Hemodialysis: Attaching or Changing TEGO Connectors on Central Venous Catheter (CVC)

Site Applicability

PHC Hemodialysis Units

Practice Level

Specialized: Nurses who have completed the required education and who provide nursing care in a PHC Renal Program hemodialysis unit may perform this procedure.

Need to Know

1. Sterile technique must be maintained when performing this procedure.
2. During this procedure both staff and patients should wear a mask. As well, nurses must wear either goggles or a face shield for protection from blood spatters.
3. If the patient's clothing compromises accessing their central line, or maintaining a sterile field, the patient should don a patient gown prior to initiating dialysis.
4. Hemodialysis catheters are available in various lengths. The volume of each lumen of the catheter is stamped on the lumens or lumen clamps. Prior to initiating hemodialysis, the CVC block (e.g. sodium citrate, heparin) must be withdrawn and discarded.
5. When blocking a catheter with a TEGO Connector an additional 0.1 mL of sodium citrate for example, is added to the lumen volume to accommodate the volume of the TEGO Connector.
6. 2% W/V Chlorhexidine Gluconate 70% V/V Isopropyl Alcohol swab sticks and swabs are used for cleaning all hemodialysis catheters and exit sites.
7. Alcohol swabs (70%) are used to disinfect TEGO Connector tips. Repeat cleaning if tip is inadvertently contaminated. TEGO Connectors are wiped with a new alcohol swab in between all connections.
8. Air embolus is a potential catastrophic complication of hemodialysis that can lead to death.
9. The risk of an air embolus while accessing a central line for hemodialysis is very high.
10. To prevent an air embolus from occurring, **the catheter ports must never be left unattended and open to the air**; the port clamps must be closed when they are not being used to access the patient's bloodstream.
11. When attaching a syringe or blood tubing connector to a TEGO Connector, screw syringe or blood tubing onto a TEGO Connector clockwise, until it stops – **do not** over tighten. To disconnect, twist syringe or blood tubing connector counter clockwise.
12. TEGO Connectors are changed weekly.

Equipment and Supplies

1. alcohol swabs (8)
2. face shield/goggles
3. garbage receptacle
4. mask (2)
5. hemodialysis CVC scrub tray
6. sterile gloves
7. tape
8. TEGO Connector (2)
9. 2% W/V Chlorhexidine Gluconate 70% V/V Isopropyl Alcohol swabs (5)
10. 10 mL luer lock syringe (4)
11. 20 mL syringe of 0.9% normal saline (NS) without preservative (2), if not available use 10 mL syringes (4)
12. blood specimen tubes (if required)

Procedure

Steps

STEPS	RATIONALE
1. Gather supplies.	
2. Program timer for 3 minutes (this can be done when entering prescription data).	
3. Don mask and assist patient with mask.	
4. Perform hand hygiene.	
5. Don clean gloves.	
6. Remove dressings from the exit site and catheter limbs.	
7. Remove gloves.	
8. Perform hand hygiene.	
9. Open tray using aseptic technique.	
10. Organize supplies, observing aseptic technique, and add TEGO Connectors and other supplies to dressing tray.	
11. Perform hand hygiene.	

12. Don sterile gloves.	
13. Hold catheter with sterile 4 x 4.	
14. Apply drape to the field.	
15. Set catheter limbs down on a new sterile 4 x 4 on top of the drape.	
16. Follow steps in cleaning skin and changing dressing (See B-00-12-10043).	
17. When finished cleaning skin, start timer (use a new sterile 4 x 4 when touching the machine).	
18. Take 1-2% W/V Chlorhexidine Gluconate 70% V/V Isopropyl Alcohol swab and scrub the catheter. Discard CHG swab.	To disinfect the catheter. Friction scrub will provide the best quality of cleaning.
19. With your non-dominant hand, lift the catheter by holding it in the middle.	
20. Take another 2% W/V Chlorhexidine Gluconate 70% V/V Isopropyl Alcohol swab and scrub the arterial limb including the TEGO Connector/red end cap that will be removed. Discard CHG swab.	To disinfect the catheter limb. Friction scrub will provide the best quality of cleaning.
21. Repeat step 20 for the venous limb.	
22. Discard the 4 x 4 that the catheter limbs were set down and set catheter limbs on the sterile drape.	
23. Ensure catheter clamps are closed.	Ensuring that the catheter clamps are closed will prevent an air embolus.
24. Remove the TEGO Connector/red end cap with gloved hand. Clean the arterial catheter hub with a new 2% W/V Chlorhexidine Gluconate 70% V/V Isopropyl Alcohol swab. Discard CHG swab.	
25. Attach the new TEGO Connector to the arterial lumen.	
26. Repeat steps 24 and 25 with the venous limb.	
27. Apply dressing once timer has sounded or once the area is completely dry.	
28. Wipe the TEGO Connector tip with an alcohol swab. Discard alcohol swab. Attach a 10 mL luer lock syringe to the TEGO Connector on the arterial lumen.	To make sure that the area is disinfected before accessing it.

29. Open arterial lumen clamp and withdraw 5 mL of blood. Close clamp.	To remove blocking agent and blood clots from the catheter.
30. Detach the 10 mL syringe from the arterial lumen. Discard the syringe and contents. Wipe the TEGO Connector tip with an alcohol swab. Discard alcohol swab. Attach a new 10 mL luer lock syringe to the TEGO Connector on the arterial lumen.	
31. Repeat steps 28 to 30 for the venous lumen. If necessary, pre-dialysis bloodwork can be drawn at this time.	
32. With a 10 mL syringe attached, open arterial lumen clamp and check for adequate blood flow using a "withdraw and instill motion." Close clamp.	Adequate blood flow is necessary to obtain a maximum pump speed during dialysis.
33. Remove 10 mL syringe from the TEGO Connector on the arterial lumen. Wipe the TEGO Connector tip with an alcohol swab. Discard alcohol swab. Attach the 20 mL syringe of normal saline. Flush lumen using a "push/pause" method (i.e. short repetitive pushes on syringe plunger). Close clamp. Do not force normal saline flushes.	"Push/pause" flush technique increases the turbulence within the catheter lumen during the flush, thereby making the flush more effective.
34. Repeat steps 32 and 33 for the venous lumen.	
35. Remove the 20 mL syringe from the TEGO Connector on the arterial lumen and discard. Wipe the TEGO Connector tip with an alcohol swab. Discard alcohol swab and connect arterial line.	
36. Prime circuit with blood as per procedure for initiating hemodialysis.	
37. Repeat step 35 for the venous lumen and venous line. Ensure connections are secured.	A loose connection could result in air entering the circuit or the patient's blood stream.
38. Turn blood pump on at 100 mL/min and observe arterial and venous pressures.	
39. Unless contraindicated, increase blood pump to 200 mL/min and record arterial and venous pressures and pump speed on the hemodialysis log.	Record arterial and venous pressures at a blood pump speed of 200 mL/MIN provides baseline data regarding catheter patency and thrombus formation.
40. Secure lines to patient bed/chair with tape and or clamps.	To prevent pulling of catheter and possible line separation.

41. Adjust dialysis parameters to obtain maximum dialysis adequacy.	

Documentation

Hemodialysis Log

- Adequacy of blood flow from each lumen.
- TEGO change, exit site, dressing, etc.

HD Care Guide

- Date to change TEGO Connectors

Patient and Family Education

1. Explain procedure and rationale to patient. Educate the patient regarding:
    - The potential harm of air entering the extracorporeal circuit.
    - Signs of symptoms of air embolism and need to seek immediate medical attention. Signs and symptoms of air embolism include:
        - sensation of air rushing into the circulation (e.g. hearing the “sound of a train” or rushing air”)
        - chest pain, dyspnea, shortness of breath, coughing, cyanosis, and visual disturbances
        - neurological deficits such as confusion, coma, and hemiparesis
        - loss of consciousness, convulsions, or death
2. Contact your nurse, hemodialysis unit, or nephrologist on call after hours, if you notice any of the following:
    - Any drainage, redness, swelling, or pain around the catheter exit site
    - Excessive bleeding from the catheter exit site
    - Chills or fever
    - If the TEGO Connector becomes loose or falls off, ensure the catheter remains clamped and contact the hemodialysis unit as soon as possible. Urgent care is required due to risk of infection or air entering the bloodstream.
    - If the catheter has partially or completely been pulled out, apply pressure over the site with clean gauze and seek medical attention.
    - If any portion of the catheter develops a hole, leak, or partial separation, ensure the catheter is clamped off between your body and the problem area. The catheter clamp is moveable and can be slid up the body of the catheter. If necessary the catheter may be kinked with your fingers to occlude the catheter. Seek medical attention to help prevent serious injury. Call 911.

3. Between dialysis treatments ensure that:
    - The catheter clamp is closed. If the clamp opens, close it immediately.
    - The catheter should only be used for hemodialysis treatments, unless authorized by nephrologist.
    - TEGO Connectors are secure and should only be removed by nurses who have specialized education and training.
    - The dressing is dry and in place and the exit site is clean and dry. Do not remove the dressing. If the dressing falls off, replace it with a new dressing.
    - Avoid any activities that may irritate or cause harm to the catheter.
    - Do not shower or submerge your catheter in water. Hot tubs should be avoided.
    - For non-cuffed catheters, the stitches must remain in place for as long as you have a catheter.
    - For cuffed catheters (Permcaths), the stitches are removed once the catheter is healed (approximately 4 to 8 weeks).

Related Documents

1. B-00-12-10152 – Hemodialysis: Accessing a Central Venous Catheter (CVC) with and without Tego Connectors
2. B-00-12-10043 – Hemodialysis: Central Venous Access Dressing
3. B-00-12-10144 – Hemodialysis: Flushing and Capping Central Venous Catheters
4. B-00-07-13026 – Gloves
5. B-00-07-13027 – Face Protection: Masks, Goggles and Face Shields – infection Control
6. B-00-07-13033 – Gowns and Protective Apparel
7. B-00-07-13038 – Spills: Blood and Body Fluids

References

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3. Bander, S. & Woo, K. (2018). UptoDate® Literature Review: *Central catheters for acute and chronic hemodialysis access.* Retrieved March 14, 2019 from https://www.uptodate.com/contents/central-catheters-for-acute-and-chronic-hemodialysisaccess?
4. Counts, C. (Ed). (2008). *Core Curriculum for Nephrology Nursing*. American Nephrology Nurses' Association: Pitman, NJ.

5. *TEGO Connector Directions for Use*. (2009). CardioMed Supplies Inc: Lindsay, ON.
6. Thomas, A. (2006). Clinical educators network nursing recommendations for management of vascular access in hemodialysis patients. *CANNT Journal*, *16,* 18-20.
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