removing Tegos to see if flow improves. Refer to BC Renal guideline: Tego Connector Change.

Repeat steps 13-18 using the venous port/Tego. Pre-dialysis blood work using unit protocol can be drawn at this time.

19. Repeat hub-scrub.¹ Attach a 20 mL (or 10 mL) prefilled normal saline syringe to the arterial port/ Tego. Flush lumen using a forceful flush method. Repeat if using 10 mL syringe with a hub-scrub¹ between syringes. Clamp lumen. (total: 20 mL per lumen).

20. Repeat step 19 for the venous port/Tego.

Connect blood lines and initiate dialysis:

If using the “direct method”:

21. Repeat hub-scrub. Remove syringe from the arterial port/Tego and discard. Ensure there is no

¹If Tego connector is used, simply wipe with an antiseptic wipe. Hub-scrub is not necessary.

air in the arterial blood line. Connect the arterial blood line to the arterial port/Tego maintaining tip to tip sterility. Ensure connections are secure.

22. Repeat hub-scrub. Remove syringe from venous port/Tego and discard. Ensure there is no air in the venous blood line. Connect the venous blood line to the venous port/Tego. Ensure connections are secure. Go to step 26.

If using the ‘indirect method’:

23. Repeat hub-scrub. Remove syringe from the arterial port/Tego and discard. Ensure there is no air in the arterial blood line. Connect the arterial blood line to the arterial port/ Tego while maintaining tip to tip sterility. Ensure connections are secure. Open arterial clamp (ensure saline line is clamped).
24. Turn on blood pump at 100 - 150 mL/min and allow blood to fill arterial chamber, dialysis line, dialyzer and venous chamber. Stop pump.
25. Remove syringe from venous port/Tego and discard. Ensure there is no air in the venous blood line. Connect the venous blood line to the venous port/Tego. Ensure connections are secure. Open venous clamp.
26. Open clamps on both the arterial and venous ports/Tegos and blood lines and initiate dialysis as per physician’s orders.
27. Turn blood pump on at 100 - 150 mL/min.
28. Unless contraindicated, increase blood pump speed to 200 mL/min. Wait two minutes and then record arterial and venous pressures and pump speed on the HD log.
29. 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).
30. Adjust dialysis parameters to obtain maximum dialysis adequacy.

4.0 Patient Education and 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 or a new dressing if instruction has been provided. Come to the dialysis unit to have a new dressing applied if instruction has not been provided on self-dressing changes.
- 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.
- Do not open your catheter (if part of the home HD program, doctor or nurse will provide specific instructions). 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.

Patient Handout: Care of Your Catheter:

www.bcrenalagency.ca/resource-gallery/Documents/Your%20hemodialysis%20catheter.pdf

5.0 Documentation

- Document CVC hook-up, dressing change and 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.
- Document weekly the distance from the exit site to the top of the hub.
- Document if Tego change was completed.
- Document arterial and venous pressures at 200 pump speed.

6.0 References

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7.0 Developed & Approved by:

Developed by:

- BC Vascular Access Educators Group (VAEG)
- Renal Educators Group (REG)

Approved by:

- BC Renal Hemodialysis Committee (reviewed 2011 version; only minor changes in 2017 version)
- BC Renal Medical Advisory Committee (reviewed

2011 version; only minor changes in 2017 version)

For information about the use and referencing of BC Renal provincial guidelines/resources, refer to the Table of Contents.