PURPOSE:
To decrease the possibility of central line site infection(s) through the use of antiseptic agents at the catheter exit site.

CONSIDERATIONS:
Central Line:
1. Remember to have the patient turn their head away from the central line site while the dressing is being removed to prevent contamination from sneezing, etc.
2. If patient is unable to turn his/her head, a mask should be considered.

BIOPATCH™
1. BIOPATCH™ is treated with chlorhexidine gluconate, a broad-spectrum antimicrobial and anti-fungal agent that is released for up to seven days.
2. When applied to a central venous catheter site, the BIOPATCH™ dressing helps reduce catheter tip colonization and bloodstream infection.
3. The BIOPATCH™ dressing can absorb up to eight times its own weight in fluid and provides a one-inch zone of inhibition from the insertion site.
4. The BIOPATCH™ should be placed so that the pre-cut slit is oriented near or under the catheter. Ensure that BIOPATCH™ edges remain together to maximize product performance.
5. Central venous catheter lines and tubing should be directed away from ostomy sites and bags to decrease cross-contamination.
6. BIOPATCH™ dressings require a physician’s order.
7. The safety and effectiveness of the BIOPATCH™ antimicrobial dressing has not been established in children less than 16 years of age. The dressing should not be used on premature infants or on patients with a known sensitivity to chlorhexidine gluconate.

EQUIPMENT:
Central line dressing kit
Non-sterile and sterile gloves
Mask
BIOPATCH™ Product
Tape
Alcohol swabs

PROCEDURE:
1. Adhere to Standard Precautions.
2. Explain the procedure to the patient and/or caregiver(s). Determine whether the patient has any allergies to products containing chlorhexidine gluconate or isopropyl alcohol.
3. Assemble supplies including the dressing change kit, BIOPATCH™.
5. Loosen the clear or gauze dressing carefully and separate it from the skin without pulling on the central venous catheter.
6. Assess the central venous catheter site for signs of infection including drainage, redness, odor or inflammation.
7. Remove non-sterile gloves and dispose of soiled dressings properly. (Perform hand hygiene.)
8. Using sterile technique, open central venous catheter dressing change kit and establish sterile field.
9. Open BIOPATCH™ package and add to sterile field, if not included in central venous catheter dressing kit.
10. Don sterile gloves.
11. Instructions for using BIOPATCH™:
   a. Place BIOPATCH™ dressing around catheter with blue side up and white foam side next to patient’s skin. New blue product placement indicator facilitates correct application.
   b. To ensure easy removal, place BIOPATCH™ dressing so that catheter rests on or near the radial slit. Edges of slit must touch to assure efficacy.
   c. Assure complete contact between skin and BIOPATCH™ dressing.
12. Cover BIOPATCH™ dressing with a secondary dressing. (See Central Venous Catheter: Dressing Change.)

AFTER CARE:
1. Document in patient’s record:
   a. Type and appearance of venous access site.
   b. Patient’s response to procedure.
   c. Instructions given to patient/caregiver.
   d. Response to training.
   e. Communication with physician.
Purpose:
To assess a non-functioning catheter for occlusion.

Policy:
The nurse will address preventive measures, identify signs and symptoms of, and promptly intervene when central vascular access device (CVAD) occlusion is suspected.

A thorough assessment of the patient and the CVAD for the potential cause of an occlusion will be performed, and the appropriate intervention will be performed to restore catheter patency.

Catheter clearance agents, such as precipitate-clearing or thrombolytic (declotting) agents, are used only with CVADs.

Considerations:
1. A non-functioning catheter may be caused by the catheter tip being lodged against the wall of the subclavian vein, superior vena cava or right atrium. Changing the patient's position, raising their arms above their head or performing the Valsalva maneuver may help dislodge the catheter tip.
2. Studies have shown the presence of thrombus or fibrin around tips of most long-term catheters, regardless of catheter function. Patients with central venous catheters should be assessed for signs of central vessel occlusion such as swelling of the extremity, shoulder, chest, neck or face. Signs of central vessel occlusion should be reported to the physician immediately.
3. Difficulty in drawing blood from an implanted vascular access device is not uncommon due to the structure of the reservoir and catheter. PICC catheter should be a 3.0 French or larger. PICC lines may also be vulnerable to kinking under the dressing, especially if some of the catheter remains exposed causing difficulty in drawing blood.
4. Force must not be used to clear an IV catheter because of the risk of rupture and subsequent catheter embolism. Only syringes 10 mL or greater should be used.
5. Clotting of the catheter is generally caused by running an infusion too slowly, turning off the pump accidentally for prolonged periods of time or inadequate or infrequent irrigation of the line. Review all of these causes when instructing the patient/caregiver.

Prevention:
- Use a positive-pressure flushing technique with negative-pressure needleless connectors to prevent the reflux of blood into the catheter tip
- Flush visible blood from CVAD
- Flush after blood draws
- Flush between medication/solution administration to prevent precipitate formation from mixing of incompatible infusates
- Change filters on a routine basis
- Ensure all clamps are open before initiating infusion

Assessment:
- Assess for signs of partial or complete occlusion, including:
  - Sluggish infusion or flushing
  - Lack of brisk blood return
  - Increasing occlusion alarms on an electronic infusion device (EID)
  - Complete inability to infuse or flush (complete occlusion)
- Assess and attempt to identify potential causes of occlusion
  - Mechanical:
    - External: tight suture, clamped catheter, kinked tubing, obstructed filter, nonfunctioning needleless connector
    - Internal: catheter malposition, kinked catheter, pinch-off syndrome
  - Nonthrombotic: lipid buildup from 3-in-1 parenteral nutrition admixtures, drug precipitate
  - Thrombotic: most common, due to fibrin buildup, blood clots within or around catheter (eg, intraluminal occlusion or fibrin sheath/tail)
- Identify appropriate catheter-clearance agent (precipitate-clearing or declotting agent).

Equipment:
- Gloves
- Alcohol applicator (wipe/swab/disk/ampule)
- 2- 10 mL syringes
- Needles or needle less adaptor
- Normal saline (2 – 10 mL)
- Heparin solution (100 units/mL or as prescribed)
- Puncture-proof container
- Impervious trash bag

Direct Instillation Method: Use with Partial Thrombotic or Nonthrombotic Occlusions:
1. Perform hand hygiene.
2. Explain procedure to patient.
3. Don gloves.
4. Disinfect needleless connector with antiseptic solution; allow to dry completely.
5. Attach syringe with precipitate-clearing or declotting solution.
6. Unclamp CVAD, if appropriate, and slowly inject precipitate-clearing or declotting agent. Do not force solution into CVAD.
7. Allow solution to dwell according to the manufacturer’s directions for use.
8. After appropriate dwell time, disinfect needleless connector with antiseptic solution; allow to dry completely.
9. Attach empty 10-mL syringe and attempt to aspirate blood
   - A free-flowing blood return indicates patency
   - If patency is reestablished, withdraw a total of 4-5 mL of blood, clamp CVAD, and remove and discard syringe
   - Repeat procedure if patency is not achieved
   - Notify MD if unable to achieve patency
10. Attach 10-mL syringe of preservative-free 0.9% sodium chloride (USP) unclamp, and flush CVAD. Flush with total of 20 mL.
11. Resume ordered therapy or lock catheter as appropriate.
12. Dispose of used supplies in appropriate receptacles.
13. Remove gloves.

APPEAR CARE:
1. Document in patient’s record:
   a. Date, time, procedure and observations.
   b. Patient’s response to procedure, side effects and management.
   c. Instructions given to patient/caregiver.
   d. Communication with physician.

REFERENCE:
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections
**Purpose:**
To obtain blood specimens from a central line for laboratory tests.

**Considerations:**
1. Confirm physician’s order for blood work use of the central venous catheter for drawing the specimens.
2. If aspiration of blood or fluid becomes difficult, have patient change position, take a deep breath or lift one or both arms above head.
3. See specific procedures for drawing blood. (See Infusion Therapy – Groshong Catheter Maintenance and Implanted Vascular Access Device (IVAD).)
4. Drawing blood for clotting studies from a heparinized line may falsely alter the results obtained.

**Equipment:**
- Gloves
- Alcohol applicator (wipe/swab/disk/ampule)
- Heparin solution (100 units/mL or as prescribed)
- Normal saline
- 10-20 mL syringes (2)
- Needles or needleless adaptors (2)
- Vacutainer sleeve
- Lab tubes
- Puncture-proof container
- Impervious trash bag

**Procedure:**
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Discontinue administration of infusates prior to obtaining blood samples.
7. Disinfect needleless connector with antiseptic solution; allow to dry complete.
8. Obtain discard sample:
   - Attach empty 10 mL syringe and withdraw 4-5 mL of blood
   - or-
   - Attach blood-tube holder, advance blood collection tube to obtain 4-5 mL of blood
9. Obtain blood samples as ordered.
10. Transfer flood samples from syringe(s) to appropriate blood specimen tubes, if applicable.
11. Change needleless connector according to manufacturer’s directions for use or organizational policy.
12. Flush CVAD with 10 mL preservative-free sodium chloride (USP) and lock CVAD or resume infusion as ordered.

**Post-Blood Drawing:**
1. Label blood samples before leaving the patient as established by the organization - patient name and date of specimen.
2. Send samples to testing laboratory:
   - Certain specimens may need to be placed on ice during transport; check with laboratory used by the organization
   - Place blood specimen in sealed container for transport
   - Identify container with BIOHAZARD label
3. Discard used supplies in appropriate receptacles.
4. Remove gloves.
5. Perform hand hygiene.

**Reference:**
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections.
Infusion Therapy – Central Venous Catheter: Flushing/Heparinization

SECTION: 25.07

Strength of Evidence Level: 3

PURPOSE:
To maintain patency of a central venous catheter.

POLICY:
Flushing is performed prior to each infusion to assess vascular access device (VAD) function, after each infusion to prevent missing of incompatible medications and solutions, and after blood sampling.

Locking is performed to maintain device patency and prevent occlusion by instilling solution in an intermittently used VAD.

Single-use flushing and locking systems will be used.

A VAD should never be forcibly flushed. To prevent damage, the patency of the VAD should be assessed using a 10-mL syringe.

CONSIDERATIONS:
1. A central venous catheter (CVC) is a venous access device with the tip located in the superior vena cava. It provides access to the patient's circulation for the administration of any type of intravenous therapy including drawing blood for laboratory analysis.
2. Heparin flushing is to be done after every use of the catheter and once a day when not in use, with 1-5 mL of 100 units/mL of heparin solution or as ordered per physician. (Amount of heparin depends on type of CVC.) With a multi-lumen catheter, each lumen must be heparinized at least once a day and after every lumen use. [EXCEPTION - SEE PROCEDURE FOR GROSHONG CATHETER MAINTENANCE WHICH USES ONLY SALINE FOR IRRIGATION.]
3. Prior to interruption of the line, the connections should be cleaned with an alcohol applicator, using friction and allowed to air dry.
4. Connections may be secured with tape to avoid disconnection.
5. All connections must be luer-locks.
6. The intermittent injection port should be changed at least every 7 days or sooner if leaking, inadvertently disconnected, when drawing blood or if unable to flush all of the blood residue out of the intermittent injection port.

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
10 mL syringes (2)
Normal saline prefilled syringe(s)
Heparin solution (100 units/mL or as prescribed) prefilled syringe(s)
Puncture-proof container
Impervious trash bag

PROCEDURE:
1. Perform hand hygiene.
2. Gather supplies.
3. Don gloves.

Flushing
4. Disinfect needleless connector with antiseptic wipe using friction and a scrubbing motion; allow to dry completely.
5. Attach syringe of preservative-free 0.9% sodium chloride (USP) to needleless connector while maintaining the sterility of the syringe tip.
6. Open VAD clamp, if present.
7. Slowly aspirate until brisk blood return is obtained.
8. Slowly inject preservative-free 0.9% sodium chloride (USP) into VAD, noting any resistance or sluggishness of flow.
   a. Never inject against resistance
   b. VAD will require further evaluation if unable to flush freely
9. Remove syringe and discard.
10. Administer prescribed infusate or proceed to locking procedure.

Locking
11. Disinfect needleless connector with antiseptic wipe using friction and a scrubbing motion; allow to dry completely.
12. Attach syringe of locking solution to needleless connector while maintaining the sterility of the syringe tip.
13. Slowly inject solution into catheter.
14. Follow clamping sequence to reduce blood reflux based on type of needleless connector used:
   a. Positive pressure needleless connector: clamp after syringe disconnection
   b. Negative pressure needleless connector: maintain pressure on the syringe plunger while closing the clamp on the VAD or extension set, then disconnect the syringe
15. Discard syringe and used supplies in appropriate receptacles.
16. Remove gloves and perform hand hygiene.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Amount of normal saline and heparin flush, including strength of heparin.
   c. Patient's response to procedure, side effects and management.
   d. Instructions given to patient/caregiver.
   e. Communication with physician, if needed.

REFERENCE:
Infusion Therapy – Central Venous Catheter: Gauze Dressing Change

Strength of Evidence Level: 3

PURPOSE:
To prevent the entrance of infective agents by providing a protective barrier over the catheter exit site.

CONSIDERATIONS:
1. Gauze dressings must be changed every 48 hours and whenever soiled or wet.
2. Never use acetone or acetone-based products on or around the catheter. Acetone erodes silicone or silastic tubing.
3. Only gauze dressings should be used when drainage is present around the central venous catheter exit site or patient has skin reaction to transparent film.
4. A transparent dressing with gauze underneath is considered a gauze dressing and must be changed every 48 hours and whenever soiled or wet.

EQUIPMENT:
Gloves, sterile and non-sterile
Alcohol applicators (wipe/swab/disk/ampule)
Antimicrobial applicators (wipe/swab/disk/ampule) or ChloraPrep®
Alcohol wipes (3)
2x2 gauze, sterile (plain)
2x2 gauze, sterile (split)
Tape
Mask
Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver. Ask if patient is allergic to any creams, ointments or solutions that are put on the skin (i.e. iodine).
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position.
5. Ensure adequate lighting.
6. Don non-sterile gloves and mask. Have patient turn head away from site or also wear a mask.
7. Remove old dressing being careful not to dislodge catheter.
8. Inspect insertion site for signs of infection, i.e., redness, swelling, pain, heat or drainage. Also inspect the sutures, if applicable, to be sure they are intact. Inform the physician of any signs of infection and problems with the sutures.
9. Remove gloves.
10. Open all packages and place on the clean surface.
11. Don sterile gloves. 
   [NOTE: It is important to loosen all blood, scabs and debris from the exit site and catheter.]
12. Clean VAD site with ChloraPrep®. Use repeated back and forth and side to side motion, cleansing the skin over the VAD for 30 seconds, allow site to air dry for at least 30 seconds. DO NOT blot.
13. Gently clean the outside of the catheter with the inside surface of an alcohol wipe, repeat two times, starting from the exit site to the catheter hub. DO NOT pull on catheter.
14. Cover with split 2x2 gauze followed by plain 2x2 gauze and secure with tape. To ensure that the dressing is closed and intact, adhesive material should be applied over the entire gauze surface securing all edges.
15. DO NOT allow the catheter to hang down the chest. Loop the catheter and secure with tape to prevent accidental dislodgment.
16. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient’s record:
   a. Date, time procedure and observations.
   b. Type and appearance of venous access site.
   d. Instructions given to patient/caregiver.
   e. Communication with physician, if needed.

REFERENCE:
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections.
Infusion Therapy – Central Venous Catheter: Intermittent Injection Port Change

Strength of Evidence Level: 3

PURPOSE:
To maintain an aseptic, intact device for intermittent intravenous access.

CONSIDERATIONS:
1. Intermittent injection ports are changed at least every seven days as necessary when they become loose or leak and following a blood draw.
2. Luer-lock injection ports must be used.

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
10 mL syringes (2)
Normal saline pre-filled syringe(s)
Heparin solution (100 units/mL or as prescribed) pre-filled syringe(s)
Injection port
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position.
5. Ensure adequate lighting.
6. Using prefilled normal saline and/or heparin syringe, insert needle less adaptor straight into center of new injection port.
7. Slowly inject flush to fill dead space of injection port and then remove needle less adaptor.
8. Clean old injection port and catheter at the junction with alcohol applicator using friction. Allow to air dry.
9. Wrap new alcohol wipe around connection and hold in place until disconnecting the injection port.
10. Clamp catheter with a smooth-edge clamp. (Groshong – DO NOT use clamp.)
11. Remove old intermittent injection port.
12. Remove protective cover from new intermittent injection port.
13. Attach new sterile flush-filled intermittent injection port, twisting firmly to secure.
14. Unclamp catheter.
15. Flush catheter per protocol or reconnect to infusion as needed.
16. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Type and appearance of venous access site.
   c. Instructions given to patient/caregiver.
   e. Communication with physician, if needed.

REFERENCE:
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections
Infusion Therapy – Central Venous Catheter: Transparent Semi-Permeable Adhesive Dressing Change

SECTION: 25.14

Strength of Evidence: Level 3

PURPOSE:
To provide a protective barrier over the catheter exit site allowing visibility of the site and reducing frequency of dressing change.

CONSIDERATIONS:
1. Never use acetone or acetone-based products on or around the catheter. Acetone erodes silicone or silastic tubing.
2. Transparent permeable adhesive dressings should be changed at least every 5 to 7 days, when wet, incompletely adherent or per physician's orders.
3. If infection, drainage and/or skin breakdown is present at catheter exit site, DO NOT use a transparent dressing. (See Infusion Therapy-Central Venous Catheter: Gauze Dressing Change.)
4. Patient/caregiver are to be taught to observe the exit site daily for signs of infection, i.e., redness, swelling, pain, heat and drainage.
5. Tape is not to be used around the transparent dressing as this negates the properties of the dressing. If gauze is used under a transparent permeable adhesive dressing, it is considered a gauze dressing and should be treated. (See Infusion Therapy-Central Venous Catheter: Gauze Dressing Change.)

EQUIPMENT:
Gloves, sterile and non-sterile
Central line dressing kit

PROCEDURE:
2. Explain the procedure and its purpose to the patient/caregiver. Ask if patient is allergic to any creams, ointments or solutions that are put on the skin (especially iodine).
3. Assemble the equipment on a clean surface close to the patient.
4. Place patient in comfortable position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Don non-sterile gloves and mask. Have patient turn head away from site or also wear a mask.
7. Remove old dressing being careful not to dislodge the catheter.
   [Note: To remove, gently grasp the edge and slowly pull the dressing from the bottom up towards the insertion site.]
8. Inspect the insertion site for signs of infection, i.e., redness, swelling, pain, heat or drainage. Also inspect the sutures, if applicable, to be sure they are intact. Inform the physician of any signs of infection and problems with the sutures.
10. Open all packages and place on the clean surface.
11. Don sterile gloves.
   [NOTE: It is important to loosen all blood, scabs and debris from the exit site and catheter. Use care with patients with compromised clotting factors.]
12. Clean the exit site weekly and PRN. Using sterile technique, cleanse site with chlorhexidine gluconate sponge. Use repeated back and forth and side to side motion, cleansing the skin over the Vascular Access Device (VAD) for 30 seconds. Allow site to dry for 30 seconds and then apply transparent dressing.
13. DO NOT blot.
14. Gently clean the outside of the catheter with the inside surface of an alcohol wipe. DO NOT pull on catheter.
15. DO NOT allow catheter to hang down the chest. Loop the catheter and secure with tape to the chest wall to prevent accidental dislodgment.
16. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Type and appearance of venous access site.
   c. Patient's response to procedure.
   d. Instructions given to patient/caregiver.
   e. Communication with physician, if needed.

REFERENCE:
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections
PURPOSE:
To maintain continuous flow of intravenous fluid at ordered rate and volume.

EQUIPMENT:
Gloves
IV solution
Alcohol applicator (wipe/swab/disk/ampule)
Sterile needle or needle less adaptor
IV pole
IV pump (optional)
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Verify IV solution label with order for accuracy. Inspect fluid container for leaks, cracks or particulate matter.
3. Observe flow rate, absorbed volume, insertion site and patient’s general condition.
4. If continuous IV therapy is prescribed, transfer drip chamber to new container when solution is completed from existing container.
5. Discard soiled supplies in appropriate containers.
6. DO NOT allow bag to run dry and air to enter tubing. If air should enter tubing:
   a. Stop drip rate.
   b. Disconnect infusion from patient.
   c. Prime tubing by gravity until air is cleared.
   d. Clean injection port with alcohol.
   e. Reconnect infusion with needle less adapter and regulate flow rate.
7. Change tubing every 72-96 hours immediately upon suspected contamination or when system’s integrity is compromised.

AFTER CARE:
1. Document in patient’s record:
   a. Amount of solution/medication infused from previous container.
   b. Existing solution, type, volume, date, time started.
   c. Type and appearance of venous access site.
   d. Patient’s response to procedure, side effects and management.
   e. Instructions given to patient/caregiver.
   f. Communication with physician.

REFERENCE:
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections
Infusion Therapy – Groshong Catheter Maintenance

SECTION: 25.18

Strength of Evidence Level: 3

PURPOSE:
To maintain a patent line for continuous or intermittent drug, fluid infusion or blood withdrawal.

CONSIDERATIONS:
1. The Groshong catheter has a patented, three-position, pressure-sensitive valve that does not require the use of heparin or clamping.
2. Clamping may damage the catheter.
3. Never use acetone or acetone-based products on or around catheter. Acetone erodes silicone or silastic tubing.
4. Keep all sharp objects (e.g., pins, scissors) away from the catheter.
5. If leaking or breaking of the catheter occurs, cover the broken part with a sterile gauze pad. DO NOT clamp and send patient to emergency department.
6. Always flush catheter with 20 mL normal saline after blood withdrawal.
7. If blood is noted in catheter, flush with 20 mL normal saline.
8. If unable to flush the catheter, call physician for further orders.
9. Heavy straining or lifting may cause back flow of blood into the catheter.
10. Heparin may be used as a flush in Groshong catheter per physician's orders. It will not hurt the catheter.

FLUSHING GROSHONG CATHETER WITHOUT CHANGING INJECTION PORT
The Groshong catheter requires flushing with 10 mL normal saline every 7 days. Flush with 20 mL of normal saline after infusion of blood, when blood is observed in the catheter, and after drawing a blood sample. If withdrawing blood after infusion of TPN, flush the catheter with 20 mL of normal saline before obtaining blood sample.

EQUIPMENT:
- Gloves
- Alcohol applicator (wipe/swab/disk/ampule)
- 10-20 mL syringe with needle or needle less adaptor
- Normal saline
- Tape
- Puncture-proof container
- Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position making sure that site is accessible.
5. Ensure adequate lighting.
7. Clean injection port with alcohol applicator, using friction. Allow to air dry.
8. Flush catheter using normal saline (Heparin if indicated) per physician’s orders.
9. Loop the catheter and secure with tape.
10. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Appearance of central venous access site.
   c. Amount of normal saline flush.
   d. Patient’s response to procedure.
   e. Instructions given to patient/caregiver.

FLUSHING AND CHANGING INJECTION PORT OF GROSHONG CATHETER
The injection port must be changed at least every 7 days when not in use and PRN when they become loose or leakage is noted. Following a blood draw, the injection port must be changed.

EQUIPMENT:
- Gloves
- Alcohol applicator (wipe/swab/disk/ampule)
- 10-20 mL syringe with needle or needle less adaptor
- Normal saline
- Tape
- Puncture-proof container
- Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position making sure that site is accessible.
5. Ensure adequate lighting.
6. Prepare syringe with normal saline. Remove air from syringe.
7. Open protective package of injection port.
8. Insert needle or needle less adaptor straight into center of new injection port.
9. Slowly inject flush to fill dead space of injection port and then remove needle or needle less adaptor.
10. Clean old intermittent injection port and catheter at junction with alcohol applicator, using friction. Allow to air dry.
11. Wrap new alcohol wipe around connection and hold in place until you disconnect the injection port.
12. Ask patient to hold breath or wait until patient is exhaling before removing old injection port.
13. Remove old intermittent injection port.
14. Remove protective cover from new intermittent injection port.
15. Attach new pre-filled intermittent injection port, twisting firmly to secure.
16. With new injection port in place, flush catheter briskly with 10 mL normal saline.
17. Before syringe is completely empty apply pressure on plunger while removing the needle or syringe from the injection port (positive pressure).
18. Loop the catheter and secure.
19. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Appearance of central venous access site.
   c. Amount of normal saline flush.
   d. Patient's response to procedure.
   e. Instructions given to patient/caregiver.

BLOOD WITHDRAWAL FROM GROSHONG CATHETER

EQUIPMENT:
- Gloves
- Alcohol applicator (wipe/swab/disk/ampule)
- 10 mL syringe for discard
- Appropriate lab tubes
- Normal saline
- Injection port
- Tape
- Puncture-proof container
- Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position making sure that site is accessible.
5. Ensure adequate lighting.
6. Prepare two syringes, one with 10 mL normal saline and one with 20 mL normal saline.
7. Open protective package of injection port and pre-fill dead space with normal saline.
8. Clean old intermittent injection port and catheter at junction with applicator, using friction. Allow to air dry.
9. Wrap new alcohol wipe around connection and hold in place until you disconnect the injection port.
10. Disconnect injection port from catheter. Attach 10 mL normal saline filled syringe and flush line (if TPN infusing use 20 mL of normal saline). Using same connected syringe pull back 5 mL of blood for discard.
11. Discard blood-filled syringe in puncture-proof container.
12. Obtain specimens, then flush with 20 mL normal saline briskly.
13. Loop the catheter and secure.
14. Discard soiled supplies in appropriate containers.

MEDICATION ADMINISTRATION
Medication can be administered via the Groshong catheter either continuously or intermittently. If a pump is used, refer to manufacturer’s guidelines for specific instructions.
Flush the Groshong catheter with 10 mL normal saline prior to medication administration, between medications if more than one is administered and at the end of the administration.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Appearance of central venous access site.
   c. Blood samples drawn, identity and location of laboratory where specimens taken.
   d. Amount of normal saline flush.
   e. Patient's response to procedure.
   f. Instructions given to patient/caregiver.

REFERENCE:
Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections.
Infusion Therapy – Implantable Vascular Access Device (IVAD): Insertion of Non-Coring Needle and Maintenance

SECTION: 25.20

Strength of Evidence Level: 3

PURPOSE:
To maintain a patent vascular access for continuous or intermittent drug, fluid infusion or blood withdrawal via an implantable vascular access device. Prevention, early detection and management of implanted vascular access device related complications.

CONSIDERATIONS:
1. An implantable vascular access device (IVAD) consists of a self-sealing septum, reservoir, and radiopaque catheter. The catheter may terminate in the venous system (e.g., superior vena cava).
2. Sterile technique is MANDATORY when accessing the port. The use of a non-coring needle is required to safely access the self-sealing septum. The non-coring needle, i.e., Huber, designates the type of bevel necessary to avoid tearing or coring of the self-sealing septum. Non-coring needles are either 90-degree angle or straight.
3. Appropriate needle placement is evidenced by all of the following:
   a. Feeling the non-coring needle touch the backplate when inserted.
   b. Evidence of blood return.
   c. IVAD flushes without difficulty.
4. The portal septum varies in size and ease of accessibility. Correct and secure needle placement is MANDATORY before IVAD is used. The life of the silicone septum is approximately 2,000 punctures with a 22-gauge non-coring needle.
5. Flushing protocols for IVADs are as follows:
   • Intravenous - every 4 weeks when not in use, Heparin solution (100 units/mL), 5 mL.
6. DO NOT exceed 40-psi pressure when administering fluid through the system. Pressure in excess of 40 psi can easily be generated with most syringes. The smaller the volume of the syringe, the higher the pressure that can be generated; therefore, it is necessary to use a 10 mL or larger syringe. Catheter rupture with possible embolization can occur with pressure in excess of 40 psi.
7. When continuous access for therapy is required, a 90 degree, or right angle, non-coring safety needle with attached extension tubing should be used. Non-coring needles should be changed every 7 days or PRN.
8. Potential complications include infection, occlusion, inability to draw blood, and superior vena cava syndrome.
9. Confirm physician’s order to use the IVAD to obtain blood specimen, especially if drawing blood culture or specimen for clotting studies.
10. Blood samples can only be withdrawn from an IVAD that has a large lumen catheter.
11. If aspiration of blood becomes difficult, ask the patient to change positions, take a deep breath or lift uninvolved arm above his/her head.
12. Drawing blood for clotting studies from a heparinized line may falsely alter the results obtained.
13. It is strongly recommended that safety devices be utilized during the removal of infusaport needles.

A. INSERTION OF NON-CORING NEEDLE

EQUIPMENT:
- Gloves, sterile and non-sterile
- Alcohol applicators (wipe/swab/disk/ampule)
- Antimicrobial applicators (wipe/swab/disk/ampule)
- Non-coring safety needle with attached extension tubing
- Injection port (optional)
- Normal saline syringe
- Heparin solution syringe (100 units/mL or as prescribed)
- 2x2 gauze sponge, sterile
- Transparent semi-permeable adhesive dressing
- Self-adhesive bandage
- Mask
- Puncture-proof container
- Impervious trash bag

PROCEDURE:
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Locate the septum by palpating the outer perimeter of the IVAD.
7. Open all supplies onto sterile field.
8. Don one sterile glove and mask. Prepare normal saline and heparin solution syringes, maintaining sterile technique.
10. Using sterile technique, fill extension tubing and non-coring safety needle with normal saline and, if indicated, an injection port with heparin solution.
11. Clean area over portal septum with Chlorohexidine 2% solution (ChloroPrep) following manufacturers’ instructions or may use three alcohol applicators beginning at the center of septum and cleaning outward in a circular motion, never returning to the middle. Allow to air dry. DO NOT blot.
12. Stabilize IVAD. Using a perpendicular angle, insert non-coring safety needle into septum until the
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13. Attach 10 mL normal saline filled syringe to the needle extension tubing and after unclamping, aspirate for blood return. After blood return is established, flush with normal saline solution.

14. Clamp the extension tubing and remove the normal saline syringe. Attach the pre-filled injection port. Insert the heparin-filled syringe with 25-gauge needle or needle less adaptor into injection port. Inject 5 mL heparin solution, using steady pressure. Before syringe is empty, clamp extension tubing and slowly remove syringe and needle or needle less adaptor while applying steady pressure on plunger. Apply dressing to site. (See Infusion Therapy-Central Venous Catheter: Transparent Semi-Permeable Adhesive Dressing.)

15. If needle is to be removed: Clamp the extension tubing and remove the normal saline syringe. Attach the heparin-filled syringe and unclamp extension. Flush with 5 mL of heparin solution. Clamp extension tubing before removing final syringe.

16. Securely anchor IVAD by placing thumb and forefinger of non-dominant hand on edges of the IVAD while pulling the non-coring needle straight up and out of the IVAD septum.

17. Clean site after needle removal and maintain pressure with sterile gauze until bleeding stops. Apply self-adhesive bandage if indicated.

18. Discard soiled supplies in appropriate containers.

AFTER CARE:

1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Needle size - gauge and length.
   c. Amount of normal saline and heparin flush, including strength of heparin.
   d. Patient's response to procedure, side effects and management.
   e. Instructions given to patient/caregiver.

B. MEDICATION ADMINISTRATION
   (non-coring needle in place)

EQUIPMENT:

- Gloves
- Alcohol applicator (wipe/swab/disk/ampule)
- Needles or needle less adaptor (3)
- Normal saline syringe (2)
- Heparin solution syringe (100 units/mL, or as prescribed) (1)
- 2x2 gauze sponge, sterile
- Self-adhesive bandage

Medication

Supplies appropriate for infusing medications (i.e., syringes with needles or needle less adaptor, infusion set)

Tape

Puncture-proof container

Impervious trash bag

PROCEDURE:

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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Prepare medication.
7. Prepare two normal saline syringes with 10 mL of normal saline in each syringe. Prepare a heparin syringe with 5 mL of 100 units/mL heparin solution per physician order.
8. For IV push medication:
   b. Insert normal saline syringe with needle or needle less adaptor into injection port and aspirate for a blood return. After blood return is established, flush injection port with all of the normal saline. Remove syringe and needle or needle less adaptor.
   c. Clean injection port of extension tubing with alcohol applicator, using friction. Allow to air dry.
   d. Insert medication-filled syringe with needle or needle less adaptor into injection port. Slowly inject medication, using steady pressure, over time frame indicated by medication or physician’s orders. Remove syringe and needle or needle less adaptor.
   e. Clean injection port of extension tubing with an alcohol applicator, using friction. Allow to air dry.
   f. Insert normal saline syringe with needle or syringe. Inject normal saline into injection port and remove syringe with needle or needle less adaptor.
   g. Repeat steps c through f for each medication.
   h. Clean injection port of extension tubing with an alcohol applicator, using friction. Allow to air dry.
   i. Insert heparin-filled syringe with needle or needle less adaptor into injection port. Inject heparin solution into injection port. Clamp extension tubing before removing final syringe.
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j. If needle is to be removed: Flush injection port with heparin solution using steady pressure. Before syringe is empty, clamp extension tubing and slowly remove syringe and needle or needle less adaptor while applying steady pressure on plunger.

k. Securely anchor IVAD by placing thumb and forefinger of non-dominant hand on edges of the IVAD while pulling the non-coring needle straight up and out of the IVAD septum.

l. Clean site after needle removed and maintain pressure with sterile 2x2 gauze until bleeding stops. Apply self-adhesive bandage.

9. For one-time infusion dose:
   b. Insert normal saline syringe with needle or needle less adaptor into injection port and aspirate for a blood return. After blood return is established, flush injection port with all of the normal saline. Remove syringe and needle or needle less adaptor.
   c. Clean injection port of extension tubing with alcohol applicator, using friction. Allow to air dry.
   d. Insert infusion tubing into injection port and start infusion by regulating IV flow using roller clamp, dial-a-flow, or infusion pump. Tape connection of tubing to injection port.
   e. When infusion is complete, close roller clamp. Remove tubing from injection port. Clean injection port with alcohol applicator, using friction. Allow to air dry.
   f. Insert normal saline syringe with needle or needle less adaptor into injection port. Inject normal saline into injection port to flush extension tubing and needle. Remove syringe and needle or needle less adaptor.
   g. Clean injection port with alcohol applicator, using friction. Allow to air dry.
   h. Insert heparin-filled syringe with needle or needle less adaptor into injection port. Inject heparin solution into injection port using steady pressure. Clamp extension tubing before removing final syringe.
   i. Securely anchor IVAD by placing thumb and forefinger of non-dominant hand on edges of the IVAD while pulling the non-coring needle straight up and out of the IVAD septum.
   j. Clean site after needle removed and maintain pressure with sterile 2x2 gauze until bleeding stops. Apply self adhesive-bandage.

10. For continuous intermittent doses:
    a. Follow Steps A though G of one-time infusion dose.
    b. Insert heparin-filled syringe with needle or syringe into injection port. Inject heparin solution into injection port. Clamp extension tubing before removing final syringe.

11. Discard soiled supplies in appropriate containers.

AFTER CARE:

1. Document in patient's record:
   a. Medication administered dosage, time, route and rate.
   b. Amount of normal saline and heparin flush, including strength of heparin.
   c. Appearance of vascular access site.
   d. Patient's response to procedure, side effects and management.
   e. Instructions given to patient/caregiver.

C. DRAWING BLOOD
   (non-coring needle in place)

EQUIPMENT:

Gloves
Alcohol applicator (wipe/swab/disk/ampule)
Normal saline syringe (3)
Heparin solution syringe (100 units/mL, or as prescribed)
Lab tubes
Needles or needle less adaptor
2x2 gauze sponge, sterile
Self-adhesive bandage
Tape
Disposable apron (optional)
Protective eye wear (optional)
Puncture-proof container
Impervious trash bag

PROCEDURE:

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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Prepare heparin and normal saline syringes.
7. Label the lab tubes with patient's name, date of birth, date.
9. Insert normal saline syringe with needle or needle less adaptor into injection port. Inject normal saline into injection port and aspirate for blood. After blood return is established, flush the port with 10 mL normal saline. If using luer-lock adaptor, after flush, attach luer adaptor to hub;
attach 10 mL tube, fill and discard. Then fill appropriate tubes. Clamp line disconnect adaptor; follow steps 14 – 19 below.

10. Withdraw 10 mL of blood for discard. Remove syringe.
12. Attach appropriate size, empty syringe to injection port and withdraw blood specimens. Remove syringe.
13. General order of sample collections:
   a. First - Blood culture tubes or vials.
   b. Second - Coagulation tube (e.g., blue-top tubes).
   c. Third – Serum tube with or without clot activator or gel (e.g., red, gold, or speckle-top tubes).
   d. Fourth – Heparin tubes (e.g., green-top tubes).
   e. Fifth – EDTA tubes (e.g., lavender-top tubes).
   f. Sixth (Last) – Oxalate/fluoride tubes (e.g., gray-top tubes).
15. Flush port with 20 mL of normal saline.
17. Insert heparin-filled syringe with needle or needle less adaptor into injection port. Inject heparin solution into injection port using steady pressure. Clamp extension tubing before removing final syringe.
18. If needle is to be removed:
   a. Insert heparin-filled syringe with needle or needle less adaptor into injection port. Inject heparin solution into injection port using steady pressure. Clamp extension tubing before removing final syringe.
   b. Securely anchor IVAD by placing thumb and forefinger of non-dominant hand on edges of the IVAD while pulling the non-coring needle straight up and out of the IVAD septum.
   c. Clean site after needle removed and maintain pressure with sterile gauze until bleeding stops. Apply self-adhesive bandage.
19. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Blood samples drawn, identity and location of laboratory where specimens taken.
   c. Amount of normal saline and heparin flush, including strength of heparin.
   d. Appearance of vascular access site.
   e. Patient's response to procedure, side effects and management.
   f. Instructions given to patient/caregiver.

D. OBTAINING BLOOD FOR BLOOD CULTURES
If two sets of blood cultures are ordered, draw one set, then repeat procedure for second set 15 to 30 minutes later, or as ordered by physician. Two blood culture bottles are used per each blood culture. Cultures should be left at room temperature and sent to the laboratory within four hours.

EQUIPMENT:
Gloves, sterile and non-sterile
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
Blood culture bottles (aerobic and anaerobic)
Non-coring needle with attached extension tubing
21-gauge needles or needle less adaptors
Normal saline syringes (3)
Heparin solution syringes (100 units/mL, or as prescribed)
2x2 gauze sponge, sterile
Self-adhesive bandage
Tape
Mask
Disposable apron (optional)
Protective eye wear (optional)
Puncture-proof container
Impervious trash bag

PROCEDURE:
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Locate the septum by palpating the outer perimeter of the IVAD.
7. Place patient in comfortable position, making sure that site is accessible.
8. Open all supplies onto sterile field.
10. Using aseptic technique, fill extension tubing and non-coring needle with normal saline and if indicated an injection port with heparin solution. Clamp extension tubing.
11. Clean area over portal septum with Chlorohexidine 2% solution (ChloroPrep) following manufacturers’ instructions or may use three alcohol applicators beginning at the center of septum and cleaning outward in a circular motion, never returning to the middle. Allow to air dry. DO NOT blot.
12. Stabilize IVAD. Using a perpendicular angle, insert non-coring needle into septum until the needle stop is felt. Digital pressure on the top of the needle at the bend point will facilitate septum entry. Once IVAD is accessed, DO NOT tilt or rock the needle as this may cause damage to the septum.

13. Attach 10 mL normal saline filled syringe to the needle extension tubing and after unclamping, aspirate for blood return. After blood return is established, flush with normal saline solution.

14. Withdraw 10 mL of blood for discard. Reclamp extension.

15. Attach 10 mL syringe to extension, unclamp and withdraw blood for blood cultures. Reclamp extension.


17. Attach 21-gauge needle or needle less adaptor to blood sample syringe. Place 5 mL in each culture bottle. Invert culture bottle gently 5 to 6 times to mix the sample thoroughly. DO NOT shake the bottles. Be careful not to touch the tops of the culture bottles before filling and after filling.

18. Attach 20 mL syringe with normal saline, unclamp extension and flush vigorously. Reclamp extension.

19. If needle is to be removed:
   a. Insert heparin-filled syringe with needle or needle less adaptor into injection port. Inject heparin solution into injection port using steady pressure. Clamp extension tubing before removing final syringe.
   b. Securely anchor IVAD by placing thumb and forefinger of non-dominant hand on edges of the IVAD while pulling the non-coring needle straight up and out of the IVAD septum.

20. Clean site after needle removal and maintain pressure with sterile 2x2 gauze until bleeding stops. Apply self-adhesive bandage if indicated.

21. Discard soiled supplies in appropriate containers.

**AFTER CARE:**

1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Blood samples drawn, identity and location of laboratory where specimens taken.
   c. Amount of normal saline and heparin flush, including strength of heparin.
   d. Appearance of vascular access site.
   e. Patient's response to procedure, side effects and management.
   f. Instructions given to patient/caregiver.
Infusion Therapy – Intravenous Infusion: Secondary Intravenous/Piggyback

Strength of Evidence Level: 3

PURPOSE:
To allow the concurrent or intermittent administration of more than one solution or medication via the same insertion site.

CONSIDERATIONS:
1. Review physician's order for the type of medication and solution amount to be infused.
2. Review the actions, usual dose, indications for use, side effects and incompatibilities of the solution and medications to be used.
3. Use injection site closest to infusion solution container if using secondary administration set. If using standard administration set or connecting tubing, use injection site (Y-site) on tubing closest to the patient.
4. (See Infusion Therapy - Changing IV Solution Container and Tubing.)
5. If piggyback does not run concurrent with main solution, elevate piggyback higher until it begins to drip and is completed.
6. Use at least 2 patient identifiers prior to administering medications.
7. Per Joint Commission recommendations, all tubes and catheters should be labeled to prevent the possibility of tubing misconnections.
8. Wipe injection site (Y-site) of primary IV with alcohol applicator, using friction. Allow to air dry.
9. Insert needle or needle less adaptor into Y-site and tape securely.
10. Regulate flow rate of piggyback line, using roller clamp. [Note: May need to adjust flow rate on primary IV line to facilitate flow of piggyback.]
11. To discontinue piggyback at completion:
   a. Close roller clamp.
   b. Remove piggyback administration set (with or without needle).
12. Recheck flow rate of primary IV line and time for accuracy.
13. Discard soiled supplies in appropriate containers.

EQUIPMENT:
Gloves
Secondary medication/solution
Piggyback administration set
Alcohol applicator (wipe/swab/disk/ampule)
Tape
Needle or needle less adaptor
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Remove administration set from package and close roller clamp.
7. Invert medication/solution container, remove protective cover and insert administration set spike.
8. Attach sterile needle to end of administration set or needle less adaptor if primary set is a needle less system.
9. Squeeze drip chamber until half full and prime tubing to remove air.
10. Document in patient's record:
    a. Time, amount of solution/medication infused.
    b. Type and appearance of venous access site.
    c. Patient's response to procedure, side effects and management.
    d. Instructions given to patient/caregiver.
    e. Communication with physician.
PURPOSE:
To assess intravenous (IV) insertion site for early detection and prevention of infection.

CONSIDERATIONS:
1. IV site care is to be done as necessary.

EQUIPMENT:
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
Antimicrobial ointment (optional)
2x2 gauze sponge, sterile (optional)
Transparent permeable adhesive dressing (optional)
Tape
Gloves
Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Ask if the patient is allergic to any creams, ointments or solutions that are put on the skin, especially iodine.
4. Assemble equipment on a clean surface close to the patient.
5. Place patient in comfortable position, ensuring that site is accessible.
6. Ensure adequate lighting.
7. Remove old dressing, being careful not to dislodge cannula.
8. Inspect site for redness, tenderness or infiltration.
9. Clean the skin:
   a. If the site is excessively hairy, clip hair.
   b. Using sterile technique, cleanse site with chlorhexidine gluconate sponges. Use repeated back and forth and side to side motion cleansing the skin over the site for 30 seconds. Allow site to dry for 30 seconds. DO NOT blot.
10. Apply ointment, if ordered. Cover with sterile gauze or transparent permeable dressing. Gauze dressings must be change at least every 48 hours and as needed, if they become wet or soiled. DO NOT tape around the transparent dressing.
11. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record.
   a. Procedure and observations.
   b. Type and appearance of venous access site.
   c. Patient's response to procedure.
   d. Instructions given to patient/caregiver.
Infusion Therapy – Intravenous Solution Container and Tubing Change/Replacement

Strength of Evidence Level: 3

PURPOSE:
To reduce the incidence of contamination of intravenous (IV) solution or tubing.

CONSIDERATIONS:
1. IV tubing should be changed according to national guidelines. (See Infusion Therapy - Intravenous Therapy Administration.)
2. All intravenous solution containers should be checked for expiration date, presence of cracks, discoloration or sediment. Defective solutions or related supplies should be returned to pharmacy supplier with a written report of findings.
3. (See Safe Handling of Antineoplastic Agents for disposal of antineoplastic medications.)

EQUIPMENT:
Gloves
IV administration set
0.22 micron filter
IV solution container
Alcohol applicator (wipe/swab/disk/ampule)
Needle or needle less adaptor
Tape
Catheter clamp (optional)
IV pole (optional)
IV pump (optional)
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to the patient.
4. Place patient in comfortable position, ensuring that site is accessible.
5. Ensure adequate lighting.
6. Remove administration set from package and close roller clamp.
7. Attach filter as appropriate, to end of tubing opposite of the spike, if appropriate.
8. Invert solution container, remove protective cover and insert administration set spike.
9. Attach sterile needle or needle less adaptor to end of administration set.
10. Suspend solution container on IV pole, squeeze drip chamber half full and prime tubing.
11. Open clamp to allow fluid to prime tubing. Close roller clamp after priming tubing.
12. If using pump: Close clamp on used administration set and remove from pump. Insert new set according to manufacturer's guidelines.
13. Infusion by gravity: Close clamp on used administration set.
14. Disconnect old administration set from venous line access device and discard.
15. Clean injection port with alcohol applicator using friction. Allow to air dry. DO NOT blot.
16. Aseptically connect new administration set into injection port.
17. Unclamp line.
18. Adjust flow to prescribed rate.
19. Secure the junction of catheter extension and new administration set using tape with a tab for ease of removal if luer lock connector is not used.
20. Assess IV site and perform dressing change, if needed.
21. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient’s records:
   a. Amount of solution/medication infused from previous container.
   b. Existing solution, type, volume, rate and time started.
   c. Type and appearance of venous access site.
   d. Patient's response to procedure, side effects and management.
   e. Instructions given to patient/caregiver.
   f. Communication with physician. (If applicable.)
Infusion Therapy – Intravenous Therapy Administration

Strength of Evidence Level: 3

**PURPOSE:**
To provide a peripheral venous route for the administration of fluids and/or medications that will maintain or replace body stores of fluids, provide nutrition and treat illnesses.

**CONSIDERATIONS:**
1. Prior to instituting therapy, the nurse will:
   a. Review the physician’s order for the type of solution, amount/dosage to be infused, rate of infusion, frequency, route and duration.
   b. Obtain patient’s allergy history.
   c. Obtain a signed informed consent form.  
      [Note: This must be done before beginning therapy.]
   d. Instruct the patient or caregiver regarding storage and handling of supplies and patient care required in the absence of the nurse.
   e. Review the actions, usual dosage, indications for use, side effects and incompatibilities of the solution or medication to be administered.
      [Note: For the purpose of consistency, all plastic catheters and needles will be referred to as cannulas and special techniques noted for using plastic intravenous catheters and stainless steel intravenous (IV) needles.]

2. In selecting equipment, consider the following:
   a. Duration and purpose of therapy:
      (1) Steel needles (butterfly) may be used for short-term or one-time dosing of non-irritating infusates given with the nurse in attendance.
      (2) Plastic catheters are indicated in long-term continuous or intermittent therapy and when giving potentially irritating infusates.
         Description: A plastic/silicone catheter inserted over the needle. The needle is removed once the catheter is in the vein.
   b. Cannula length and gauge:
      (1) The size of the cannula lumen must be less than the lumen of the vein. Choose the smallest gauge that is adequate for the prescribed rate and type of infusate (22–24 gauge is recommended).
      (2) The length of the cannula may be directly related to infection and/or embolism formation; therefore, the shortest cannula that will accommodate the therapy is required. Length should not be more than 3/4 to 1 1/4 inch for a distal, peripheral site.

3. In selecting a vein, consider the following:
   a. Location:
      (1) Use most distal, superficial vein first.
      (2) In elderly patients, veins of the hands may be unsuitable due to the lack of supporting tissue.
      (3) A large vein should be used for long-term therapy and hypertonic or potentially irritating drugs or solutions, e.g., peripheral parenteral nutrition or hydration fluids with potassium.
   b. Condition of veins:
      (1) Select a healthy, resilient vein above areas of previous infiltration, bruising or inflammation.
      (2) Vein should feel round, firm, elastic and engorged, not hardened.

4. Techniques to distend the vein include:
   a. Apply a tourniquet 4-6 inches above selected site.
   b. Request patient to open and close fist intermittently. This will make the vein more prominent.
   c. Place extremity in a dependent position.
   d. Massage in the direction of venous flow.
   e. Gently tap over the intended site.
   f. Apply heat with heating pad or warm, moist towel.

5. The bevel of the cannula needle should be up when attempting to access the vein to reduce the risk of piercing the vein’s back wall.

6. All tubing must be primed to remove the air prior to attaching to the patient’s cannula.

7. A short microbore extension set should be attached to all peripheral cannulas.

8. Minimal amounts of tape should be used in securing the cannula hub to the patient’s skin, leaving puncture site and junction of tubing to cannula free.

9. IV tubing must be changed according to the national standards listed below:
   a. Primary continuous - every 72-96 hours.
   b. Secondary continuous - every 72-96 hours.
   c. Primary intermittent - every 24 hours.
   d. Secondary intermittent - every 24 hours.
   e. Blood products tubing - after each unit.
   f. TPN tubing - every 24 hours.
   g. Fat emulsion (LIPIDS) – every 24 hours.

10. Luer-lock connections should be used whenever possible; if not, tubing connections should be taped and a tab left for ease of removal.

11. When administering intravenous therapy in the home, healthcare workers should adhere to Standard Precautions. (See Infection Control: Standard Precautions.)

12. The use of arm boards to immobilize an extremity is allowed to prevent potential infiltration or phlebitis in an uncooperative, disoriented or elderly patient or
child. The arm board should be removed, and the patient’s extremity circulatory status should be assessed at established intervals.

13. After three unsuccessful attempts at cannula placement, the nurse should consider requesting assistance from her/his supervisor/manager.

14. Excess hair at the intended site should be clipped, NOT shaved, because of the potential for microabrasions, which increase the risk of infection.

15. Use at least two patient identifiers prior to administering medication.

**EQUIPMENT:**

- Gloves
- Tourniquet
- Alcohol applicator (wipe/swab/disk/ampule)
- Antimicrobial applicator (wipe/swab/disk/ampule)
- Cannula
- IV solution
- IV tubing
- 0.22-micron filter
- 5-10 mL syringe with normal saline
- Small extension set, e.g., 5-inch microbore
- 2x2 gauze sponges, sterile
- Transparent permanent adhesive dressing
- Antimicrobial ointment (optional)
- Tape
- IV pole
- Arm board (optional)
- Puncture-proof container
- Impervious trash bag
- Disposable apron (optional)
- Protective eye wear (optional)

**PROCEDURE:**

2. Explain procedure and purpose to patient/caregiver.
3. Assemble the equipment on a clean surface close to the patient.
4. Question patient regarding allergies to adhesive tape and iodine.
5. Place patient in a comfortable position, ensuring that site is accessible and stable.
6. Ensure adequate lighting.
7. Prepare equipment.
   a. Check patient's name and expiration date on fluid container.
   b. Check fluid container for prescribed solution, leakage, particulate matter and discoloration.
   c. Add medication, if necessary. Label the container with name of additive, date, time and nurse’s initials.
8. Assess hand or arm for appropriate venipuncture sites.
9. Apply tourniquet.
10. Clean the skin.
    a. If the site is excessively hairy, clipping is recommended.
    b. Clean site with chlorhexidine gluconate sponge. Use repeated back and forth and side to side motion, cleansing the skin for 30 seconds. Allow to air dry for 30 seconds.
    c. DO NOT blot. DO NOT retouch cleansed area due to contamination of site.
11. Anchor the vein by holding the skin taut below the selected site.
12. Insert the cannula at a 30-45 degree angle beside the vein.
13. When skin is pierced, lower the angle of the cannula almost parallel to the skin. Gently apply pressure and enter the vein.
14. When backflow of blood is evident, advance the cannula forward keeping the inner needle (stylet) stationary until the hub is flush against the insertion site.
15. Release the tourniquet. Apply pressure above site to occlude blood flow. Remove stylet and connect extension set. Flush line with 5-10 mL of normal saline. Observe site for swelling or discomfort.
16. Connect IV tubing, securing to extension set. Secure tubing connections with tape, leaving a tab for removal if luer lock connection is not used.
17. Start infusion slowly while observing site.
18. Secure the cannula hub to the patient with tape. DO NOT cover the insertion site and the hub/tubing connection.
19. Cover with transparent dressing.
20. Secure IV tubing with tape to prevent tension on the insertion site.
21. Use an arm board, if indicated.
22. If using an infusion pump to regulate the drip rate, refer to the manufacturer's instructions on the package.
23. Regulate the drip rate if infusing by gravity and apply time tape to solution container.
   a. Formula for computing drops/minute is: Rate (mL/hr) x Drop Factor of tubing (gtts/mL / 60 (min/hr) = gtts/min.
   b. The formula to determine drops per minute is: gtts/mL of infusion set x hourly volume = gtts/min. 60 min/hr.
24. If a micro drip set is used, the number of drops/minute equals the amount of solution/hour.
This type of set is recommended since calculation is simple to remember and the patient/caregiver can learn to regulate the flow easier.

25. Discard soiled supplies in appropriate containers.

REMOVAL:
2. Stop IV flow by closing clamp or turning off pump.
3. Remove dressing from insertion site and inspect skin.
4. Place sterile gauze over needle at insertion site. Withdraw cannula slowly. Cannula should be removed at an angle nearly flush with the skin to prevent injury to the wall of the vein. Apply pressure to puncture site with gauze for 2 to 3 minutes. Observe to see if catheter is intact.
   If catheter is not intact:
   a. Notify physician immediately. Physician may request that patient be transported to nearest emergency department for evaluation.
   b. Place patient on strict bed rest.
   c. Monitor patient closely for signs and symptoms of embolism.
5. Apply gauze sponge or self-adhesive bandage and elevate extremity.
6. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Medication/solution administered, dose, time, rate, site and route.
   b. Patient's response to procedure, side effects and management.
   c. Type and appearance of venous access site.
   d. Instructions given to patient/caregiver.
   e. Communication with physician, if appropriate.
2. Write date of insertion, gauge, length of catheter and initials on dressing tape.
**Phlebitis**

**POLICY:**
The nurse will address preventive measures, identify signs and symptoms of, and promptly intervene when phlebitis is suspected.

Phlebitis may occur up to 48 hours after vascular access device (VAD) removal.

Risk factors for phlebitis include:
- Multiple manipulations of infusion delivery system
- Large gauge and length of catheter
- Catheter material and configuration
- Failure to stabilize VAD adequately
- Patient age, condition, acuity
- Administration of irritating infusates (acid/alkaline pH and high osmolarity)
- Inadequate VAD insertion technique
- Inadequate skin antisepsis
- Inadequate care and maintenance practices
- Extended dwell time

**PREVENTION:**
- Use the smallest-gauge and -length catheter to accommodate the prescribed therapy.
- Avoid placing catheter in areas of flexion
- Consider a CVAD for infusates with a pH less than 5 or greater than 9, or osmolarity greater than 600 mOsm, or final dextrose concentration less than 10%
- Perform thorough skin disinfection before catheter insertion
- Allow antiseptic to dry completely before inserting catheter
- Adhere to aseptic technique with all infusion access and medication/solution administration
- Stabilize VAD to minimize movement at the insertion site

**ASSESSMENT:**
- Assess patient and insertion site on a routine basis by palpating skin gently through the dressing and observing skin and insertion site for signs of phlebitis, including:
  - Pain/tenderness at site
  - Erythema
  - Warmth
  - Swelling
  - Induration
  - Purulent drainage
  - Palpable venous cord

**INTERVENTIONS:**
- Discontinue infusion
- Remove catheter
- Assess severity of phlebitis using a standardized scale
- Determine the potential cause of the phlebitis
  - Chemical = involving drugs or solutions
  - Mechanical = involving the catheter
  - Bacterial = involving bacteria
- Notify licensed independent practitioner (LIP) regarding degree of phlebitis
- Apply thermal compress to phlebitic area for 20-minute periods, 3-4 times per day, with LIP’s order
- Reassess vascular access needs
- Replace short peripheral catheter in opposite extremity
- Consider CVAD if irritating fluids is probable cause
- Observe site for signs of postinfusion phlebitis, such as inflammation, erythema, edema, and drainage; palpate site for warmth and induration
- Document in patient’s permanent medical record

<table>
<thead>
<tr>
<th>Grade</th>
<th>Clinical Criteria</th>
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<tr>
<td>1</td>
<td>Erythema at access site with or without pain</td>
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<tr>
<td>2</td>
<td>Pain at access site with erythema or edema</td>
</tr>
<tr>
<td>3</td>
<td>Pain at access site with erythema or edema Streak formation Palpable venous cord</td>
</tr>
<tr>
<td>4</td>
<td>Pain at access site with erythema and/or edema Streak formation Palpable venous cord &gt; 1 inch in length Purulent drainage</td>
</tr>
</tbody>
</table>

**REFERENCES:**


Infusion Therapy – Intravenous Therapy: Assessment and Management of Infiltration and Phlebitis

SECTION: 25.25

Strength of Evidence Level: 3


**Infiltration and Extravasation**

**POLICY:**
The nurse will address preventive measures, identify signs and symptoms of, and promptly intervene when infiltration and extravasation are suspected.

Risk factors include:
- Multiple manipulations of infusion delivery system
- Large gauge and length of catheter
- Failure to stabilize VAD adequately
- Patient age, condition, acuity
- Administration of irritating infusates/solutions (acid/alkaline pH and high osmolarity)
- Infusion history
- Inadequate VAD insertion technique
- Inadequate care and maintenance practices
- Extended dwell time

**PREVENTION:**
- Use the smallest-gauge and shortest catheter to accommodate the prescribed therapy
- Avoid placing catheter in areas of flexion
- Consider a central vascular access device (CVAD) for infusates with a pH less than 5 or greater than 9, or osmolarity greater than 10%
- Infuse irritating infusates into large peripheral veins; avoid use of veins in hand, fingers
- Stabilize catheter to minimize movement at the insertion site
- Ensure patency of VAD prior to infusion, including assessment of brisk blood return upon aspiration
- Instruct patient to immediately report any pain, burning, or swelling with infusion administration
- Teach home care patients to secure administration set on skin to avoid pulling at VAD insertion site and how to perform activities of daily living (ADL) while protecting catheter site and infusion

**ASSESSMENT:**

**General**
- Do not rely on alarms from electronic infusion devices (EIDs) to detect infiltration or extravasation
- Teach patient and/or caregiver signs and symptoms to report and the importance of immediate reporting.

**Short Peripheral and Midline Catheters**
Assess all short peripheral and midline catheters for immediate or delayed signs and symptoms of infiltration/extravasation including, but not limited to:
- Changes in skin color, including blanching, bruising, or redness surrounding insertion site
- Edema in any direction from the insertion site
- Changes in skin temperature, including coolness or warmth
- Pain, burning, or stinging with injection or infusion
- Development of blisters
- Impaired ability to move fingers, hand, or entire extremity
- Numbness, tingling, and other signs of paresthesia in the extremity
- Fluid leakage from insertion site
- Slowed capillary refill

**Central Vascular Access Devices**
Assess for immediate or delayed signs and symptoms of infiltration and extravasation including, but not limited to:
- Loss of blood return upon aspiration
- Resistance to syringe injection
- Altered or stopped fluid flow by gravity
- Leaking from the insertion site
- Edema in the neck, shoulder, or chest surrounding the CVAD exit site
- Pain or discomfort of any kind at the insertion site, tip location, or along the CVAD’s venous pathway

**INTERVENTIONS:**

**Infiltration (nonvesicant solutions)**
- Discontinue infusion immediately and remove catheter
  - Apply pressure at site to prevent bleeding and achieve hemostasis
- Institute appropriate supportive treatments as needed, such as elevation of the extremity or thermal applications
Teach patient to report any progression of signs and symptoms such as changes in extremity mobility, sensation, elevated temperature, and signs of infection.

Extravasation (vesicant solutions)

- Discontinue infusion immediately
- If catheter must be removed:
  - Aspirate for infused medication before removing catheter
  - Apply gentle pressure at site to prevent bleeding and further tissue damage
- Notify LIP and obtain specific orders to treat the extravasation
- Treatment of extravasation depends on the type of medication and severity of the complication and may include thermal manipulation, use of antidotes, and surgical interventions
  - Check drug manufacturer’s directions for use
  - Thermal application
    - Application of heat or cold based on specific vesicant medication
    - Cooling is recommended for alkylating agents, anthracyclines, antitumor antibiotics, and taxanes; use has been reported with propofol, vancomycin, nafcillin, doxycycline, calcium, potassium, promethazine, and parenteral nutrition solution
    - Heat is recommended for plant alkaloids, vasoconstricting agents (eg, dopamine, dobutamine, epinephrine)
- Antidotes for treatment of extravasation injuries include:
  - Sodium thiosulfate for alkylating agents
  - Dexrazoxane (Totect®) for anthracyclines
  - Hyaluronidase for plant alkaloids, dextrose, electrolytes (eg, calcium, potassium, sodium bicarbonate), and antibiotics (eg, nafcillin, vancomycin)
  - Phentolamine for vasopressor agents, including dobutamine, dopamine, epinephrine, metaraminol, norepinephrine, phenylephrine
- Reassess vascular access needs
- Replace short peripheral catheter in opposite extremity
- Continue to monitor site, as clinically significant complications can result from infiltration or extravasation
- Observe site for signs and symptoms of compartment syndrome, nerve injury, blisters, skin sloughing, tissue necrosis, functional and sensory loss

Document in patient’s permanent medical record:
- Date and time of infiltration/extravasation
- Catheter type and size
- Whether insertion site is new or preexisting
- Drug administered, method of administration, and estimated volume of fluid that escaped into the tissue
- Patient complaints or experience during the extravasation
- Appearance of access site
- Treatment measures taken and outcome

Complete Unusual Occurrence or Sentinel Event Report according to organizational policy.

<table>
<thead>
<tr>
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<th>Clinical Criteria</th>
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</thead>
<tbody>
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<td>No symptoms</td>
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<td>1</td>
<td>Skin blanched</td>
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<tr>
<td></td>
<td>Edema, 1 inch in any direction</td>
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<td>Cool to touch</td>
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<td></td>
<td>With or without pain</td>
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<tr>
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<tr>
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<td>Skin discolored, bruised, swollen</td>
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<td></td>
<td>Gross edema &gt;6 inches in any direction</td>
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<tr>
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<td>Deep pitting tissue edema</td>
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<tr>
<td></td>
<td>Circulatory impairment</td>
</tr>
<tr>
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<td>Moderate-severe pain</td>
</tr>
<tr>
<td></td>
<td>Infiltration of any amount of blood products, irritant, or vesicant</td>
</tr>
</tbody>
</table>

REFERENCES:


Infusion Therapy – Midline Catheter: Maintenance and Management of Potential Complications

SECTION: 25.27

Strength of Evidence Level: 3

PURPOSE:
To maintain a patent IV access for continuous or intermittent drug, fluid infusion or blood withdrawal via a midline catheter. Prevention, early detection and management of midline catheter related complications.

CONSIDERATIONS:
1. Intermittently accessed midline catheters will be flushed with 5 mL of heparin solution 10 units/mL every 24 hours, after each use or as prescribed by physician.
2. The intermittent injection port will be changed once a week or PRN.
3. When medication is administered in order to eliminate problems of drug incompatibility, the SASH method of flushing is utilized. Unless otherwise ordered by a physician, 10 mL of normal saline will be used.
   S – Saline.
   A – Administer drug/solution.
   S – Saline.
   H – Heparin.
4. Dressing should be changed at least every 5 to 7 days or PRN when using a transparent permeable adhesive dressing. Patients who are active and perspire profusely may require more frequent dressing changes. If any blood is noted under dressing at catheter exit site, dressing must be changed.
5. The application of a polymer skin coating (skin preparation swabs) increases both the patient's comfort and dressing life.
6. The patient/caregiver is to be taught to check site for:
   a. Excessive drainage or bleeding from catheter exit site.
   b. Redness or swelling around the catheter exit site.
   c. Pain, soreness, swelling or tenderness on the arm where catheter is inserted.
   d. Pain or discomfort during infusion of IV solution.
   e. Chest pain or discomfort while catheter is in place.
   [Note: No blood pressure cuff or tourniquet should be used on accessed arm.]
7. The midline catheter is made of extremely soft material and is not recommended for routine blood draws. However, it is possible to draw blood samples without collapsing the catheter if slow, gentle pressure is used.
8. Confirm physician’s order for blood work and to use the midline catheter for drawing the samples.
9. Difficulty in drawing blood from the midline catheter may be due to patient's position, collapsing of the catheter by clots, a clamped catheter, or pressure to withdraw blood is too great.
10. Drawing blood for clotting studies from a heparinized line may falsely alter the results obtained.

PROCEDURE:

A. MANAGEMENT OF COMPLICATIONS
1. A good physical assessment and patient education are the first line of defense in the management of post-insertion complication.
2. The following are the possible complications that may be encountered in the care of midline catheters and their management:
   a. Bleeding due to patient's inherent coagulopathy problems may be managed by mild pressure to the dressing for 5 minutes at the site of insertion.
   b. Sterile mechanical phlebitis has been found to occur:
      (1) Within the first 48 to 72 hours after insertion.
      (2) More in women than men.
      (3) More in left-sided insertions.
      (4) More when large-gauge catheters are inserted.
   c. Grade I-III phlebitis:
      (1) Apply moist, warm compresses to upper arm for 20 minutes 4 times a day, elevation of extremity and mild exercise.
      (2) If patient develops fever, increased pain, or there is questionable discharge at site, notify physician for possible removal of line.
   d. Cellulitis:
      (1) Cellulitis is best managed by prevention. A thorough cleansing of the site, adherence to sterile procedure and proper after care of insertion site eliminates this complication.
      (2) Cellulitis, when noted, is successfully managed by a course of oral antibiotics such as dicloxicillin. Notify physician for appropriate medical therapy.
   e. Catheter sepsis may only be diagnosed by establishing the following criteria:
      (1) The patient is septic.
      (2) Blood culture for specific organism.
      (3) Catheter tip culture for same organism.
      (4) No other potential source of organism.
      (5) Resolution of septic picture upon removal of catheter.
      [Note: Management of catheter sepsis is in itself a diagnostic tool. Differential diagnosis management, and the decision to keep or remove the catheter are made by the physician.]
   f. Air embolism: Signs and symptoms of air embolism are chest pain, sub-sternal pain, dyspnea, tachycardia, hypotension and nausea complaints. Immediately position patient to the left side, head down, and call 911.
Infusion Therapy – Midline Catheter: Maintenance and Management of Potential Complications  SECTION: 25.27

Strength of Evidence Level: 3

g. Pain during infusion: Infuse solution at a slower rate. Applying warm compresses to upper arm during infusion may help decrease pain. Assess patient for potential thrombophlebitis, infiltration and sepsis. If symptoms persist, immobilize arm, discontinue infusion and notify physician.

h. Drainage from exit site: Assess drainage and rate of infusion. Culture could be indicated.

i. Thrombophlebitis: Immobilize arm, discontinue infusion and notify physician.

B. FLUSHING/HEPARINIZATION

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
5 mL Heparin syringe (10 units/mL or as prescribed)
Normal saline, if indicated (10mL)
Tape
Puncture-proof container
Impervious trash bag

PROCEDURE:
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Prepare syringes with flushing solution, normal saline and heparin.
7. Clean injection port with alcohol applicator, using friction. Allow to air dry.
8. If medication administered, follow SASH method (see Consideration Step 4).
9. If medication not administered, insert heparin-filled syringe with 25-gauge needle or needle less adaptor into injection port unless cap has a positive pressure valve. Inject heparin solution into injection port using steady pressure. Before syringe is completely empty, clamp line and apply pressure on plunger while withdrawing syringe and needle or needle less adaptor.
10. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time and procedure performed.
   b. Amount of saline and heparin solution flush, including strength of heparin.
   c. Medication administered, dosage and time.
   d. Appearance of venous access site: ease of flushing and/or blood return.
   e. Patient's response to procedure.
   f. Instructions given to patient/caregiver.

C. INTERMITTENT INJECTION PORT CHANGE
If the 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. The injection port is changed every 7 days or PRN, if leaking or disconnected.

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
Injection port
5 mL Heparin syringe (10 units/mL or as prescribed)
10 mL normal saline syringe
Clamp
Tape
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Explain the procedure and purpose to patient/caregiver.
3. Assemble equipment on clean surface close to patient.
4. Place patient in comfortable position, making sure that site is accessible and below the level of the heart.
5. Ensure adequate lighting.
6. Open protective packaging of new injection port.
7. Insert normal saline filled syringe with 25-gauge needle or needle less adaptor into injection port.
8. Slowly inject flush to fill dead space of injection port, and then remove syringe and needle or needle less adaptor. Insert Heparin filled syringe and flush.
9. Clamp catheter.
10. Clean extension set and injection port at junction with alcohol applicator, using friction.
11. Wrap alcohol wipe around junction until injection port is removed.
12. Remove old injection port.
13. Remove protective cover from new injection port.
14. Prime new injection port with 10 units/mL heparin. Attach new pre-filled injection port, twisting firmly to secure. 15. Unclamp catheter.
16. Tape extension set and injection port junction.
17. Flush with 5 mL-heparin solution, using steady pressure. Remove syringe and needle or needle less adaptor, exerting positive pressure on syringe as it is removed.
18. Clamp catheter or reconnect to infusion, as needed.
19. Discard soiled supplies in appropriate containers.
AFTER CARE:
1. Document in patient's record:
   a. Date, time and procedure performed.
   b. Amount of heparin flush and strength.
   c. Appearance of venous access site.
   d. Patient's response to procedure.
   e. Instructions given to patient/caregiver.

D. SITE CARE, DRESSING CHANGE

EQUIPMENT:
Gloves, sterile and non-sterile
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
transparent permeable adhesive dressing
Steri-Strips
Skin prep swab (optional)
Mask (optional)
Impervious trash bag

PROCEDURE:
2. Explain the procedure and purpose to the patient/caregiver. Ask if patient is allergic to any creams, ointments or solutions that are put on the skin, i.e., iodine.
3. Assemble the equipment on a clean surface, close to the patient. Create a sterile field.
4. Place patient in comfortable position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Don non-sterile gloves and mask, if indicated.
7. Slowly loosen transparent dressing at the distal end. Support and anchor catheter tube with the other hand during this process. Peel dressing toward the exit site and parallel to the skin.
8. Inspect site for signs and symptoms of infection. If present, notify physician. Perform hand hygiene.
9. Remove gloves, perform hand hygiene and don sterile gloves.
10. Cleanse site with Chlorhexidine gluconate sponge. Use repeated back and forth and side to side motion, cleansing the skin over the VAD for 30 seconds. Allow to air dry for 30 seconds. DO NOT blot.
11. Anchor the catheter to the skin using steri-strips or tape.
12. Apply transparent permeable adhesive dressing. Dressing must cover entire exit site, catheter and extension tubing connector leaving only the injection port accessible for therapy and procedures.
13. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Procedure and observations.
   b. Appearance of venous access site.
   c. Patient's response to procedure.
   d. Instructions given to patient/caregiver.

E. DRAWING BLOOD

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
10 mL normal saline syringe
10 mL syringes for waste
Lab tubes
Heparin solution (10 units/mL or as prescribed)
Syringes with needles or needle less adaptors
Injection port
Protective eye wear (optional)
Disposable eye wear (optional)
Puncture-proof container
Impervious trash bag

PROCEDURE:
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Use vasodilation techniques (e.g., warm fluids orally; a warm pack to the site) prior to attempting blood sampling.
8. Clamp catheter and remove old injection port.
9. Connect a luer-lock syringe to hub of catheter to perform blood sampling procedure rather than using a needle inserted into the injection port. Unclamp catheter.
10. Flush with 10 mL of normal saline before drawing any blood.
11. Withdraw 5-10 mL blood/normal saline mixture. Discard syringe with blood into puncture-proof container.
12. Obtain the blood sample.
   [NOTE: Always use slow, gentle pressure when withdrawing a blood sample, to prevent collapsing the catheter.]
13. If unable to withdraw blood, try the following:
   a. Rotate, flex or change arm position to move the catheter tip into a "free from obstruction" position.
   b. Flush catheter again with normal saline.
14. Attach syringe with 10 mL of normal saline to line, unclamp and flush line vigorously to remove all blood from line. Reclamp line.

15. Attach new pre-filled injection port to line and flush. 
(See Infusion Therapy- Intermittent Injection Port Change.)

16. General order of sample collections:
   a. First: Blood culture tubes or vials.
   b. Second: Coagulation tube (e.g., blue-top tubes).
   c. Third: Serum tube with or without clot activator or gel (e.g., red, gold, or speckle-top tubes).
   d. Fourth: Heparin tubes (e.g., green-top tubes).
   e. Fifth: EDTA tubes (e.g., lavender-top tubes).
   f. Sixth: (Last): Oxalate/fluoride tubes (e.g., gray-top tubes).

17. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Date, time and procedure performed.
   b. Blood samples drawn, identity and location of laboratory where specimens taken.
   c. Amount of normal saline and heparin flush, including strength of heparin.
   d. Patient's response to procedure.
   e. Instructions given to patient/caregiver.
   f. Communication with physician.
PURPOSE:
To provide accurate and safe administration of parenteral therapy.

CONSIDERATIONS:
1. Parenteral administration of opioid analgesic medications can be useful in optimizing pain control with reduced systemic side effects.
2. Parenteral administration may be indicated for severe or intractable pain when:
   a. Oral, transdermal or rectal analgesic medications can be useful in optimizing pain control with reduced systemic side effects.
   b. Patients experience nausea and vomiting or cannot swallow oral medications.
   c. Contraindication to rectal medication.
   d. Large oral doses cause unacceptable systemic complications.
3. Parenteral administration of analgesics may be:
   a. Intermittent or bolus.
   b. Continuous infusion (infusion control device required).
   c. Continuous infusion with supplemental bolus for breakthrough pain (infusion control device required).
4. Infusion devices include:
   a. External Ambulatory PCA Pump.
5. Drug therapy alternatives include:
   a. Morphine may be administered via IV, IM, or SC. Morphine has a short half-life and no toxic or active metabolites.
   b. Hydromorphone is useful when Morphine is poorly tolerated or ineffective.
   c. Meperidine is short acting, and is not recommended for use in chronic, severe pain since it has a CNS toxic metabolite (normeperidine) that accumulates with repeated dosing.
   d. Fentanyl and Sufentil are very potent opiate agonists with a rapid onset of action and shorter duration of action than morphine. They are generally used epidurally in an attempt to lower narcotic requirements and improve analgesia or avoid nausea and epidural side effects of other narcotics.
   e. Clonidine (Duraclon), a centrally-acting analgesic can be used in combination with an opiate agonist for the treatment of severe pain that is not controlled by the use of an opiate agonist for the treatment of severe pain that is not controlled by the use of an opioid alone.
6. Routine use of Naloxone in the home is not recommended because administration can precipitate acute withdrawal and lack of pain control. Proper administration requires continual monitoring by a healthcare professional.
   a. On a case-by-case basis, a physician may elect to have Naloxone in the home.
   b. A specific physician order is required if Naloxone is in the home.
7. Central Venous access is recommended for continuous administration to maintain uninterrupted level of analgesic in the home.

Dosage:
1. Dosage should be titrated to optimize individual pain control while minimizing adverse effects of medication.
2. Convert intermittent SQ, IV or PO dosage to comparative parenteral dosage utilizing the Equianalgesic Chart (See Attachment A.) For initiation of continuous parenteral therapy determine the total daily usage of patient's current intermittent therapy and convert using the Equianalgesic Chart as follows:
   a. Calculate total daily oral dose that patient received during the previous 24 hours.
   b. Multiply total daily oral dose by the conversion factor for the specific narcotic analgesic for the total daily subcutaneous dose.
   c. To determine the subcutaneous dose per hour, divide the total daily subcutaneous dose by 24.
3. The dose and/or rate of infusion can usually be safely increased in increments of 10-20% of current dose or rate of infusion of by increasing the basal rate by 50% of the total daily bolus requirement for PCA patients. The patient should be observed and monitored for 1 to 2 hours after increasing dosage for untoward effects.

Adverse Reactions/Side Effects:
1. In the case of respiratory depression, reduce the rate of infusion or stop the infusion for a short period of time to reverse respiratory depression. Consult physician for instruction. Severe respiratory depression may necessitate the use of a narcotic antagonist (i.e., Naloxone). Obtain specific physician order prior to administering Naloxone.
2. Gastrointestinal:
   a. Nausea and vomiting, motion may aggravate these symptoms. Antiemetics may be helpful in treating nausea and vomiting but may be additive to other unwanted side effects of the analgesic.
   b. Constipation is caused by the anticholinergic action of most of the opioid analgesics used. Patients receiving pain management therapy should be placed on a high fiber diet and take laxatives or a stool softener on a regular basis. Adequate hydration may also be helpful in reducing symptoms.
3. Analgesics may cause drowsiness, seizures, agitation, restlessness, confusion, tremors and somnolence. Changing to an alternative medication may alleviate these symptoms. Patients may benefit from dose reduction or adjunctive medication treatment.
4. Vasodilation, hypotension, pruritus, flushing, sweating and allergic reaction. Antihistamines are sometimes useful in treating these symptoms of adverse effects. If antihistamines are not effective or contraindicated then an alternative analgesic medication should be employed.

**Monitoring:**

1. Vital signs (including respiratory rate) should be monitored periodically during the course of therapy and according to the needs of the individual patient.
2. Assess the patient response to therapy by determining the level of comfort using an appropriate pain scale (0 - 10 intensity scale where 0 = no pain, 10 = worse pain) and report changes to physician.
3. Evaluate the patient for any other adverse effects that might be caused by the medication and report to physician as appropriate.

**Drug Interactions:**

1. CNS depressants (i.e., alcohol, benzodizepines, phenothiazines) cause additive sedative effects.
2. Cimetidine and phenytoin delay hepatic metabolism of opioids that will likely enhance the effect of the opioid.
3. Aminophylline and sodium bicarbonate solutions cause precipitation with morphine solution and are not compatible.

**EQUIPMENT**

None

**PROCEDURE- Prior to Administration**

1. The patient shall meet the admission criteria and have an appropriate indication for pain management therapy.
2. Physician orders shall include:
   a. Name of drug, concentration dosage in mg/hour, dosage and frequency of bolus dose as appropriate and route.
   b. Limits or range of continuous infusion and bolus dose to be set in programming the ambulatory infusion pump.
   c. Subcutaneous, intravenous (peripheral or central) route.
3. Assessments shall utilize a pain intensity tool and should address location, duration, onset, characteristics of pain, patient’s goals for pain relief and alleviation or causative factors.
4. All patient-controlled analgesics should be infused via infusion pump or autoinfusion.
5. Programmable pumps that deliver analgesic medication should be verified for correct programming prior to initiation of therapy.

**PROCEDURE- Administration**

PURPOSE:
To maintain a patent IV site for intermittent IV therapy.

CONSIDERATIONS:
1. Review Intravenous Therapy Administration.
2. The injection port can be connected to a cannula with extension tubing to convert to an intermittent infusion line.
3. Intermittent IV insertion sites must be changed every 72 hours and prn or as physician orders may leave in up to 5 days if venous status is poor and there are no signs or symptoms of phlebitis, infiltration and/or infection. IV insertion site to be evaluated every 72 hours.
4. Peripheral site care must be done as needed.
5. Check the patency and placement of the cannula prior to infusion.
6. The cannula must be flushed immediately after each infusion and every 24 hours when not in use with 5 mL of bacteriostatic normal saline followed by 5 mL of 10 units per mL heparin solution or as ordered per physician.

EQUIPMENT:
Gloves
Tourniquet
Cannula
Normal Saline syringes (2)
IV cannula
Heparin syringe (10 units/mL, or as prescribed)
Alcohol wipe applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
2x2 gauze sponge, sterile
Transparent dressing
Antimicrobial ointment (optional)
Tape
Microbore extension
Injection port
Puncture-proof container
Impervious trash bag

PROCEDURE:
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Follow considerations and procedures under (See Intravenous Therapy Administration.) for selection of vein, inserting and securing the cannula.
7. Remove cover of new injection port and insert the port into the cannula extension. Flush with saline as ordered by the physician.
8. Saline/heparin flushes:
   a. Clean end of injection port with alcohol applicator using friction. Allow to air dry.
   b. Insert needle less adapter of normal saline syringe into injection port and flush gently to determine patency of lock.
   c. Follow with heparin flush, before removing syringe close clamp to reduce possibility of clot formation.
9. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient’s record:
   a. Procedure and observations.
   b. Type and appearance of venous access site.
   c. Amount of saline and heparin flush, including strength of heparin.
   d. Patient’s response to procedure, side effects and management.
   e. Instructions given to patient/caregiver.
   f. Communication with physician.
**Purpose:**
To maintain a patent intravenous (IV) access for continuous or intermittent drug, fluid infusion or blood withdrawal via a peripherally inserted central catheter (PICC).

Prevention, early detection and management of central venous catheter related complications.

**Considerations:**

1. The PICC is an IV access device inserted into the peripheral vascular system. The catheter may be advanced into the Vena cava. Vena cava placement is confirmed by radiology. The catheter provides for ready access to the patient’s circulation for administering drugs, blood products and total parenteral nutrition.

2. Intermittently accessed PICC lines are flushed with 5 mL of heparin solution 10 units/mL every 24 hours, after each use or as prescribed by physician.

3. The intermittent injection port will be changed once a week or PRN.

4. When medication is administered in order to eliminate problems of drug incompatibility, the SASH method of flushing is utilized:
   - S – Saline.
   - A – Administer drug/solution.
   - S – Saline.
   - H – Heparin.

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

5. The initial (post-insertion) dressing should be over the insertion site to absorb any post insertion bleeding or drainage. A transparent dressing should be placed over this. Subsequent dressing changes do not require the use of gauze unless excessive drainage is present. A Biopatch may be applied at exit site with each dressing change.

6. Dressing change is performed every 7 days or PRN using a transparent permeable adhesive dressing. Patients who are active and perspire profusely may require more frequent dressing changes. If any blood or moisture is noted at catheter insertion site, dressing must be changed.

7. The patient/caregiver is to be taught to check site for:
   - Excessive drainage or bleeding from catheter exit site.
   - Redness or swelling around the catheter exit site.
   - Pain, soreness, swelling or tenderness in the arm where the catheter is inserted.
   - Pain or discomfort during infusion of IV solution.
   - Chest pain or discomfort while catheter is in place.

8. Blood sampling can only be performed on a 3.0 French and larger size catheters and only with physician order.

9. Confirm physician’s order for blood work and to use the PICC for drawing the samples.

10. Difficulty in drawing blood from the catheter may be due to patient’s position, occlusion of the catheter by clots or a clamped catheter or pressure to withdraw blood is too great. Drawing blood for clotting studies from a heparinized line may falsely alter the results obtained.

### A. Management of Complications

1. A good physical assessment and patient education are the first line of defense in the management of post-insertion complication.

2. The following are the possible complications that may be encountered in the care of PICC lines and their management.
   a. **Bleeding:**
      - (1) A small amount of bleeding at the site of insertion is common. A sterile 2x2 gauze at the site of insertion is sufficient to manage this.
      - (2) Bleeding due to patient’s inherent coagulopathy problems may be managed by applying a mild pressure dressing aseptically for 5 minutes at the site of insertion.
   b. **Sterile mechanical phlebitis** has been found to occur:
      - (1) Within the first 48 to 72 hours after insertion.
      - (2) More in women than men.
      - (3) More in left-sided insertions.
      - (4) More when large gauge catheters are inserted.
   c. **Grade 0-4 phlebitis:**
      - (1) Apply moist, warm compress to upper arm for 20 minutes 4 times a day, elevate extremity and limit exercise of the extremity.
      - (2) If patient develops fever, increased pain, palpable cord or there is questionable discharge at site, notify physician for possible removal of PICC.
   d. **Cellulitis:**
      - (1) Cellulitis is best managed by prevention. A thorough cleansing of the site, adherence to sterile procedure and proper after-care of insertion site eliminates this complication.
      - (2) Cellulitis, when noted, may be successfully managed by a course of oral antibiotics such as dicloxicillin. Notify physician for appropriate medical therapy.
   e. **Catheter-related bloodstream infection (BSI)** diagnosed according the following Centers for Disease Control and Prevention (CDC) criteria:
Catheter sepsis may only be diagnosed by establishing the following criteria:

1. The patient is septic.
2. Positive blood culture.
3. Catheter tip culture and for some organism.
4. No other potential source of organism.
5. Resolution of septic picture upon removal of catheter.

Therefore, management of catheter sepsis is in itself a diagnostic tool. Differential diagnosis, management and the decision to keep or remove the catheter are made by the physician.

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 during infusion: Stop Infusion. Assess patient for potential thrombophlebitis, infiltration, and sepsis. If symptoms persist, immobilize arm, discontinue infusion and notify physician.

h. Catheter tip migration may occur in patients who experience frequent vomiting, severe coughing and some physical activity.

i. Drainage from exit site: Assess drainage and rate of infusion. Culture could be indicated.

j. Thrombophlebitis, although rare, may occur. Immobilize arm, discontinue infusion and notify physician.

k. Broken catheter:
   1. Teach patient how to apply tourniquet to upper arm to occlude venous system if catheter breaks off and how to secure remaining exterior catheter with tape.

2. Explain the procedure and purpose to the patient/caregiver.

3. Assemble the equipment on a clean surface with sterile drape close to the patient.

4. Place patient in comfortable reclining position, ensuring that the site is accessible.

5. Ensure adequate lighting.


7. If medication administered, follow SASH method (see Consideration No. 4).

8. If medication not administered, insert heparin filled syringe with needle less adapter into injection port. Inject heparin solution using steady pressure. Before syringe is completely empty, clamp line and apply pressure on plunger while removing syringe, unless cap has positive pressure valve.

9. Discard expended supplies in appropriate containers.

AFTER CARE:

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

C. INTERMITTENT INJECTION PORT CHANGE

If the extension tubing is attached at the time of catheter insertion, it is a permanent part of the catheter and is changed ONLY if cracked, leaking or inadvertently disconnected. The injection port is then changed every 7 days and PRN.

EQUIPMENT:

Gloves
Sterile drape
Clamp
10 mL syringes
Needle less adapter
Tape
Alcohol applicator/antimicrobial (wipe/swab/disk/ampule)
Normal saline, if indicated
Heparin solution (10 units/mL or as prescribed)
Puncture-proof sharps container
Biohazard trash bag

PROCEDURE:


2. Explain the procedure and purpose to the patient/caregiver.

3. Assemble the equipment on a clean surface with sterile drape close to the patient.

4. Place patient in comfortable reclining position, ensuring that the site is accessible.

5. Ensure adequate lighting.


7. If medication administered, follow SASH method (see Consideration No. 4).

8. If medication not administered, insert heparin filled syringe with needle less adapter into injection port. Inject heparin solution using steady pressure. Before syringe is completely empty, clamp line and apply pressure on plunger while removing syringe, unless cap has positive pressure valve.

9. Discard expended supplies in appropriate containers.

AFTER CARE:

1. Document in patient’s record:
   a. Date, time and procedure performed.
   b. Amount of saline and heparin flush, including strength of heparin solution.
   c. Medication administered, dosage and time.
   d. Appearance of venous access site.
   e. Patient’s response to procedure.
   f. Instructions given to patient/caregiver.
   g. Patient’s response to teaching.
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. Draw 10 mL of heparin solution into a 10 mL syringe.
7. Remove tape securing extension set and injection port to the catheter.
8. Insert heparin-filled saline syringe with needle less adapter into the new injection port. Aspirate first to confirm device patency.
9. Slowly inject flush to fill dead space of injection port.
11. Clamp catheter.
12. Wrap alcohol wipe around junction until injection port is removed.
13. Remove old injection port.
14. Remove protective cover from new injection port.
15. Attach new pre-filled injection port, twisting firmly to secure with syringe still attached.
16. Unclamp catheter. Aspirate first to confirm device patency.
17. All equipment needs to be luer lock.
18. Inject 5 mL heparin solution, using steady pressure. Remove syringe, exerting positive pressure on syringe as it is removed.
19. Clamp catheter or reconnect to infusion, as needed.
20. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient’s record:
   a. Date, time and procedure performed.
   b. Amount of heparin solution flush, including strength of heparin solution.
   c. Appearance of venous access site involving catheter/skin junction.
   d. Patient’s response to procedure.
   e. Instructions given to patient/caregiver.
   f. Patient’s response to teaching.

D. DRESSING CHANGE

EQUIPMENT:
Sterile transparent semi-permeable adhesive dressing (Opsite, Tegaderm)
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule) or Chloraprep®
Steri strips
Skin preparation swab – skin protectant
Mask
Gloves, sterile
Gloves, non-sterile
Biohazard trash bag
Sterile drape
Marking pen/labels

PROCEDURE:
2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface with sterile drape close to the patient.
4. Place patient in comfortable, reclining position, ensuring that site is accessible.
5. Ensure adequate lighting.
6. Don non-sterile 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 VAD – related complication development. If present, notify physician.
9. Remove contaminated gloves and don new sterile gloves.
10. Cleanse site with chlorhexidine gluconate sponge, using repeated back and forth and side to side motion, cleansing the skin over the VAD for 30 seconds. Allow site to dry for 30 seconds.
11. DO NOT blot.
12. Verify that external catheter length visible outside corresponds to initial placement measurement. If it does not, notify physician before continuing use.
13. Anchor the hub of the catheter to the skin using steri strips.
14. Apply transparent semi-permeable adhesive dressing. Ensure dressing covers wing of hub of PICC line, depending on catheter design. Refer to manufacturer’s recommendations for additional catheter securement.
15. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient’s record:
   a. Date, time and procedure performed.
   b. Appearance of venous access site.
   c. External length of catheter.
   d. Patient’s response to procedure.
   e. Instructions given to patient/caregiver.
   f. Patient’s response to teaching.
E. DRAWING BLOOD

EQUIPMENT:

Gloves
Alcohol applicator (wipe/swab/disk/ampule)
10-20 mL normal saline
Evacuated tubes for lab assay
10 mL syringes with needle less adapters
Heparin solution (10 units/mL or as prescribed)
Injection port
Protective eye wear (optional)
Disposable apron (optional)
Puncture-proof container
Biohazard trash bag
Sterile drape

PROCEDURE:

2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface with sterile drape close to the patient.
4. Place patient in comfortable reclining position, ensuring that site is accessible.
5. Ensure adequate lighting.
6. Use vasodilation techniques, e.g., warm fluids orally or a warm pack to the extremity, prior to attempting blood sampling.
7. Clean extension set and injection port at junction with alcohol applicator using friction. Allow to air dry.
8. Insert needle less system with normal saline-filled syringe into injection point.
9. Aspirate first to determine PICC patency, then flush with 10 mL of normal saline before drawing any blood.
10. Withdraw maximum of 10 mL blood/normal saline mixture (the internal lumen of a 20-gauge PICC catheter is 0.3 mL). Discard syringe with blood into puncture-proof container.
11. Obtain the blood sample using a 10 mL syringe. [Note: Always use slow, gentle pressure when withdrawing a blood sample to prevent collapsing of the catheter.]
12. If unable to withdraw blood, try the following: a. Rotate, flex or change arm position to move the catheter tip into a free-from-obstruction position. b. Aspirate, then flush catheter again with normal saline. c. Reposition patient and reattempt aspiration and flush procedures.
13. Insert needle less system with 10 mL normal saline-filled syringe into injection port and flush PICC vigorously to remove all blood. Flush with a total of 20 mL normal saline. Re-clamp. Attach syringe with heparin solution, unclamp and flush with heparin solution. Clamp. Remove syringe. Attach new pre-filled injection port to PICC adaptor/hub and flush.
14. General order of sample collections:
   a. First: Blood culture tubes or vials.
   b. Second: Coagulation tube (e.g., blue-top tubes).
   c. Third: Serum tube with or without clot activator or gel (e.g., red, gold or speckle-top tubes).
   d. Fourth: Heparin tubes (e.g., green-top tubes).
   e. Fifth: EDTA tubes (e.g., lavender-top tubes).
   f. Sixth (Last): Oxalate/fluoride tubes (e.g., gray-top tubes).
15. Discard contaminated supplies and equipment in appropriate containers.

AFTER CARE:
1. Document in patient’s record:
   a. Date, time and procedure performed.
   b. Blood samples drawn and volume of blood, identity and location of laboratory where specimens taken.
   c. Amount of normal saline and heparin flush, including strength of heparin.
   d. Patient’s response to procedure.
   e. Instructions given to patient/caregiver.
   f. Patient’s response to teaching.
PURPOSE:
To establish safe guidelines for peripherally inserted central catheter (PICC) removal.

CONSIDERATIONS:
1. Insertion, tip placement and removal of a PICC are performed only when ordered by the physician.
2. Any breakage of a PICC line will result in immediate removal or repair.

EQUIPMENT:
- Gloves, sterile and non-sterile
- 2x2 gauze sponge, sterile
- Antimicrobial ointment
- Occlusive dressing
- Tape and/or self-adhesive bandage
- Suture removal kit (optional)
- Disposable apron (optional)
- Protective eye wear (optional)
- Impervious trash bag

PROCEDURE:
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 supine position, ensuring that site is accessible with arm at 90 degree angle.
5. Ensure adequate lighting.
6. Don non-sterile gloves.
7. Place patient’s arm at side on a protective barrier. Remove old dressing and discard appropriately. Cleanse site per agency protocols.
8. Prepare PICC removal materials:
   a. Open sterile glove field. Place sterile gauze on field.
   b. Apply antiseptic ointment to site.
   c. Don sterile gloves.
   d. Remove sutures, if present.
   e. Grasp catheter at exit site and remove with slow steady motion.
   f. If resistance is felt, stop removing catheter and wait a few moments; patient may be having venous spasms.
   g. If resistance continues, place warm pack on arm (venous dilation) and wait 10 minutes.
   h. If still unable to withdraw, apply sterile gauze at insertion site and tape in place. Notify physician.
9. After catheter has been removed 1-2 inches, re-grasp near exit site and repeat procedure until completely removed. If patient reports severe pain, or if abnormal resistance to removal is assessed, stop procedure, secure catheter and contact physician.
10. After catheter is removed, apply digital pressure to site until homostasis is achieved, apply sterile occlusive dressing. Apply sterile gauze dressing to site, and tape in place or apply transparent dressing.
11. Measure the length of the catheter, condition of tip and compare with pre-insertion length. If length is smaller than the pre-insertion length, notify physician immediately.
12. Instruct patient/caregiver to assess site every 24 hours until site is epithelialized.
13. Instruct patient to observe site for:
   a. Excessive bleeding or drainage.
   b. Extensive bruising.
   c. Pain, redness or swelling.
   d. Signs and symptoms of infection.
   e. Unusual pain or discomfort.
   f. Chest pain or discomfort.
14. Instruct patient to leave dressing in place for 24 hours. If no bleeding or drainage occurs, site may be left open to air.
15. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in the patient's record:
   a. Date, time and procedure performed.
   b. Length of catheter removed.
   c. Patient's response to procedure, side effects and management.
   d. Instructions given to patient/caregiver.
   e. Communication with physician.
Strength of Evidence Level: Blank
PURPOSE:
To establish guidelines and standards for the continuous infusion of medications via the subcutaneous route.

CONSIDERATIONS:
1. Prior to instituting therapy, describe the care required of the family in the absence of the nurse.
2. Patients considered for continuous subcutaneous infusion (CSQI) are listed below:
   a. Patients unable to take medications by mouth because of physiological alterations.
   b. Patients requiring subcutaneous injections for a period of greater than 48 hours, e.g., post-op.
   c. Patients requiring parenteral narcotics but have poor venous access.
3. Medications given via CSQI may include:
   a. Parenteral narcotics.
   b. Iron binding compounds (Deferoxamine or Desferal).
4. Patients referred to homecare for CSQI of narcotic analgesics should receive the first dose in a controlled environment.
5. An electronic infusion device (pump) is required to administer a CSQI to ensure accurate, safe delivery.
6. Review special considerations related to narcotic analgesic infusions. (See Continuous Intravenous Narcotic Infusion.)
7. Hourly infusion volume should be equal to or less than 3.0 mL/hour to prevent local site irritation.
8. Insertion sites should be monitored twice daily by patient/caregiver and by the nurse three times a week after initial insertion, progressing to bi-weekly, then weekly.
9. Insertion sites are to be changed every 3 to 5 days on an established schedule and anytime signs of redness or swelling occur. Sites should be rotated and should not be reused for 7 to 10 days. Select sites at least 1 inch from previous site, using a new needle with each insertion attempt.
10. The subcutaneous cannula can be inserted into any area having an ample amount of subcutaneous tissue. Potential sites are:
   a. Upper arm.
   b. Thigh.
   c. Abdomen.
   d. Flank areas.
   e. Chest (optimal site of an ambulatory patient is the upper chest area).
11. Hardened areas may form under the skin, which may be due, in part, to malabsorption of the medication. Histamines are released into the subcutaneous tissue from the trauma of the needle stick. These decrease blood flow and may slow absorption of the medication. These areas should not be used until they return to normal.
12. The size of the cannula depends on the size of the patient, the drug and rate of infusion. (Range of sizes from 25-27 gauge, 3/8 to 1 1/2 inches.)
13. Insertion site should be dressed with a clear, occlusive dressing without gauze to allow visualization of site.
14. All tubing should be primed prior to insertion of cannula device.
15. Tubing and cassette or infusion bag should be changed according to an established schedule and when site is changed.
16. Patient/caregiver education should include the following:
   a. Purpose of medication/therapy.
   b. Desired medication effect.
   c. Potential side effects and adverse reactions.
   d. Assessment of site twice daily.
   e. Rotation of site, including insertion procedure (with a physician order).
   f. Emergency phone numbers.
   g. Use and care of infusion pump, including troubleshooting alarms.

EQUIPMENT:
Gloves
Medication
Pump and tubing
Subcutaneous device:
   a. Patch
   b. 23- to 27-gauge winged-catheter with attached extension tubing
Alcohol applicator (wipes/swab/disk/ampule)
Antimicrobial applicator (wipes/swab/disk/ampule)
Sterile tape or steri strips
Transparent semi-permeable adhesive dressing
Normal saline – 10 mL vial
Microbore 4-6 inch extension (if needed)
3 mL syringe with needle or needle less adaptor
Disposable apron (optional)
Protective eye wear (optional)
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Identify patient and explain procedure and purpose to patient/caregiver.
3. Assemble equipment on a clean surface close to patient.
4. Place patient in a comfortable position, ensuring that site is accessible.
5. Open all packages and place on clean surface.
6. While maintaining aseptic technique, attach the subcutaneous cannula needle and extension to pump tubing.
7. Insert pump tubing into infusion pump according to manufacturer's instructions. Spike medication container and prime tubing through end of subcutaneous cannula needle.

8. Identify and palpate potential insertion site to ensure the skin is soft and non-tender.

9. Clean the skin:
   a. If the site is excessively hairy, clipping is recommended.
   b. Question the patient regarding allergies to adhesive tape and iodine.
   c. Cleanse site with chlorhexidine gluconate sponge, using repeated back and forth and side to side motion, cleansing the skin for 30 seconds. Allow site to air dry for 30 seconds.
   d. DO NOT blot.

10. Pinch skin at site using the thumb and index finger to raise a fat fold of at least 1 inch.

11. Insert cannula using a 45-degree angle and release the fat fold. If using a subcutaneous set, insert at a 90-degree angle. Secure wings flat against the skin using sterile tape or steri strips and across extension tubing for security of the site.

12. Cover with a transparent semi-permeable adhesive dressing. DO NOT use ointment at site.

13. Connect primed pump tubing to extension and start the infusion.

14. Discard soiled supplies in appropriate containers.

**AFTER CARE:**

1. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Medication dose, rate, time and site.
   c. Appearance of CSQI site.
   d. Patient's response to procedure.
   e. Instructions given to patient/caregiver.
Infusion Therapy – StatLock Catheter Securement Device: Application, Maintenance and Removal

Strength of Evidence Level: 3

PURPOSE:
To outline appropriate techniques for application, maintenance and removal of the StatLock device.

CONSIDERATIONS:
1. An order from a physician is not required to apply, maintain, or remove the StatLock device.
2. DO NOT use the StatLock device:
   a. On a catheter that is sutured in place.
   b. On patients who have known allergies to tape or adhesive.
   c. Where loss of adhesion could occur, such as a diaphoretic patient.
   d. On patients who are confused.
3. Use sterile technique when applying or removing the StatLock device during a single dressing change.
4. DO NOT allow the adhesive material on the StatLock anchor pad to come in contact with alcohol or acetone.
5. Minimize catheter manipulation while applying the StatLock device.
6. Always secure the catheter with a 1/2 inch steri strip at or near the insertion site prior to applying or removing the StatLock device to prevent accidental dislodging of catheter.

EQUIPMENT:
Alcohol skin preps
StatLock securement device
Skin prep pad
1/2 inch steri strip
Supplies for sterile central venous catheter dressing change
Additional steri strips as needed

PROCEDURE:
2. Explain procedure to patient.
3. Remove old dressing and discard per agency policy.
4. Apply a 1/2 inch steri strip at or near the catheter insertion site, if not already present.
5. Remove old StatLock device:
   a. Open the “over the top” retainer of the StatLock device, one side at a time. To do this, stabilize the catheter by holding down the StatLock device with one hand while opening the “over the top” retainer with the other hand.
   b. The adhesive material on the anchor pad is alcohol soluble. Rub the edge of the StatLock anchor pad with alcohol and slowly peel back the anchor pad while continuing to apply alcohol between the anchor pad and the patient’s skin.
   c. Remove steri strip at insertion site, if present.
6. Dispose of used supplies appropriately.
7. Perform site care.
8. Apply a clean steri strip at or near the insertion site to secure catheter.
9. Apply a new StatLock device:
   a. Select the site on which the StatLock device will be placed. The StatLock anchor pad should be placed so that the posts are within 1 to 1 1/2 inch of the catheter insertion site.
   b. Clean site with alcohol prep pad. Keep alcohol away from the StatLock device to prevent removal of adhesive. Allow the site to dry thoroughly.
   c. Prep the selected site with skin prep pad included in the StatLock kit to protect skin and encourage adhesion. Allow to dry thoroughly. Site should be smooth to the touch, not sticky, before proceeding.
   d. DO NOT attach the anchor pad to the skin at this time. The catheter must be secured to the StatLock device before applying the StatLock anchor pad to the skin.
   e. Orient the StatLock so that the arrow points towards the catheter insertion site.
   f. Place the catheter’s securement holes (the holes in the suture wings of the catheter) onto the StatLock posts.
   g. Close the “over the top” retainer to secure.
   h. Peel the paper backing off the StatLock anchor pad one side at a time and place the adhesive portion of the anchor pad on the patient’s skin, one side at a time.
10. Maintenance of the StatLock device:
    a. StatLock should be replaced minimally every 7 days or when soiled.
    b. StatLock device should not be covered with transparent dressing.

AFTER CARE:
1. Document in patient’s record:
   a. Procedure and observations.
   b. Instructions given to patient/caregiver.
   c. Response to procedure.
   d. Communication with physician.
Infusion Therapy – Tissue Plasminogen Activator (TPA) CATHFLO™ Activase

Strength of Evidence Level: 3

PURPOSE:
To restore the patency of a central venous catheter (CVC) occluded by fibrin or coagulated blood in the catheter.

CONSIDERATIONS:
1. CATHFLO™ Activase (Alteplase, TPA) is a tissue plasminogen activator—a “Clot Buster.” It is an enzyme that converts plasminogen into plasmin, which then degrades the fibrin existing in blood clots. It will not restore patency of a catheter in which medication precipitate is suspect.
2. Activase is approved by the FDA for the management of occluded CVCs in the dosage of 1 mg/mL. Activase is prepared in the home, reconstituted with 2.2 mL sterile water immediately before use. The solution may be used within 8 hours if stored at 36-86 degrees Fahrenheit.

EQUIPMENT:
10 mL syringes (2)
10 mL normal saline flush
Heparin flush per agency policy
Sterile water

PROCEDURE:
2. Explain procedure to patient.
3. Ascertain catheter occlusion, check for external mechanical obstructions.
4. Obtain physician order to attempt to restore venous device patency. Order should state specifically TPA (CATHFLO™) 2 mg/mL instill and dwell into vascular access device catheter type: Port/PICC, if patency not restored, may repeat one time.
5. Wash your hands, set up a clean work area and gather supplies.
6. Assess patient for signs/symptoms of superior or vena cava (SVC) syndrome or venous thrombosis (swelling in neck, face, shoulder, or arm on the same side as the catheter.) If present, notify physician and DO NOT instill CATHFLO™
7. Clamp catheter to prepare for TPA instillation.
8. Clean catheter hub with alcohol wipe.
9. Remove extension tubing and end cap – DO NOT instill through an extension.
10. Mix and dilute CATHFLO™ as per manufacturer guidelines:
   a. Draw up 2.2 mL sterile water, using 10 mL syringe, instill into CATHFLO™ vial, swirl –DO NOT shake to dissolve.
   b. Withdraw 2 mL CATHFLO™ TPA Alteplase solution in 10 mL syringe.
11. Attach the 10 mL syringe with 2 mL CATHFLO™
12. Open the catheter clamp and install CATHFLO™
13. Clamp catheter.
14. Leave empty CATHFLO™ TPA syringe in place.
15. Allow 30-minute dwell time or per physician’s order.
16. Unclamp the catheter.
17. Attempt to aspirate the TPA and blood from the line. Continue to aspirate until 5-10 mL of blood is obtained in the syringe.
18. Clamp catheter line. Remove syringe.
20. Flush line with 10 mL normal saline.
21. Final flush catheter with heparin flush solution per catheter type and physician’s order.
22. Clamp catheter.
23. If a patent catheter with a blood return is not obtained, repeat process as ordered.
   a. Second instillation may be up to 120 minutes, or even overnight (8 hours) if ordered by the physician.
   b. If after second TPA CATHFLO™ instillation, catheter patency cannot be re-established, notify physician for further catheter evaluation.

AFTER CARE:
1. Document in patient’s record:
   a. Procedure and observations.
   b. Instructions given to patient/caregiver.
   c. Patient’s response to procedure.
   d. Communication with physician.
PURPOSE:
To safely and effectively administer total parenteral nutrition (TPN) in the homecare setting.

CONSIDERATIONS:
1. Prior to instituting therapy, the nurse should describe the care required of the patient/caregiver in the absence of the nurse.
2. TPN usually refers to high-calorie formulas of the following concentrations:
   a. Amino Acids - 8.5% or greater.
   b. Glucose - 15% or greater (final concentration).
   c. Lipids may be added in varying amounts.
3. Final glucose concentrations of 10% or less may be given via a peripheral vein for short-term therapy.
4. TPN should always be given via a central venous access device (central line) to prevent severe thrombophlebitis. Placement of the catheter tip in the superior vena cava (SVC) should be verified by x-ray before the catheter is used.
5. TPN must be given using an infusion control device (pump) for safe, accurate delivery.
6. Initial orders for TPN should include:
   a. Formula of solution, total daily volume with taper schedule (if appropriate).
   b. Lipid administration including volume, percentage of lipids, frequency and method of administration (e.g., piggy-back or mixed in a 3-in-1 solution).
   c. Lab work ordered and whether labs can be drawn from central line.
   d. Routine site care:
      (1) Dressing change frequency.
      (2) Type of dressing to be used.
      (3) Flush protocol (heparin and saline).
7. Medications and additives may be added to TPN solution before container is spiked for hanging, e.g., heparin, insulin, MVI (multi-vitamins), etc. It is the responsibility of the mixing pharmacist to determine compatibilities and concentrations prior to dispensing solutions and additives.
8. Solutions are stored in the refrigerator until needed. Solutions should be taken out to warm at least 2 hours prior to administration. Cold solutions may cause the patient to have an elevated temperature due to the autonomic response of the body to warm the blood.
9. Solutions, tubing and filters are changed every 24 hours in an established order.
10. Filters should be used as follows:
    a. TPN solution without lipids - 0.22 micron filter.
    b. TPN solution with lipids (3-in-1) - 1.2 micron filter.
11. Strict aseptic technique is MANDATORY in all aspects of TPN administration.
12. Unless specifically ordered, the TPN catheter or port should not be used for any other therapy. It should be a DEDICATED line.
13. Solutions should be compounded under a laminar-flow hood with pharmacy supervision. Labels should include the following:
    a. Patient name.
    b. Mixing date.
    c. Physician's name.
    d. Expiration date.
    e. Formula components.
    f. Pharmacist's initials.
14. Solution labels should be verified against the physician's orders. Integrity of the container and solution should be checked for:
    a. Clarity.
    b. Contaminants.
    c. Precipitates.
    d. Turbidity.
    e. Leaks.
15. Complications of TPN include, but are not limited to, the following:
    a. Metabolic:
       (1) Infection/sepsis.
       (2) Hyperglycemia/Hypoglycemia.
       (3) Circulatory volume excess/deficit.
       (4) Electrolyte, mineral and vitamin imbalance.
       (5) Allergic reactions.
    b. Mechanical:
       (1) Catheter occlusion.
       (2) Catheter displacement/infiltration.
       (3) Central vein thrombosis/occlusion.
       (4) Air embolism.
       (5) Catheter embolism.
       (6) Infusion pump malfunction/failure.
16. Efforts to prevent mechanical complications include:
    a. Keeping scissors and serrated clamps away from catheter site.
    b. Opening clamp before flushing.
    c. Closing (clamping) catheter before opening the system except for the Groshong. (See Groshong Catheter Maintenance.)
17. Patient/caregiver should be instructed and/or demonstrate competence in all aspects related to administration of TPN.
18. Patient/caregiver will be instructed and observed for return demonstration before performing independently. Instructions will be verbal and in written form. Patient/caregiver instructions should include:
    a. Home monitoring parameters.
    b. Signs and symptoms of metabolic as well as mechanical complications.
    c. Preparation of additives.
    d. Storage and care of supply and solutions.
    e. Operation of mechanical infusion device.
    f. Infusion catheter maintenance.
    g. Reporting mechanisms for patient.
    h. Catheter complications including sepsis, air embolism and catheter occlusion.
19. Initial patient assessment should include:
Infusion Therapy – Total Parenteral Nutrition Administration

SECTION: 25.40

Strength of Evidence Level: 3

a. Admission height and weight.
b. Normal weight.
c. Type of infusion pump.
d. Type of central venous access.

20. Use at least 2 patient identifiers prior to administering medications.

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
TPN solution (2NI or 3NI)
Heparin/normal saline flushes, as needed
needle less adaptor or non-coring needle with extension for IVAD
10 mL syringes (2)
CVC dressing, as ordered
Tape
Puncture-proof container
Impervious trash bag

PROCEDURE:
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 position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Prepare equipment.
   a. Check TPN solution and container for proper solution, leaks, particulate matter, clarity and turbidity.
   b. Add medication(s) as ordered.
   c. Connect tubing to solution container. Prime tubing.
7. Connect tubing to pump per manufacturer's instructions.
9. Insert needle-locking device or needle less adaptor into intermittent injection port.
10. Program pump and start per manufacturer's instructions.
11. Discontinuing TPN infusion:
    a. Turn off pump and close tubing clamp.
    b. Remove needle-locking device or needle less adaptor from intermittent injection port.
    c. Clean intermittent injection port with alcohol applicator.
    d. Flush venous access device per physician's order/manufacturer's recommendation.
12. Discard soiled supplies in appropriate containers.

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
Medications in single or multi-dose containers
Syringes of appropriate sizes with 21-gauge needles or needle less adaptors
TPN solution (warmed to room temperature)
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Carefully read the name, dose and expiration date on each medication label.
3. Inspect the TPN bag for patient name, correct formula, expiration date and leaks and the solution for cloudiness, discoloration, sediment, particles and/or brown oily streaks (lipid solutions).
4. Place the TPN bag on a clean surface with the injection port handy.
5. Ensure adequate lighting.
7. Clean injection port with alcohol applicator. Allow to air dry.
8. Place the first medication container near the bag, away from the others. Check the medication label again.
9. Clean top of vial with alcohol applicator. Allow to air dry. Repeat using antimicrobial applicator, if applicable. Let air dry. DO NOT blot.
10. Choose the appropriate-sized syringe with needle or needle less adaptor, remove the needle cover and draw the appropriate amount of air into the syringe.
11. Insert the needle or needle less adaptor into the vial below the fluid level.
12. With the needle below the fluid level, withdraw the prescribed amount of medication.
13. Remove the needle or needle less adaptor from the vial, insert into the TPN bag injection port and inject the medication.
14. Remove the needle or needle less adaptor from the port, and drop into the needle disposal container.
15. Gently rock the TPN bag to thoroughly mix the added medication.
16. Discard the used medication vial, and place the next one near the bag.
17. Repeat steps 9-15 for each medication additive.
18. Discard soiled supplies in appropriate containers.

EQUIPMENT:
Gloves
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
TPN solution (warmed to room temperature, with additives added)
Administration set
Filter, 0.22 micron for TPN, 1.2 micron if 3-in-1
21-gauge needle in protective "click-lock" device or needle less adaptor
Infusion pump
Tape
Puncture-proof container
Impervious trash bag

PROCEDURE:
2. Place the TPN bag on a clean surface.
3. Identify patient and place in a comfortable position, making sure that site is accessible.
4. Ensure adequate lighting.
5. Wash hands. Don gloves.
6. Attach the filter and the needle or needle less adaptor to the administration set.
7. Remove the cover from the port on the TPN bag and the cover from the administration set, and insert the spike securely into the bag.
8. Fill the drip chamber half way and expel air from the tubing, filter and needle or needle less adapter, if applicable.
9. Insert the administration set into the infusion pump according to the manufacturer's instructions.
11. Insert the saline flush syringe, making sure the catheter clamp is open before instilling. Close the clamp, remove the syringe and drop it into the needle disposal container. Repeat with heparin flush as ordered.
12. Discard soiled supplies in appropriate containers.
13. Remove gloves. Wash hands.

IF THE CATHETER DEVELOPS A LEAK OR HOLE
1. To prevent air from entering the catheter:
   a. Clamp the catheter between chest and the damaged place.
   b. Call the physician.
   c. If physician is not available, call 911.

AFTER CARE:
1. Record weight with each visit.
2. Document in patient's record:
   a. Date, time, procedure and observations.
   b. Type and volume of solution, medication added.
   c. Time infusion started, discontinued and hourly infusion rate.
   d. Amount of saline and heparin flush solution, including strength of heparin.
   e. Type and appearance of venous access site.
   f. Patient's response to procedure, side effects and management.
   g. Instructions given to patient/caregiver.
   h. Communication with physician, when necessary.
# Equianalgesic Chart

Approximate Equivalent Doses of Parenteral and PO Analgesics for Moderate to Severe Pain

<table>
<thead>
<tr>
<th>Name</th>
<th>Route</th>
<th>Equianalgesic Dose (mg)</th>
<th>Peak Duration (hr)</th>
<th>Duration (hr)</th>
<th>Comments</th>
<th>Precautions with Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Morphine</strong>&lt;sup&gt;(M.S.)&lt;/sup&gt;</td>
<td>IV, IM PO Rectal</td>
<td>10 30-60 NA</td>
<td>1/2-1 1 1/2-2</td>
<td>4-6 4-7</td>
<td>Standard against which all drugs are compared. The PO dose is 3 to 6 times the IM dose. M.S. is appropriate for long-term use.</td>
<td>Use cautiously with patients who have impaired ventilation, bronchial asthma, increased intracranial pressure, or liver failure.</td>
</tr>
<tr>
<td><strong>Meperidine</strong>&lt;sup&gt;(Demerol®)&lt;/sup&gt;</td>
<td>IV, IM PO</td>
<td>75 300</td>
<td>1/2-1 1 1/2-2</td>
<td>2-4 2-4</td>
<td>Poor oral absorption. Shorter duration of action. <strong>Not</strong> appropriate for long-term use.</td>
<td>Norperidine accumulates causing CNS excitation (muscle twitching, irritability, seizures, etc). Contraindicated in impaired renal function or patients taking MAO inhibitors.</td>
</tr>
<tr>
<td><strong>Fentanyl</strong>&lt;sup&gt;(Sublimaze®)<strong>(Duragesic®)</strong></td>
<td>IV, IM Topical</td>
<td>0.1</td>
<td>not established</td>
<td>½-2 72</td>
<td>Used in anesthesia Transdermal patch for chronic pain. Start with 25 mcg/hour patch in narcotic naïve patients. Releases over 72 hours.</td>
<td>Patch may require 6 days to reach equilibrium when dose increased. Takes about 17 hours for drug level to decrease by 50% after patch removal. Breakthrough medication necessary especially at start of therapy.</td>
</tr>
<tr>
<td><strong>Methadone</strong>&lt;sup&gt;(Dolophine®)**</td>
<td>IV, IM PO</td>
<td>10 20</td>
<td>1/2-1 1 1/2-2</td>
<td>4-6 4-7</td>
<td>Long plasma half-life. (17-24 hours)</td>
<td>May accumulate (effect seen within 36-48 hours) causing excessive sedation. Use cautiously in hepatic dysfunction and the elderly.</td>
</tr>
<tr>
<td><strong>Levorphanol</strong>&lt;sup&gt;(Levo-Dromoran®)**</td>
<td>IV, IM PO</td>
<td>2 4</td>
<td>1/2-1 1 ½-2</td>
<td>4-6 4-7</td>
<td>Longer acting than M.S. when given in repeated, regular doses.</td>
<td>Drug accumulates, analgesic effect may increase with repeated doses.</td>
</tr>
<tr>
<td><strong>Hydromorphone</strong>&lt;sup&gt;(Dilaudid®)**</td>
<td>IV, IM PO</td>
<td>1.5 7.5</td>
<td>1/2-1 1 1/2-2</td>
<td>4-5 4-7</td>
<td>Shorter acting than M.S. Appropriate for long-term use and for subcutaneous infusion.</td>
<td>Same as morphine.</td>
</tr>
<tr>
<td><strong>Propoxyphene</strong>&lt;sup&gt;(Darvon®)**</td>
<td>PO PO 130 HCl 200 Napsylate</td>
<td>2-2 1/2 2-2 1/2</td>
<td>4-6 4-6</td>
<td>Darvon® = 65 mg: Darvocet® contains APAP 650 mg Darvon-N® = 100 mg</td>
<td>Less effective than 30-60 mg codeine or 600 mg ASA*, APAP* dose should not exceed 4 gm/day.</td>
<td></td>
</tr>
<tr>
<td><strong>Codeine</strong></td>
<td>IM PO</td>
<td>120 200</td>
<td>1/2-1 1 1/2-2</td>
<td>4-6 4-7</td>
<td>Tylenol #2 (Codeine 15 mg + Acetaminophen 300 mg) Tylenol #3 (Codeine 30 mg + Acetaminophen 300 mg) Tylenol #4 (Codeine 60 mg + Acetaminophen 300 mg)</td>
<td>More toxic than M.S. in high doses (&gt;65 mg) causing more nausea/vomiting and constipation. Acetaminophen dose should not exceed 4 gm/day.</td>
</tr>
<tr>
<td><strong>Oxycodone</strong>&lt;sup&gt;(Roxicodone®)**</td>
<td>PO</td>
<td>30</td>
<td>1</td>
<td>4-6</td>
<td>Available as 5 mg tab without Aspirin or Acetaminophen, Equianalgesic dose to PO MS given chronically. Advantageous when intolerant to MS.</td>
<td>Same as morphine.</td>
</tr>
<tr>
<td><strong>Oxycodone/Acetaminophen</strong>&lt;sup&gt;(Oxycodone/Aspirin)**</td>
<td>PO</td>
<td>30</td>
<td>1</td>
<td>4-6</td>
<td>Percocet® (Oxycodone + Acetaminophen (Various strengths/combinations) Percodan® (Oxycodone 5 mg + Aspirin 325 mg)</td>
<td>Acetaminophen dose should not exceed 4 gm/day. The use of MAO inhibitors or tricyclic antidepressants may increase the effect of either drug. Acetaminophen dose should not exceed 4 gm/day.</td>
</tr>
<tr>
<td><strong>Hydrocodone</strong></td>
<td>PO NA</td>
<td>1/2-1</td>
<td>4</td>
<td>Available in combination w/Acetaminophen or ASA* (Various strengths/combinations)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*APAP = Acetaminophen  *ASA = Acetylsalicylic Acid (Aspirin)
## Considerations for Home Infusion Therapy

### ANTIBIOTICS

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>CONSIDERATIONS FOR HOME ADMINISTRATION</th>
<th>RECOMMENDED VENOUS ACCESS</th>
<th>COMMENTS</th>
</tr>
</thead>
</table>
| Cephalosporins (Ancef, Fortaz, Rocephin, etc.) | - Dosing usually from 8 to 24 hours.  
- Gravity or ambulatory pump appropriate.  
- IVP.                                                                 | - Peripheral IV  
- Midline if therapy exceeds 2 weeks  
PICC if therapy exceeds 2 weeks | Therapeutic dosing should be confirmed by drug levels prior to discharge and ongoing levels monitored  
Ototoxicity  
Nephrotoxicity  
Use with caution in renal impaired patients |
| Vancomycin                  | - Dosing 12 to 24 hours.  
- High incidence of phlebitis with peripheral administration                                                | - PICC recommended  
- Can be given peripherally with precautions  
- Central Venous Catheter | Consider giving higher dose of 8 hour intervals, if appropriate to avoid 6 hour dosing |
| Ampicillin Unasyn Primaxin  | - Limited stability at room temperature requires reconstitution of drug                                      | - Peripheral IV  
- Midline                                           |                                                                                       |
| Penicillin Oxicillin Nafcillin | - Dosing usually 4 hours  
- Gravity may not be appropriate due to high frequency  
- Very high incidence of peripheral Phlebitis  
- Ambulatory pump recommended due to frequency of dosing | - Peripheral IV  
- PICC recommended if therapy exceeds 1 week  
- Central Venous Catheter |                                                                                       |
### ANTI-VIRALS

<table>
<thead>
<tr>
<th>MEDICATION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Acyclovir</td>
<td>- Dosing usually 8 hours for 21 days.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Moderate incidence of phlebitis.</td>
<td>- Peripheral IV or midline.</td>
<td></td>
</tr>
<tr>
<td>Gancyclovir</td>
<td>- Induction dosing at 12 hours x 14 days then maintenance dosing sometimes indefinitely.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- High incidence of phlebitis.</td>
<td>- CVC or PICC for long term maintenance dosing.</td>
<td>- Monitor CBC’s for neutropenia. - Consider Neupogen sc to increase WBC to within normal limits.</td>
</tr>
<tr>
<td>Foscarnet</td>
<td>- Requires long infusion period using stationary pump (usually 4 hours).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Induction dosing followed by maintenance schedule.</td>
<td>- CVC or PICC for long term maintenance dosing.</td>
<td></td>
</tr>
</tbody>
</table>

### ANTI-PROTOZOAL

<table>
<thead>
<tr>
<th>MEDICATION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Pentamidine</td>
<td>- Requires rate control and stationary pump.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Can cause severe hypoglycemia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Needs a caregiver present for dosing at home.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Moderate risk for phlebitis.</td>
<td>- Peripheral IV appropriate if short term.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Midline catheter preferred.</td>
<td>- Monitor trend of serum glucose. - If hypoglycemia demonstrated, may limit options for home administration.</td>
</tr>
</tbody>
</table>
### ANTI-FUNGAL

<table>
<thead>
<tr>
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<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>- Usually a “target” total dose.</td>
<td>CVC or PICC required.</td>
<td>- Optimize pre-med prior to discharge home.</td>
</tr>
<tr>
<td></td>
<td>- Extremely high incidence of phlebitis.</td>
<td></td>
<td>- If side effects are severe, should have someone in the home during infusion.</td>
</tr>
<tr>
<td></td>
<td>- Side effects frequently require pre-med with Tylenol/Benadryl, occasionally Demerol if rigors occur.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Stationary pump required.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TOTAL PARENTERAL NUTRITION

<table>
<thead>
<tr>
<th>MEDICATION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>(Dextrose concentration &gt;10%)</td>
<td>- “Cycled” infusion (over 12 hours or more) is recommended for home.</td>
<td>CVC or PICC required.</td>
<td>- One of the most complex therapies for patients/caregivers to learn.</td>
</tr>
<tr>
<td></td>
<td>- Infusion should be cycled at least once prior to discharge with labs drawn 1 hour after disconnect.</td>
<td></td>
<td>- Caregiver/support person in the home highly recommended.</td>
</tr>
<tr>
<td></td>
<td>- Solutions at home generally “3 in 1” (lipids are added to infusion bag).</td>
<td></td>
<td>- Lab work should be ordered on a routine basis</td>
</tr>
<tr>
<td></td>
<td>- Requires extensive teaching prior to discharge (at least 2 in hospital sessions).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Patient taught to add MVI, Zantac, insulin etc. due to stability.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### PAIN MANAGEMENT

<table>
<thead>
<tr>
<th>MEDICATION</th>
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<th>COMMENTS</th>
</tr>
</thead>
</table>
| (IV, sc, Epidural) Continuous Infusion and/or bolus dosing. | - Dosing should be optimized prior to discharge.  
- Caregiver/support person in the home required.  
- Administered using ambulatory pump which provides continuous (basal) rate as well as bolus option.  
- Pump is programmed by CIVN staff with lock-out “features” which limit patient access to dosing beyond established parameters.  
- No limit to dose that can be provided. | - Continuous infusion sc can be given effectively up to 50 mg/hour. requires adequate sc sites to accommodate continuous infusion. Watch volume; keep $\leq 2$ mL/hr.  
- IV via peripheral, midline, or central access.  
- Epidural catheters for home administration must be tunneled “permanent” catheter. | - Recommend D/C of all other pain meds with dose conversion to IV/sc rate (allows better assessment of dosing response). |

### CHEMOTHERAPY

<table>
<thead>
<tr>
<th>MEDICATION</th>
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<th>RECOMMENDED VENOUS ACCESS</th>
<th>COMMENTS</th>
</tr>
</thead>
</table>
| - Patients and caregivers are generally not taught self-administration.  
- CVC required.  
- Intermittent dosing done by RN.  
- Continuous infusions done by ambulatory pump.  
- Chemo spill kits should be taught to patient and left in the home. | - CVC/PICC required. | | |
REFERENCES


Center for Phlebotomy Education.


