

CONSIDERATIONS:

1. LPNs working in New Hampshire may not care for central lines based on the NH State Practice Act.
2. Non-tunneled catheters are percutaneously placed while central venous catheters most often placed via the subclavian or internal jugular vein. These are short term catheters, most often used only in acute care and much less often seen in home care. There may be instances when patients are sent home with a non-tunneled catheter, usually for a very short term infusion need. PICC, tunneled catheters, and implanted ports are more appropriate central venous catheters for the home care nurse.
3. Non-tunneled catheters are available in single and multi-lumen options.
4. The most common catheter locking recommendation to maintain patency is 3 mL of heparin solution 10 units/mL every 24 hours, after each use, or as prescribed by a physician.
5. 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, 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's 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.
6. There are alcohol caps that can be used to protect the needleless connector between uses. This type of product is increasing in use 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. Once removed, the cap is discarded and a fresh cap is applied after each infusion.
7. 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.
8. Site care and dressing changes are performed every seven days and PRN using a transparent semi-permeable dressing. If using a gauze dressing, site care and dressing changes must be performed at least every two 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 have allergic reactions to transparent dressings. 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, if used, are generally changed at least once per week in accordance with manufacturer instructions.

9. Blood sampling is performed with non-tunneled catheters with a physician's order. Refer to *Infusion Therapy – Central Line: Blood Specimens*
10. The non-tunneled catheter should be removed when it is no longer needed for infusion therapy in collaboration with the physician.
11. When removing the catheter, the primary consideration is to prevent air embolism. This is done by:
 - a. Asking patient to perform Valsalva maneuver, or to exhale during removal
 - b. Applying pressure to removal site until bleeding has stopped
 - c. Applying a petroleum-impregnated dressing to seal the ski- to-vein tract
12. Teach the patient/caregiver to check catheter site 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 catheter
 - d. Pain or discomfort during infusion of IV solution
 - e. Chest pain or any discomfort while catheter is in place
13. 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/caregiver 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 PICCs:
 - 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: *Infusion Therapy – Central Line: 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. Teach patient/caregiver to immediately place a clamp between the skin and the cracked catheter and call the home care nurse
 - ii. Notify physician and obtain order to remove catheter in the home or send the patient to the physician for immediate removal

B. Flushing/Heparinization Equipment:

Gloves
Alcohol/antimicrobial wipe
Syringe of 10 mL normal saline, if indicated
Syringe of 3 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 (see Consideration No. 4).
8. If medication not administered, unclamp catheter and aseptically attach heparin filled syringe to needleless connector.
9. Flush heparin solution using steady pressure, then disconnect syringe and re-clamp catheter 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/caregiver 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 a new needleless connector, firmly twisting to secure with the syringe still attached.
13. Unclamp catheter. Aspirate for blood to confirm catheter patency.
14. Inject normal saline solution, using steady pressure and then disconnect syringe.
15. If line in use, resume infusion, as appropriate.
16. If line not in use, flush with heparin as ordered and clamp catheter.
17. 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/caregiver response to teaching

D. Dressing Change Equipment:

Sterile barrier

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

Antimicrobial (ChlorPrep® - 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 a 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. Remove catheter stabilization device according to manufacturer directions and stabilize catheter to reduce risk of external catheter migration out of exit site.

9. Inspect site for signs and symptoms of site infection. If present, notify physician.
10. Remove contaminated gloves wash hands, and don sterile gloves.
11. Perform skin antisepsis with one of the following:
 - 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
12. Replace catheter stabilization device per manufacturer directions (preferred method; alternate methods: surgical strips, sterile tape).
13. Verify that external catheter length visible outside corresponds to initial placement measurement. If it does not, notify physician before continuing use.
14. Apply transparent semi-permeable dressing. Refer to manufacturer recommendations for additional catheter securement.
15. Remove gloves, discard soiled supplies in appropriate containers, and wash hands:
 - a. 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. Length of catheter external and effective internal lengths
 - d. Patient's response to procedure
 - e. Instructions given to patient/caregiver
 - f. Patient/caregiver response to teaching

E. Removal of Non-Tunneled Catheter Equipment:

Central line dressing kit, or:

Mask and gloves

Chlorhexidine or 70% alcohol

2 x 2 sterile gauze

Tape for dressing

Suture removal kit, if sutured in position

Antibiotic ointment. Measuring tape for catheter

PROCEDURE:

1. Collaborate with physician about removal of the line, and obtain order for removal.
2. Adhere to Standard Precautions and gather supplies.
3. Explain procedure to patient.
4. Instruct patient in Valsalva maneuver.
5. Don clean gloves.
6. Remove dressing and stabilizing device/sutures.

7. Remove gloves.
8. Open Central Line kit, and don mask and gloves.
9. Cleanse insertion site with skin disinfectant (chlorhexidine or 70% iodine) and from insertion site outward and allow to dry.
10. Ask patient to perform Valsava maneuver while:
 - a. Pulling the catheter with gentle even pressure using dominant hand
 - b. Holding gauze securely over insertion site with non-dominant hand
 - c. If catheter resists removal, do not pull. Alert physician
11. Maintain pressure over site until bleeding stops or for a minimum of 30 seconds.
12. Place sterile occlusive dressing with antibiotic ointment over site.
13. Instruct patient to remain lying down for 30 minutes after removing catheter.
14. Instruct patient to leave dressing on for a least 24 hours.

AFTER CARE:

1. Document in patient record:
 - a. Date, time catheter removed
 - b. Appearance of insertion site pre/post removal
 - c. Length of catheter removed and comparison to previously documented catheter length
 - d. Patient's response to procedure
 - e. Instructions given to patient/caregiver
 - f. Patient/caregiver response to teaching

REFERENCE:

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