CONSIDERATIONS:

1. The PICC is a central vascular access device inserted via a peripheral vein above the antecubital fossa (e.g. basilic, cephalic) and threaded so that the tip is located centrally in the lower superior vena cava. Of note, some PICCs are placed via the internal jugular vein. There are single, double, and triple lumens PICCs. Indications for a PICC include short to moderate term infusion therapies and are generally placed for an anticipated duration of infusion therapy of less than one year.
2. PICCs may be valved or open-ended catheters. The most common catheter locking recommendation to maintain patency for open-ended PICCs is 3 mL of heparin solution; 10 units/mL every 24 hours, after each use, or as prescribed by physician. PICCs with valves in the hub or distal tip of the catheter (e.g. Groshong, Power PICC "Solo" and Vaxcel PASV) are usually flushed with normal saline to maintain patency as per manufacturer recommendations. Clamping is not recommended on valved catheters.
3. 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:
   a. Negative fluid displacement
   b. Positive fluid displacement
   c. Neutral design
   d. 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
4. 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.
5. 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. A valved catheter would use SAS method and use 20cc normal saline post flush after a blood draw.
6. 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 are 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 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.
7. Blood sampling is performed with PICCs following a physician's order. Refer to *Infusion Therapy – Central Line Blood Specimen,*
8. The PICC should be removed when no longer needed for infusion therapy in collaboration with the physician. When removing the catheter, the primary consideration is to prevent air embolism. This is done by:
   a. Positioning the patient so the insertion site is below the level of the heart
   b. Asking patient to perform Vasalva maneuver or to exhale during removal
   c. Applying pressure to removal site until bleeding has stopped
   d. Applying a petroleum-impregnated dressing to seal the skin- to-vein tract
9. The patient/caregiver is taught to check the PICC 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
10. 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 PICCs:
   a. Bleeding:
      i. A small amount of bleeding at the site of insertion in the first 24 hours after placement is common. Sterile 2 x 2 gauze at the site of insertion is sufficient to manage
   b. Occlusion: PICC 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*
   c. Sterile mechanical phlebitis may occur within the first 48 - 72 hours after placement. This may be treated:
      i. Apply moist, warm compress to upper arm for 20 minutes 4 times a day, elevate extremity and encourage mild use of the extremity (promotes blood flow around PICC)
      ii. If symptoms worse, do not completely resolve and patient develops fever, increased pain, palpable cord or notify physician for evaluation and probable removal of PICC
   d. 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
   e. 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. Arm with PICC line will have circumference and length of external catheter measured at admission visit, weekly with each dressing change and/or if evidence of swelling or pain. Notify physician if present.
   f. 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
   g. Pain: Stop Infusion. Assess patient for phlebitis, infiltration, and sepsis. If symptoms persist, immobilize arm, discontinue infusion and notify physician
   h. Cracked catheter:
      i. Teach patient/caregi*ver to* immediately place tape over 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 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.
6. Disinfect needleless connector with alcohol wipe using friction for at least 15 seconds. Allow to air dry.
7. If medication administered, follow SASH or SAS method
8. If medication not administered, unclamp PICC and aseptically attach heparin filled or saline syringe to needleless connector depending on type of catheter.
9. Flush 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/caregiver response to teaching

C. Needleless Connector Change:

1. If an extension tubing is attached at the time of catheter insertion, it is considered a permanent part of the catheter and is changed ONLY if cracked, leaking or inadvertently disconnected. If added after PICC placement, there are no evidence-based

guidelines for frequency of changing the extension set; based on common home care practice, the extension set is changed at least every seven days. The needleless connector is changed every seven days and PRN.

EQUIPMENT:

Gloves
Needleless connector
Alcohol applicator/antimicrobial wipes
Prefilled 10 mL saline syringe
Puncture-proof 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 close to the patient.
4. Place patient in comfortable reclining position, ensuring that the 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 PICC 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, if ordered, 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/caregiver 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. Remove catheter stabilization device according to manufacturer's directions and stabilize PICC 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:
    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. 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. Ensure dressing covers wing of hub of PICC line, depending on catheter design. Refer to manufacturer's recommendations for additional catheter securement.

15. Measure circumference of arm 2 inches above site and compare to previous measurement.
16. Remove gloves, discard soiled supplies in appropriate containers, and wash hands.
17. 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 circumference of arm.
    d. Patient's response to procedure
    e. Instructions given to patient/caregiver
    f. Patient/caregiver response to teaching

E. Removal of PICC 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/caregiver.
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 air 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 PICC resists removal, do not pull:
        i. Attempt warm, moist compresses to the venous pathway, axilla, and hand to increase venous distention
        ii. If still unable to remove, notify physician; a reattempt to remove the PICC the following day is recommended or refer the patient to physician (interventional radiology) for removal
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. Measure length of catheter.
14. Instruct patient to remain lying down for 30 minutes after removing catheter.
15. 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 site pre/post removal
    c. Length of catheter removed and comparison with previously documented catheter length
    d. Patient's response to procedure
    e. Instructions given to patient/caregiver
    f. Patient/caregiver response to teaching

REFERENCE:

Infusion Nurses Society, Inc. (2011). *Policies and Procedures for Infusion Nursing.* 4th Edition. INS, 220 Norwood Park South, Norwood, MA.

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.* 3rd Edition (pp. 495-515). St. Louis, MO: Saunders/Elsevier.

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