

**CONSIDERATIONS:**

1. LPNs working in New Hampshire may not care for central lines based on the NH State Practice Act.
2. The subcutaneously tunneled central vascular access device is a surgically placed catheter. The catheter is tunneled between an entrance site, where the catheter enters the venous circulation, and an exit site, where the catheter extrudes from the skin. The catheter has a synthetic cuff that lies in the tunneled area between the entrance and exit site. Over time, the tissue attaches to the cuff to stabilize the catheter and hold it in place and will seal the pathway to the vein, reducing the risk for bloodstream infection. The tunneled catheter is most often inserted via the subclavian or internal jugular vein and threaded so that the tip is located centrally in the lower superior vena cava or right atrium. There are single, double, and triple lumen tunneled catheters. Indications are for long term infusion therapies and can remain in place for months to years.
3. Tunneled catheters may be valved or open-ended catheters. The most common catheter locking recommendation to maintain patency for open-ended catheters is 5 mL of heparin solution 10 units/mL at least once per day or after each use, or as prescribed by physician. Catheters with valves in the hub or distal tip of the catheter (e.g. Groshong) are usually flushed with normal saline to maintain patency as per manufacturer recommendations (usually weekly).
4. The needleless connector is changed at least once per week, if any blood or debris is visible within the connector, prior to withdrawal of blood for blood cultures, after blood draws and PRN. There are three categories of needleless connectors: negative fluid displacement, positive fluid displacement, and neutral design. It is important to follow the manufacturer guidelines particularly in relation to flushing sequence. For example, with positive fluid displacement connectors, it is important to clamp after removing the flush syringe in order to avoid blood reflux into the catheter which increases risk for occlusion.
5. There are alcohol caps that can be used to protect the needleless connector between uses. This type of product is increasingly used as emerging research is demonstrating reduced risk of bloodstream infection. When such caps are applied, the need for scrubbing the needleless connector before access is eliminated. The cap is discarded once removed and a fresh cap applied after each infusion.
6. When medication is administered the SASH method of flushing is utilized to reduce the risk of precipitation due to drug incompatibility:

**S** – Saline

**A** – Administer drug/solution

**S** – Saline

**H** – Heparin

Unless otherwise ordered by a physician, 5 - 10 mL of normal saline will be used.

7. Site care and dressing changes are performed every 7 days and PRN using a transparent semi-permeable dressing. If using a gauze dressing, site care and dressing changes are performed at least every 2 days. Use of gauze dressings may be preferable in patients who perspire profusely, who require frequent dressing changes, and in those who have sensitivity or allergic reactions to transparent dressings. One of the advantages to a tunneled catheter is that once well healed in place, the catheter may be managed without a dressing. The home care nurse should collaborate with the physician to discuss the need for a dressing.
8. Antimicrobial dressings may also be used such as chlorhexidine impregnated dressings which reduce the risk of microbial growth at the catheter exit site. The evidence for use of these dressings is primarily in acute care with short term catheters. These dressings may be used on a short term basis with tunneled catheters (e.g. 2 - 3 weeks) until the tunnel is well healed.
9. Blood sampling is performed with a tunneled catheter with a physician's order.
10. The tunneled catheter should be removed when no longer needed for infusion therapy. The tunneled catheter is not removed by the home care nurse; the patient is referred to the physician for removal.
11. The patient/caregiver is taught to check the catheter site for, and to report:
  - a. Excessive drainage or bleeding from catheter exit site
  - b. Redness or swelling around the catheter exit site
  - c. Pain, soreness, swelling or tenderness in the arm or in the shoulder, chest, or neck on the side of the PICC
  - d. Pain or discomfort during infusion of IV solution
  - e. Chest pain or any discomfort while catheter is in place
12. Per Joint Commission recommendations all tubes and catheters should be labeled to prevent the possibility of tubing misconnections. Staff should emphasize to all patients/caregivers the importance of contacting a clinical staff member for assistance when there is an identified need to disconnect or reconnect devices.

**A. Management of Complications:**

1. Thorough assessment and patient education are the first line of defense in the prevention, identification, and management of post-insertion complications.
2. The following are some possible complications that may be encountered with tunneled catheters:

- a. Occlusion: Occlusion as evidenced by inability to withdraw blood, sluggish flow, and inability to flush or infuse may be due to mechanical, thrombotic, or precipitate problems. Refer to Procedure: Occlusion and TPA
- b. Infection: Signs and symptoms of exit site infection include erythema, tenderness, induration, and/or purulent drainage at the site. Signs and symptoms of catheter associated bloodstream infection (CLABSI) include fever, chills, backache, malaise, nausea, hypotension, nausea and/or vomiting. Local site infection may precede or occur concomitantly with CLABSI. CLABSI may occur with or without signs of local site infection. The physician is notified of suspected infection. Depending upon severity of signs and symptoms, interventions may include evaluation and treatment at home (e.g. culture of drainage, blood cultures, antibiotics, catheter removal) or hospitalization
- c. Catheter associated venous thrombosis: Signs and symptoms are pain or edema in the extremity, shoulder, neck or chest; engorged peripheral veins on the extremity, shoulder, neck or chest wall and/or difficulty with neck or extremity motion. Notify physician if present
- d. Air embolism: Signs and symptoms of air embolism are chest pain, sub-sternal churning sound on auscultation dyspnea, tachycardia, hypotension, nausea and anxiety. Immediately position patient on the left side with head down and call 911
- e. Pain: Stop Infusion. Assess patient for phlebitis, infiltration, and sepsis. If symptoms persist, immobilize arm, discontinue infusion and notify physician
- f. Cracked catheter:
  - i. Refer to Procedure: *Infusion Therapy – Central Line : Repair*
  - ii. Teach patient to immediately place a clamp between the skin and the cracked catheter and call the home care nurse

**B. Flushing/Heparinization Equipment:**

Gloves  
Alcohol/antimicrobial wipe  
Syringe of 10 mL normal saline, if indicated  
Syringe of 5 mL heparin solution (10 units/mL or as prescribed)  
Puncture-proof sharps container  
Biohazard trash bag

**PROCEDURE:**

1. Adhere to Standard Precautions.
2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface.

4. Place patient in comfortable position, ensuring that the site is accessible.
5. Ensure adequate lighting. Don gloves.
6. Disinfect needleless connector with alcohol wipe using friction for at least 15 seconds. Allow to air dry.
7. If medication administered, follow SASH method
8. If medication not administered, unclamp PICC and aseptically attach heparin filled syringe to needleless connector.
9. Flush heparin solution using steady pressure, then disconnect syringe and reclamp PICC as appropriate.
10. Discard used supplies in appropriate containers.

**AFTER CARE:**

1. Document in patient record:
  - a. Date, time and procedure performed
  - b. Amount of saline and heparin flush, including strength of heparin solution
  - c. Medication(s) administered dosage and time
  - d. Appearance of PICC site
  - e. Patient's response to procedure
  - f. Instructions given to patient/caregiver
  - g. Patient's response to teaching

**C. Needleless Connector Change**

The needleless connector is changed every 7 days and PRN

**EQUIPMENT:**

Gloves  
Needleless connector  
Alcohol applicator/antimicrobial wipes  
Prefilled 10 mL saline syringe  
Puncture-proof container  
Biohazard trash bag  
Prefilled heparin syringe

**PROCEDURE:**

1. Adhere to Standard Precautions.
2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface close to the patient.
4. Place patient in comfortable reclining position, ensuring that site is accessible and below the level of the heart.
5. Ensure adequate lighting.
6. Don gloves.
7. Attach saline syringe aseptically to new, sterile needleless connector and prime to fill dead space, leaving syringe attached to connector.

8. Disinfect junction of catheter hub/extension set and needleless connector with alcohol wipe using friction for at least 15 seconds. Allow to air dry.
9. Clamp catheter to reduce risk of air embolism or bleeding during procedure.
10. Remove old needleless connector.
11. Disinfect hub with alcohol wipe using friction and allow to dry.
12. Replace with new needleless connector, twisting firmly to secure with syringe still attached.
13. Unclamp catheter. Aspirate for blood to confirm PICC patency.
14. Inject normal saline solution, using steady pressure and then disconnect syringe.
15. Resume infusion, as appropriate or flush with heparin and clamp catheter.
16. Remove gloves, discard soiled supplies in appropriate containers, and wash hands.

**AFTER CARE:**

1. Document in patient record:
  - a. Date, time and procedure performed
  - b. Amount of flush solution
  - c. Appearance of PICC site
  - d. Patient's response to procedure
  - e. Instructions given to patient/caregiver
  - f. Patient's response to teaching

**D. Dressing Change Equipment:**

Sterile barrier

Sterile 5 x 7 cm transparent semi-permeable dressing (Opsite, Tegaderm)

Antimicrobial (Chloraprep® - preferred; povidone iodine, or 70% alcohol)

Catheter stabilization device

Skin preparation swab – skin protectant

Mask

Gloves, sterile ( 1 pair)

Biohazard trash bag

Sterile drape

Marking pen/labels

**PROCEDURE:**

1. Adhere to Standard Precautions.
2. Explain the procedure and purpose to the patient/caregiver.
3. Place sterile barrier on clean surface; open sterile items and drop onto barrier.
4. Place patient in comfortable, reclining position, ensuring that site is accessible.
5. Ensure adequate lighting.
6. Don gloves and mask.
7. Slowly loosen transparent dressing at the distal end while anchoring catheter with the other hand. Peel dressing toward the exit site and parallel to the skin.

8. Inspect site for signs and symptoms of site infection. If present, notify physician.
9. Remove contaminated gloves wash hands, and don sterile gloves.
10. Perform skin antisepsis:
  - a. Chlorhexidine solution: apply using back and forth motion for at least 30 seconds
  - b. Povidone iodine or 70% alcohol: apply using swabsticks in a concentric circle beginning at the insertion site, moving outward; note that povidone iodine must remain on the skin for at least 2 minutes or longer to dry completely for adequate skin antisepsis
  - c. Allow skin to air dry. DO NOT blot
11. Verify that external catheter length visible outside corresponds to initial placement measurement. If it does not, notify physician before continuing use.
12. Apply transparent semi-permeable dressing.
13. Remove gloves, discard soiled supplies in appropriate containers, and wash hands.
14. Label dressing with date, time, and initials.

**AFTER CARE:**

1. Document in patient record:
  - a. Date, time and procedure performed
  - b. Appearance of venous access site
  - c. Patient's response to procedure
  - d. Instructions given to patient/caregiver
  - e. Patient's response to teaching

**REFERENCE:**

- Bullock-Corkhill, M (2010). Central Venous Access Devices: Access and Insertion. In: Alexander, M., Corrigan A., Gorski, L., Hankins J., Perucca, R., Eds. *Infusion Nursing: An Evidenced Based Approach*. 3<sup>rd</sup> Edition (pp. 480-494). St. Louis, MO: Saunders/Elsevier.
- Infusion Nurses Society, Inc. (2011). *Policies and Procedures for Infusion Nursing*. 4<sup>th</sup> Edition. INS, Norwood Park South, Norwood: INS.
- Infusion Nurses Society (2011). Infusion Nursing Standards of Practice. *Journal of Infusion Nursing* 34 (1S), S1-S110.
- Gorski, L, Perucca, R, Hunter, M (2010). Central Venous Access Devices: Care, Maintenance, and Potential Complications. In: Alexander, M., Corrigan A., Gorski, L., Hankins J., Perucca, R., Eds. *Infusion Nursing: An Evidenced Based Approach*. 3<sup>rd</sup> Edition (pp. 495-515). St. Louis, MO: Saunders/Elsevier.

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Revised: Policy Committee 08/14

Adopted from VNAA; Approved Policy Committee 08/13