Implantable Venous Access Device (IVAD) Central Venous Catheter (CVC) – Basic Care and Maintenance (Adult)

Site Applicability

All VCH & PHC Acute and Community

Practice Level

- RN, LPN
- RPN (SPH Only)

See site specific Practice Level/Education Requirements:

- **PHC** (see Appendix A)
- **VCH** (see Appendix B)

Policy Statement

1. The recommended, optimal IVAD tip position is the distal (lower third) superior vena cava (SVC) or the cavo-atrial junction (CAJ) or Right Atrial Junction (RAJ).
2. The IVAD may be used AFTER initial tip confirmation by a Physician/Designate.
3. Catheter tip position is documented in the patient's health record.
4. For IVADs not inserted at your acute care facility, and without documentation on admission, prior to use:
   - Catheter tip confirmation is **required** by Chest X-Ray (CXR).
   - Catheter patency **must** be verified by flushing and aspiration with blood return noted without resistance or complication.
5. Only a non-coring needle is used to access an IVAD.
6. Review necessity of IVAD with physician and patient, and ensure prompt removal of unnecessary IVAD.
7. Assess the IVAD site daily for signs and symptoms of complication.
8. A dedicated IVAD lumen for TPN is recommended.
9. **Identify type of IVAD prior to accessing:** Valved / Non-valved. Identify type using client identification card ["wallet card"]. Every effort to identify type must be made to provide best care. If type unknown, consult your Infusion Program Clinician/IV Educator to confirm best flush/lock solution.
10. **Power injectable** IVADs may be non-valved or valved.
    - MUST BE IDENTIFIED as power injectable prior to injection. See Part 4 Policy statement.
    - DO NOT POWER INJECT INTO A CATHETER NOT IDENTIFED AS POWER INJECTABLE.
    - A Power Injectable IVAD is identified by any of the following: documentation (i.e. wallet card), CXR, scout scan, or shape and 3 raised palpable bumps depending on manufacturer.
    - **Power injectable non-coring needle** must be used.
    - **Coastal sites:** use only power non-coring needles in power injectable IVADs. [***Always*** confirm the IVAD is power injectable. DO NOT assume that the presence of a power non-coring needle indicates that the IVAD is power injectable.]
11. A pump is recommended for infusions via IVAD. For blood products, refer to transfusion guidelines: **See Blood Components / Products: Administration [D-00-12-30223].**
    - **No minimum rate is recommended for continuous infusion via pump.**
    - **For infusions not via pump (i.e. gravity) minimum rate must be 50 mL/hour.**
12. 10 mL is the smallest-sized syringe to be used for flushing an IVAD.
13. A needleless connector is required and attached to the non-coring needle tubing at all times.
14. If accessed for ongoing therapy, non-coring needle is changed every 7 to 8 days during treatment.
    - Remove non-coring needle when therapy/treatment complete.
    - Between therapy/treatment, maintain patency of IVAD with monthly access and flush/lock.
15. Aseptic technique is maintained throughout all IVAD care and maintenance procedures.
16. IVAD is removed surgically by surgeon or interventional radiologist.

Need to Know

- Each septum (dome) is an independent lumen.
- IVAD is inserted by a Radiologist or Vascular/General Surgeon in a specialty care area.
- IVAD catheter tip placement is done under fluoroscopy at time of insertion, or by CXR.
- **The IVAD system consists of:** a self-sealing, silicone septum reservoir and a radiopaque catheter attached to the reservoir. The IVAD septum is accessed using a non-coring needle.
- The IVAD has a vein entrance site (jugular vein/neck or subclavian vein/chest) and a reservoir under the skin, commonly located on the chest wall.
- IVADs may be:
  - **Valved** (flushed with normal saline (NS) only) or
  - **Non-valved** (flushed with NS followed by heparin lock). If accessed and not in use, must be clamped.
- **Administration of phenytoin through an IVAD may precipitate and block the IVAD catheter.**
  - Consult Infusion Program Clinician/IV Educator prior to dedicating one lumen for phenytoin from time of insertion.
- **Dual Lumen IVAD:**
  - A dual-lumen IVAD is one device with two separate septums and reservoirs, each with its own catheter lumen.
  - Follow IVAD procedures when caring for a dual-lumen IVAD, per each reservoir/lumen.
  - Each reservoir may be accessed at the same time with separate non-coring needles. When performing monthly flush/lock of dual-lumen IVAD, each reservoir/lumen must be flushed and locked.
  - May be power injectable; refer to Part 4: Policy Statement to determine identifiers.
- **Peripherally Accessed System (e.g. P.A.S. PORT®):**
  - A peripherally accessed system is a small IVAD inserted by a physician under the skin on the arm. The catheter is threaded via the basilic, brachial or the cephalic vein until the tip is in the superior vena cava.
  - Do not do blood pressure or blood work on the arm with an arm port.
  - Follow IVAD procedures when caring for an arm port.
  - **MUST USE 0.5 inch non-coring needle to access, no larger than 20 gauge.**
- **For Flow Rates and Priming Volumes:** refer to manufacturer and/or Infusion Program Clinician/IV Educator.
- Management of Complications – see Appendix C

Patient education and information material for IVAD is given to the patient/patient's family after an IVAD is inserted - see Patient Education.

IVAD Catheters with Valve

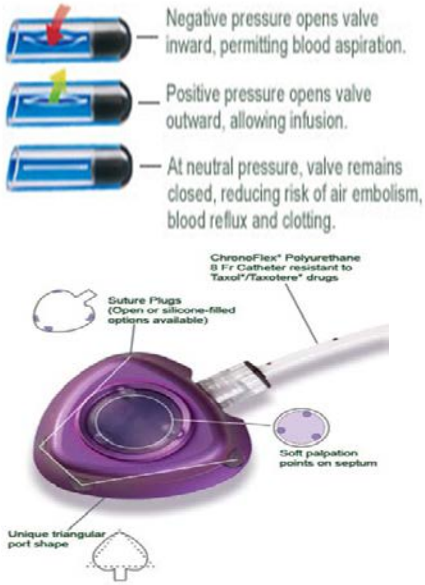
- Valve opens with infusions or aspiration but remains closed when not in use.
- The valve may open if positive pressure occurs in the chest, for example, coughing, vomiting or suctioning
- May or may not be Power Injectable

Example A: proximal valve IVAD (e.g. Pressure Activated Safety Valve – PASV)

- The tip of the catheter is open with the valve located in the hub of the reservoir.

Example B: distal valve IVAD (e.g. Groshong®)

- The tip of the catheter is closed with the valve located near the tip of the catheter.



IVAD Catheters Without Valve

- The tip of the catheter is open
- There is no valve located at any point in the reservoir, or along the catheter
- When the catheter is not in use, each lumen must be locked with heparin and the non-coring needle infusion set clamped.
- May or may not be power injectable

Example: single lumen non-valved IVAD

Procedure

Procedure Resource Videos

Part 1: Site Assessment
Part 2: Post IVAD insertion care
Part 3: Accessing an IVAD
Part 4: Accessing Power Injectable IVAD
Part 5: De-accessing an IVAD
Part 6: Needleless Connector Use
- A: Flushing
- B: Needleless Connector Change
- C: Initiating an Infusion through an Accessed IVAD
- D: Discontinuing a Continuous Infusion from an Accessed IVAD

Part 7: Tubing Change
Part 8: Dressing Change with needle in situ
Part 9: Obtaining a blood sample from an IVAD
Appendix C: Management of Complications for IVAD
Appendix D: Checklists
- Accessing an Implanted Venous Access Device
- De-accessing an Implanted Venous Access Device
- Obtaining blood sample from a CVC: Vacutainer method
- Obtaining blood sample from a CVC: Syringe method

Appendix E: CVC Quick Reference

Part 1: Site Assessment

Policy Statement:

1. The IVAD site is assessed at the beginning of each shift, and PRN.
2. The IVAD site is assessed prior to accessing AND de-accessing IVAD.

Procedure:

Assessment:

1. Skin/Site assessment:
   a. Ensure dressing is dry, intact and dated.
   b. Ensure skin around IVAD is intact and not infected. No skin erosion visible around the reservoir or power identifying bumps.
   c. Palpate IVAD site for tenderness, redness along vein/catheter pathway.
2. Non-coring Needle assessment:
   a. Ensure non-coring needle is intact and secured with a dressing.
   b. For non-valved IVAD, ensure non-coring needle tubing is clamped when not in use.
   c. **Ensure power injectable, non-coring needle infusion set is inserted for power injecting contrast media for CT scan via a power injectable IVAD**.
   Coastal sites: insert power non-coring needles in power injectable IVADs for all uses.
3. Infection:
   a. IVAD site is free of redness, edema, tenderness or discharge.
   b. Assess patient for signs and symptoms of systemic infection.
4. Thrombus:
   a. Assess colour, warmth, sensation, movement, or edema on IVAD site/side (facial, neck, arm, hand) and compare to opposite site/side.
   b. Pain on IVAD side.

c. Visible collateral chest/facial veins, neck swelling and redness.
d. IVAD is patent: see Part 3: see #14 for patency assessment.

5. Pinch-Off Syndrome:
   a. Inability to aspirate or flush unless the IVAD arm is in raised position.
   b. Difficulty with flushing, infusing or aspirating.
   c. Intermittent and positional occlusion.
   d. Patient reports feeling pain with infusion or flushing.

Part 2: Post Insertion Care and Suture/Staple Removal

Policy Statement:

1. Change dressing and inspect chest incision and neck site within 24 hours after insertion.
2. Monitor both vein entrance site (neck) and exit site (chest) for complications.
3. The IVAD may be used AFTER initial tip position is confirmed by Physician/Designate.

Vein Entrance Site (neck):

- Remove initial dressing
- Apply new sterile gauze dressing until site healed; replace every 48 hours and PRN if wet or loose.

A. Vein Entrance Site closed with sutures:
Sutures may be dissolvable or non-dissolvable
   - **Dissolvable sutures** are not visible on the skin.
   - **Non-Dissolvable** sutures/staples are removed per this policy **7 to 8 days** post IVAD insertion, unless otherwise ordered by physician.

B. Vein Entrance Site closed with steri-strips:
   - Leave steri-strips in place until they fall off.
   - Replace only if required to keep site approximated.

Chest Site:

- Remove initial dressing to assess site; see below if accessed.
- Apply new sterile gauze dressing until site healed; replace every 48 hours and PRN if wet or loose.

A. Chest site closed with sutures:
   - **Removed per this policy 7 to 10 days post IVAD insertion, unless otherwise ordered by physician**.

B. Chest site closed with steri-strips:
   - Leave steri-strips in place until they fall off.
   - Replace only if required to keep site approximated.

C. If new IVAD is accessed (site will be needled and covered with dressing):
   - Follow procedure in Part 8.
   - May use sterile normal saline to cleanse site if saturated with blood; allow to dry completely follow with skin cleanse as per dressing change procedure (Part 8).
   - Cover needle and site with new sterile dressing; use transparent dressing for choice so site can be monitored.
   - Change cover dressing when site requires a needle change (every 7 to 8 days).

D. If new IVAD requires access:
   - **Do not needle through steri-strips**
   - **Consult Infusion Program Clinician/IV Educator**

Part 3: Accessing an IVAD

Policy Statement:

1. IVAD will be either non-valved or valved. Verify type prior to use.
2. Check patient identification card or insertion documentation. Flush and lock procedure describing use of saline only indicates IVAD is valved. Flush and lock procedure describing use of heparinized saline indicates IVAD is non-valved.
3. For IVADs not inserted at your care facility, and without documentation on admission, prior to use:
   - Catheter tip confirmation is **required** by CXR
   - Catheter patency **must** be verified by flushing and aspiration with blood return noted without resistance or complication.
4. Non-coring needle is changed every 7 to 8 days and PRN.
5. Choose a non-coring needle length and gauge based on reservoir depth, type, tissue thickness and type of solution to be infused.
6. A transparent, semi-permeable adhesive dressing is required over non-coring needle once site accessed as visualization of site is necessary.
7. Transparent, semi-permeable adhesive dressing is changed every 7 to 8 days with needle change, and PRN between needle changes if dressing is loose, wet or there is drainage noted.
8. Gauze adhesive dressing is changed every 48 hours and PRN if loose, or if moisture, drainage, blood or signs or symptoms of infection are present.
9. Strict aseptic technique is required for accessing an IVAD using dressing tray, procedure mask and sterile gloves and externally sterile (XS) NS 10 mL pre-filled syringes.
10. Untinted 2% Chlorhexidine Gluconate (CHG) with 70% alcohol is used for skin cleansing.
11. CHG 2% without alcohol is to be used when skin irritation is related to an interaction between the adhesive in the dressing, and the alcohol of the prep.
12. Skin contact with CHG must:
    - Be a minimum of 30 seconds
    - Use friction in multiple directions
13. Povidone Iodine 10% is used as an alternative to CHG in cases of contact dermatitis or allergy. Do not wash off with saline as this will affect antimicrobial properties.
14. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in mid extension tubing using NS 10 mL prefilled externally sterile (XS) syringe.
15. Flush IVAD using a turbulent, stop start technique.
16. Flush solution type and routine is dependent on IVAD type (valved or non-valved). Heparin is indicated for non-valved IVADs only. (See Part 6: A. Flushing)
17. If resistance is felt when flushing, or in the absence of blood return, ensure further assessment and interventions are considered. See Appendix C.
18. For patients with non-valved IVAD and heparin induced thrombocytopenia syndrome (HITS), omit heparin lock. Contact Infusion Program Clinician/IV Educator for direction.

Equipment:

- Surface disinfectant
- Sterile gloves
- Procedure mask
- Dressing tray
- Non-coring needle of correct gauge and length (see Policy Statement re Power Injectable IVAD)
- CHG 2% with 70% alcohol – swab sticks x 2
- Sterile needleless connector
- Transparent semi-permeable adhesive dressing
- NS 10 mL pre-filled externally sterile (XS) syringe (20 mL per lumen)
- If **non-valved IVAD** to remain capped include:

- Heparin 10 units/mL or 100 units/mL in pre-filled syringe (lock each lumen with 5 mL).
  Note: pre-filled syringes with heparin are available in 3 mL or 5 mL volumes, take note of volumes and syringes required. Use concentration provided at your site for this procedure.

- If **continuous infusion** include:
  - IV tubing primed with IV solution
  - Pump
  - Tubing change Labels

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Position patient.
5. Put on mask.
6. Wash hands thoroughly for 30 seconds using waterless hand sanitizer.
7. Set up dressing tray using aseptic technique.
8. Locate the septum of the IVAD by palpation.
9. Wash hands thoroughly for 30 seconds using waterless hand sanitizer.
10. Put on sterile gloves.
11. Attach a sterile needleless connector to the non-coring needle tubing, prime with XS NS 10mL pre-filled syringe. Leave connected in sterile tray.
12. Clean the skin over the IVAD with CHG 2% with alcohol 70% swab sticks. Starting at the center of the IVAD:
    a. Clean using friction in multiple directions for 15 seconds.
    b. Repeat with second swab stick. Skin contact with cleanser must be for a minimum of 15 seconds per swab stick.
    c. Ensure entire area that will be covered by dressing is cleaned (approximately 10 x 10 cm area).
13. Place a sterile drape just below the IVAD site.
14. Allow skin to dry **completely** to prevent skin irritation (minimum 3 minutes); increase dry time may be indicated for populations prone to skin irritation.
15. With your dominant hand, grasp the non-coring needle and remove the protective needle cover.
16. With your non-dominant hand, stabilize IVAD to prevent movement of IVAD.
17. With your dominant hand, insert the non-coring needle at a 90° angle through the skin into the septum.
18. Apply moderate pressure until the needle makes contact with the back of the device.
    ***Note:** Do not rock or tilt the needle.
19. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in mid non-coring needle tubing.
20. If unable to aspirate blood see troubleshooting guide below.

Troubleshooting:

If unable to aspirate blood from non-coring needle tubing:

a. Check non-coring needle tubing for kinks.
b. Have patient cough, do Valsalva's maneuver, turn head to opposite side, raise arms or change position.
c. Ensure non-coring needle is in contact with the back of the device.
d. Flush lumen with 5 mL NS solution and if resistance to flush is felt, stop.
e. If unable to determine correct needle placement, remove the non-coring needle and re-access IVAD with a **new** non-coring needle. DO NOT pull the needle back to skin edge and re-access at a different angle.
f. If still unable to aspirate call the Infusion Program Clinician/IV Educator.

21. Flush with 20 mL NS using turbulent, stop start technique. If swelling around IVAD site, pain with infusion or resistance to injection is felt, stop the injection and contact Infusion Program Clinician/IV Educator.
22. Apply transparent sterile dressing over the site, date and initial dressing.
23. For capped unused lumen, flush and lock as per table using turbulent, stop start technique.

Valved	Non-valved
• NS 20 mL (pre and post access). • No heparin lock required. • Flush every month with NS if IVAD not in use.	• NS 20 mL (pre and post access). • 5 mL Heparin 10 units/mL or 100 units/mL. • Flush and lock monthly (NS and heparin) if not in use. • Maximum daily heparin is 2000 units. • If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction.

    a. Remove syringe.
    b. If non-valved IVAD, clamp non-coring needle tubing.
    c. Wipe top of needleless connector with alcohol swab to remove fluid residue.
24. For continuous infusion:
    a. Flush with 20 mL of NS using turbulent, stop start technique to ensure thorough flushing of catheter.
    b. Attach IV infusion set into needleless connector.
    c. Initiate IV infusion, secure tubing and attach change label to IV tubing.
25. Document procedure.

Part 4: Using a Power Injectable IVAD for Power Injection

Policy Statement for Power Injection:

1. For IVADs not inserted at your care facility, and without documentation on admission, prior to use:
    - Catheter tip confirmation is **required** by CXR.
    - Catheter patency **must** be verified by flushing and aspiration with blood return noted without resistance or complication.
2. IVAD must be identified radiologically by CXR or scout scan prior to CT. The letters CT on the power injectable IVAD will be evident on CXR or fluoroscopy.
    - Always use Power injectable non-coring needle infusion set for power injecting contrast media for CT scan via a Power injectable IVAD.
3. Contrast media should be warmed to body temperature prior to power injection. **Warning:** Failure to warm contrast media to body temperature prior to power injection may result in IVAD system failure.
4. **Catheter tip must be positioned in the** distal (lower third) superior vena cava (SVC) or the cavo-atrial junction (CAJ) / Right Atrial Junction (RAJ) in order to be used for power injection.
5. Check for patency via aspiration of blood to mid non-coring needle tubing using a NS 10 mL pre-filled syringe. Flush with NS 20 mL prior to and immediately following the power injection studies. Failure to ensure patency of the catheter may result in IVAD system failure.
6. Do not exceed 300 PSI pressure limit setting, or the maximum flow rate setting on the power injection machine if power injecting through the power injectable IVAD.

Procedure: Identifying a patient with a power injectable IVAD

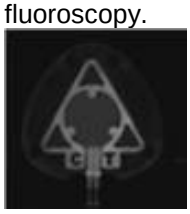
Power injectable IVADs can be distinguished from traditional IVADs by several methods.

Always verify the patient has a power injectable IVAD by at least two of the following identifiers.

1. Check patient's chart for a power injectable IVAD patient record sticker, e.g.:

2. Depending on brand, you may be able to palpate IVAD to identify a triangular IVAD housing and 3 palpation points on septum.
3. Request confirmation from the patient by asking them to show you the patient identification card, ID bracelet, or key chain they received when the IVAD was implanted, e.g.:

4. If the above identifiers are unavailable, **the IVAD must be identified radiologically** by CXR or scout scan prior to CT. The letters CT on the power injectable IVAD will be evident on CXR or fluoroscopy.



Follow procedure for accessing an IVAD
Immediately after procedure, flush IVAD as per flushing procedure (Part 6 A)

Part 5: De-accessing an IVAD

Policy Statement:

1. IVAD will be non-valved or valved. Verify type prior to de-accessing.
2. Check patient identification card or insertion documentation. Flush and lock procedure describing use of saline only indicates IVAD is valved. Flush and lock procedure describing use of heparinized saline indicates IVAD is non-valved.
3. If dual-lumen IVAD, each septum/lumen must be flushed and locked separately.
4. Use aseptic technique at all times to prevent infection.
5. Non-coring needle to be changed once a week during therapy/treatment.
6. Remove non-coring needle when therapy/treatment complete.
7. If accessed for ongoing therapy, non-coring needle is changed every 7 to 8 days during treatment.
   - Remove non-coring needle when therapy/treatment complete.
   - Between therapy/treatment, maintain patency of IVAD with monthly access and flush/lock.
8. For patients with non-valved IVAD and heparin induced thrombocytopenia syndrome (HITS), omit heparin lock. Contact Infusion Program Clinician/IV Educator for direction.

Equipment:

- Surface disinfectant
- Alcohol swabs
- Non-sterile gloves
- Sterile 2x2 gauze
- Transparent dressing
- NS 10 mL in pre-filled syringe (20 mL per lumen)

- Heparin 10 units/mL or 100 units/mL in pre-filled syringe if non-valved IVAD (lock each lumen with 5 mL).
  Note: pre-filled syringes with heparin are available in 3 mL or 5 mL volumes, take note of volumes and syringes required. Use concentration provided at your site for this procedure.

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Put on non-sterile gloves.
5. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
6. Flush with 1 to 2mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in mid non-coring needle tubing. If unable to aspirate blood, refer to **Troubleshooting Appendix C # 4 Partial Occlusion**).
7. Flush as per table using turbulent, stop start technique. (If swelling around IVAD site, pain with infusion or resistance to injection is felt, refer to **Troubleshooting Appendix C #10 Non-coring Needle Dislodgement**).

Valved	Non-valved
• NS 20 mL (pre and post access) • No heparin lock required • Flush every month with NS if IVAD not in use.	• NS 20 mL (pre and post access) • 5 mL Heparin 10 units/mL or 100 units/mL • Flush and lock monthly (NS and heparin) if not in use • Maximum daily heparin is 2000 units • If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction

8. Remove dressing and assess IVAD site.
9. Stabilize the IVAD by securely holding down the base of the non-coring needle against the IVAD.
10. Grasp the top of the non-coring needle.
11. Firmly pull the non-coring needle up; depending on the type of needle used, you may hear a “click”.
12. Apply light pressure over the site with sterile 2x2 gauze.
13. Apply a band-aid or transparent dressing if necessary.
14. Dispose of the non-coring needle tubing into sharps container.
15. Document procedure.

Part 6: Needleless Connector Use

Policy Statement:

1. IVAD is accessed with a non-coring needle; the end of the needle tubing is attached to a sterile needleless connector in order to maintain a closed system.
2. Access needleless connectors with luer-lock connection only. **Do not use a needle or cannula to access needleless connector.**
3. 10 mL is the smallest-sized syringe to be used for flushing an IVAD for routine care and maintenance.
4. Replace needleless connector:
   - Every 7 to 8 days (with needle change);
   - PRN if contamination or complication noted.
5. Access needleless connector using aseptic technique.

6. IV direct medication may be given into a capped IVAD. **Exception:** Leukemia/Bone Marrow Transplant (BMT) patients.
7. To decrease risk of catheter related infection, avoid accessing the line more than 4 to 6 times in a 24 hour period (i.e. for intermittent medications more frequently than every 6h). Obtain an order for continuous infusion.

A) Flushing

Flush solution type and routine is dependent on IVAD type (valved or non-valved). Heparin is indicated for non-valved IVADs only. See table below.

Equipment:

- Surface disinfectant
- Alcohol swabs, Large
- Non-sterile gloves
- NS 10 mL in pre-filled syringe (20 mL per lumen)
- Heparin 10 units/mL or 100 units/mL pre-filled syringe if non-valved IVAD (lock each lumen with 5 mL)
  Note: pre-filled syringes with heparin are available in 3 mL or 5 mL volumes, take note of volumes and syringes required. Use concentration provided at your site for this procedure.

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Put on non-sterile gloves.
5. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
6. Attach NS syringe to non-coring needle tubing.
7. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in mid non-coring needle tubing. If unable to aspirate blood or resistance is felt, refer to **Troubleshooting Appendix C # 4 Partial Occlusion**.
8. Flush as per table using turbulent stop start technique.

Valved	Non-valved
• NS 20 mL (pre and post access) • No heparin lock required • Flush every month with NS if IVAD not in use.	• NS 20 mL (pre and post access) • 5 mL Heparin 10 units/mL or 100 units/mL • Flush and lock monthly (NS and heparin) if not in use • Maximum daily heparin is 2000 units • If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction

9. Remove syringe.
10. Clamp non-coring needle tubing if non-valved IVAD.
11. Wipe top of needleless connector with alcohol swab to remove fluid residue.
12. Document procedure.

B) Needleless Connector Change

PHC uses sterile technique during dressing change and aseptic no touch technique for prn change without dressing change.

Equipment:

- Surface disinfectant
- Non-sterile gloves
- Alcohol swabs, Large
- Sterile needless connector
- NS 10 mL pre-filled syringe (20 mL per lumen)
- Heparin 10 units/mL or 100 units/mL in pre-filled syringe if non-valved IVAD (lock each lumen with 5 mL).
  Note: pre-filled syringes with heparin are available in 3 mL or 5 mL volumes, take note of volumes and syringes required. Use concentration provided at your site for this procedure.

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Attach 10 mL pre filled NS syringe to needleless connector using no touch technique, prime cap, leave attached in package.
5. If non-valved IVAD, clamp non-coring needle tubing.
6. Wash hands thoroughly using waterless hand sanitizer.
7. Put on non-sterile gloves.
8. Scrub non-coring needle tubing and needleless connector connection with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
9. Remove old needleless connector.
   Note: if contaminants visible (dried blood/crystallization), use new alcohol wipe to scrub hub x15 seconds, being careful to prevent alcohol solution/contaminants from entering catheter.
10. Attach new needleless connector.
11. Unclamp non-coring needle tubing if non-valved IVAD.
12. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in non-coring needle tubing. If unable to aspirate blood, refer to **Troubleshooting Appendix C #4 Partial Occlusion**).
13. For capped unused lumen, flush as per table using turbulent, stop start technique. (If swelling around IVAD site, pain with infusion or resistance to injection is felt, refer to **Troubleshooting Appendix C #10 Non-coring Needle Dislodgement**).

Valved	Non-valved
• NS 20 mL (pre and post access) • No heparin lock required • Flush every month with NS if IVAD not in use.	• NS 20 mL (pre and post access) • 5 mL Heparin 10 units/mL or 100 units/mL • Flush and lock monthly (NS and heparin) if not in use • Maximum daily heparin is 2000 units • If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction

   a. Remove syringe.
   b. If non-valved IVAD, clamp non-coring needle tubing.
   c. Wipe top of needleless connector with alcohol swab to remove fluid residue.
14. For continuous infusion:
   a. Flush with 20 mL of NS using a turbulent, stop start technique.
   b. Attach IV infusion set into needleless connector.

c. Initiate IV infusion, secure tubing and attach change label to IV tubing.

15. Document procedure.

C) Initiating an Infusion through an Accessed IVAD

Equipment:

- Surface disinfectant
- Alcohol swabs, Large
- Non-sterile gloves
- IV solution
- IV tubing
- NS 10 mL pre-filled syringe (20 mL per lumen)
- Pump
- Tubing change label

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Prime IV tubing.
5. Wash hands thoroughly using waterless hand sanitizer.
6. Put on non-sterile gloves.
7. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
8. Attach 10 mL NS syringe.
9. Unclamp non-coring needle tubing if non-valved IVAD.
10. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in mid non-coring needle tubing. If unable to aspirate blood, refer to **Troubleshooting Appendix C # 4 Partial Occlusion**.
11. Flush with 20 mL NS using turbulent, stop start technique. (If swelling around IVAD site, pain with infusion or resistance to injection is felt, click here to view **Troubleshooting Appendix C #10 Non-coring Needle Dislodgement**).
12. Connect IV tubing to needleless connector.
13. Initiate IV infusion.
14. Secure tubing.
15. Attach change label to the IV tubing.
16. Document procedure.

D) Discontinuing an Infusion

Equipment:

- Surface disinfectant
- Non-sterile gloves
- Alcohol swabs, Large
- Sterile dead end cap
- NS 10 mL pre-filled syringe (20 mL per lumen)
- Heparin 10 units/mL or 100 units/mL in pre-filled syringe if non-valved IVAD (lock each lumen with 5 mL)
  Note: pre-filled syringes with heparin are available in 3 mL or 5 mL volumes, take note of volumes and syringes required. Use concentration provided at your site for this procedure.

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.

3. Gather equipment.
4. Stop IV infusion.
5. Wash hands thoroughly using waterless hand sanitizer.
6. Put on non-sterile gloves.
7. Disconnect IV tubing from needleless connector.
8. Cap IV tubing with sterile dead end cap if IV tubing will be re-connected for later infusion.
9. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
10. Attach 10 mL NS syringe.
11. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in non-coring needle tubing. If unable to aspirate blood, refer to **Troubleshooting Appendix C #4 Partial Occlusion**.
12. Flush as per table using turbulent, stop start technique. (If swelling around IVAD site, pain with infusion or resistance to injection is felt, refer to **Troubleshooting Appendix C #10 Non-coring Needle Dislodgement**).

Valved	Non-valved
• NS 20 mL (pre and post access) • No heparin lock required • Flush every month with NS if IVAD not in use.	• NS 20 mL (pre and post access) • 5 mL Heparin 10 units/mL or 100 units/mL • Flush and lock monthly (NS and heparin) if not in use • Maximum daily heparin is 2000 units • If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction

13. Remove syringe.
14. If non-valved IVAD, clamp non-coring needle tubing.
15. Wipe top of needleless connector with alcohol swab to remove fluid residue.
16. Document procedure.
17. If removing non-coring needle follow **Part 5: De-accessing an IVAD steps #6-15**.

Part 7: Tubing Change

Policy Statement:

1. Luer-Lock IV tubing is used for all IVAD infusions.
2. Do not transfer IV tubing from one venous access to another.
3. A pump is recommended for infusions via IVAD. For blood products, refer to transfusion guidelines **See Blood Components / Products: Administration [D-00-12-30223].**

- **No minimum rate is recommended for continuous infusion via pump.**
- **For infusions not via pump (i.e. gravity) minimum rate must be 50 mL/hour.**

4. It is recommended to prime IV tubing immediately prior to use.

Tubing and Solution/Bag Change

	Tubing	IV Solution/Bag
Primary/Secondary Tubing Set		
Non-Medicated (Continuous) IV	every 96 hrs	when empty and with tubing change every 96 hrs
Medicated (Continuous) IV (incl. adds in primary bag)	every 96 hrs	every 24 hrs
Intermittent IV Infusion	every 24 hrs	with tubing change every 24 hrs

Blood and blood product infusion, see	**VCH:** TM Blood Product Fact Sheets **PHC:** Blood/Blood-Product Administration Procedure

TPN Tubing Set	
3:1 TPN: Lipids included • Filtered (1.2 micron) tubing	See Parenteral Nutrition Document: **VCH:** Parenteral Nutrition: Care and Management **PHC:** TPN: Total Parenteral Nutrition: Patient Care
2:1 TPN: Lipids separate • Filtered (0.2 micron) tubing Dextrose/Amino Acid • Lipid Tubing	See Parenteral Nutrition Document: **VCH:** Parenteral Nutrition: Care and Management **PHC:** TPN: Total Parenteral Nutrition: Patient Care
TPN: Dextrose/Amino Acid only	See Parenteral Nutrition Document: **VCH:** Parenteral Nutrition: Care and Management **PHC:** TPN: Total Parenteral Nutrition: Patient Care
TPN: Intermittent	See Parenteral Nutrition Document: **VCH:** Parenteral Nutrition: Care and Management **PHC:** TPN: Total Parenteral Nutrition: Patient Care

Equipment:

- Surface disinfectant
- Non-sterile gloves
- Alcohol swabs, Large
- NS 10 mL pre-filled syringe (20 mL per lumen)
- IV solution
- IV tubing
- Pump
- Tubing change label

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Prime tubing.
5. Stop infusion.
6. Wash hands thoroughly using waterless hand sanitizer.
7. Put on non-sterile gloves.
8. Disconnect IV tubing from needleless connector.
9. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
10. Attach NS syringe.
11. Flush with 1 to 2 mL NS before checking for patency. Patency is confirmed by aspirating until blood visible in mid non-coring needle tubing. If unable to aspirate blood, refer to **Troubleshooting Appendix C #4 Partial Occlusion**.
12. Flush using turbulent, stop start technique. (If swelling around IVAD site, pain with infusion or resistance to injection is felt, refer to **Troubleshooting Appendix C #10 Non-coring Needle Dislodgement**).

13. Remove syringe.
14. Wipe top of needleless connector with alcohol swab to remove fluid residue.
15. Connect new IV tubing to needleless connector.
16. Initiate IV infusion.
17. Secure tubing.
18. Attach change label to the IV tubing.
19. Document procedure.

Part 8: Dressing Change with Needle In-Situ

If you are:

- **Accessing an IVAD, see Part 3**
- **Accessing a power injectable IVAD, see Part 4**
- **De-accessing an IVAD, see Part 5**

Policy Statement:

1. The IVAD site must be assessed daily and with every non-coring needle or dressing change (see Site Assessment).
2. The first dressing change must be done 24 hours post IVAD insertion. (See IVAD insertion - Part 2)
3. Transparent, semi-permeable dressing is changed every 7 to 8 days and as needed when loose, or if moisture, drainage, blood or signs or symptoms of infection are present.
4. Sterile adhesive gauze dressing is used if
   a. bleeding at the site
   b. patient is diaphoretic
   c. skin impairment or reaction to transparent dressing
5. Gauze dressing is changed a minimum of every 48 hours and when needed if loose, or if moisture, drainage, blood or signs and symptoms of infection are present.
6. Strict aseptic technique is required for dressing change procedure including dressing tray, procedure mask and sterile gloves.
7. Untinted 2% Chlorhexidine Gluconate (CHG) with 70% alcohol is used for skin cleansing solution.
8. CHG 2% without alcohol is to be used when skin irritation is related to an interaction between the adhesive in the dressing, and the alcohol of the prep.
9. Skin contact with CHG must:
   a. be a minimum of 30 seconds in total
   b. use friction in multiple directions
10. Povidone Iodine 10% is used as an alternative to CHG in cases of contact dermatitis or allergy. Do not wash off with saline as this will affect antimicrobial properties.
11. Saline is not recommended as a cleaning agent for dressing change.
12. May use sterile normal saline to cleanse site if saturated in blood; follow with skin antiseptic.
13. CHG may be inactivated if used with normal saline. Ensure skin is completely dry prior to cleaning with CHG.
14. For skin impairment, irritation and skin cleansing/dressing recommendations, contact Infusion Program Clinician/IV Educator.

Equipment:

- Surface disinfectant
- Procedure mask
- Non-sterile gloves
- Sterile gloves
- Dressing tray
- Dressing (choose type based on skin condition):
  - Transparent semi-permeable
  - Sterile adhesive gauze dressing

- CHG 2% with 70% alcohol – swab sticks x 2
- Protective skin barrier for patients with sensitive skin

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Put on mask
5. Wash hands thoroughly using waterless hand sanitizer.
6. Set up dressing tray.
7. Put on non-sterile gloves.
8. Starting at outer edge, remove dressing toward non-coring needle site avoiding needle dislodgment and skin tearing.
9. Inspect the non-coring needle site. If there are any signs of infection, swab the site for Culture and Sensitivity (C&S) and notify the physician.
10. Remove non-sterile gloves.
11. Wash hands thoroughly using waterless hand sanitizer.
12. Put on sterile gloves.
13. Anchor the non-coring needle with sterile 2x2 or sterile forceps.
14. Clean the IVAD site, sutures (if present) and skin with CHG 2% with alcohol 7% swab stick.
    a. Clean using friction in multiple directions x 15 seconds
    b. Repeat with second swab stick. Skin contact with cleanser must be for a minimum of 15 seconds per swab stick.
    c. Ensure entire area that will be covered by dressing (approximately 10x10 cm) is cleansed.
15. Allow skin to dry **completely** to prevent skin irritation(minimum 3 minutes; increased dry time may be indicated for populations prone to skin irritation).
16. If required apply skin prep, allow to dry completely.
17. Apply dressing to site.
18. Ensure non-coring needle insertion site is visible near centre of dressing window and tubing is not twisted or kinked.
19. Label dressing (use Power Injectable sticker if appropriate).
20. Remove gloves.
21. Document procedure.

Part 9: Obtaining a Blood Sample from an IVAD

- Obtaining Blood Samples from a Central Venous Catheter: Vacutainer Method Checklist
- Obtaining Blood Samples from a Central Venous Catheter: Syringe Method Checklist

If IVAD is not accessed, following procedure Part 3: Accessing an IVAD or Part 4: Accessing a power injectable IVAD then follow this procedure:

- Specific labelling procedures for drawing Group and Screen, see **VCH:** Patient Identification, Specimen Collection and Labeling for Transfusion Medicine Investigation

Policy Statement:

1. Blood should not be drawn from a lumen used to infuse cyclosporine, tacrolimus or dextran.
2. If TPN is infused via a single lumen IVAD, blood work is drawn peripherally if adequate peripheral access. Prior to using TPN lumen for blood work, consult Infusion Program Clinician/IV Educator.
3. It is recommended that blood sampling be done through the needleless connector to ensure a closed-system.

4. For blood cultures: changing the needleless connector is recommended prior to obtaining blood sample.
5. Blood sampling can be done from both single and dual lumen IVAD.
   a. If dual lumen IVAD, stop infusion on other lumen during blood draw. If non-valved IVAD, clamp non-coring needle tubing.
   b. If dual lumen IVAD and second lumen is capped, flush/lock after blood sampling.
6. A discard sample is taken prior to obtaining blood work. See:
   VCH: Guidelines for Collecting Blood Samples through Vascular Access Device (VAD)
7. Flush with a **minimum** of 20 mL NS post blood draw until **needleless connector is clear** (no blood visible in needleless connector).
   a. For non-valved IVAD, if continuing IV infusion, do not lock with heparin.
   b. If capping the IVAD, follow the guidelines for heparin lock.
8. Blood sampling may be done using:
   a. Vacutainer method (preferred).
   b. Syringe method (using blood transfer device).

Equipment:

- Surface disinfectant
- Non-sterile gloves
- 4-5 alcohol swabs, large
- Luer-lock Access Device, Holder with Pre-Attached Multiple Sample Adapter (vacutainer holder)
- Lab blood tubes
- Blood culture bottles *if required – also new needleless connector (to be changed prior to blood sampling)
- Biohazard Sharps container
- Sterile dead end cap if reconnecting existing IV tubing
- 3-5 NS 10 mL pre-filled syringe (20 mL per capped lumen)
- If non-valved IVAD, Heparin 10 units/mL or 100 units/mL in pre-filled syringe (lock each lumen with 5 mL)
  Note: pre-filled syringes with heparin are available in 3 mL or 5 mL volumes, take note of volumes and syringes required. Use concentration provided at your site for this procedure.
- Additional supplies required to flush unused dual lumen IVAD after blood sampling

If using syringe method, you will need:

- Eye protection / mask with eye shield
- Luer-lock syringes as many as required to withdraw blood samples
- Blood transfer device for transferring blood from syringe into collection tubes

If obtaining coagulation tests, you will need:

- ***Vacutainer method:*** a 5 mL non-additive tube (refer to site below for non-additive tube color)
- ***Syringe method:*** an additional 10 mL syringe

For order of blood tube collection see:
VCH: Blood collection through a VASCULAR ACCESS DEVICE (CVC & ARTERIAL) Reference Guide
PHC: Phlebotomy & CVAD Quick Reference

Procedure:

1. Clean work surface with surface disinfectant and let dry.
2. Wash hands thoroughly for 30 seconds.
3. Gather equipment.
4. Turn off IV infusion if present. For dual-lumen IVAD, ensure all IV infusions are turned off prior to blood sampling.
5. If non-valved dual-lumen IVAD, clamp non-coring needle tubing of lumen not used for blood draw.
6. Wash hands thoroughly for 30 seconds using waterless hand sanitizer.
7. Put on non-sterile gloves.

8. Disconnect IV tubing from needleless connector and cap IV tubing with sterile dead-end cap to maintain sterility of IV tubing end.
9. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
10. Attach 10 mL pre-filled NS syringe and flush IVAD with a minimum of 5 mL NS.
11. Slowly aspirate discard sample (follow discard instructions below). If IVAD is valved, pull back syringe plunger 1 to 2 mL, and pause to allow valve to open and blood to come into the syringe. Continue to pull back with steady continuous pressure.

For Discard Instructions see:
VCH: Guidelines for Collecting Blood Samples through Vascular Access Device (VAD)

Troubleshooting:
If blood flow slows or stops:
a. Check non-coring needle tubing for kinks.
b. Have patient cough, do Valsalva's maneuver, turn head to opposite side, raise arms or change position.
c. Change blood collection tube.
d. Use syringe to withdraw blood through the needleless connector.
e. Change needleless connector.
f. Flush lumen with 5 mL NS solution and if resistance to flush is felt, stop and contact Infusion Program Clinician/IV Educator.

12. Remove discard syringe.
13. Attach either Luer-lock Access Device, Holder with Pre-Attached Multiple Sample Adapter (vacutainer holder) or a 10 mL syringe and withdraw sample. See Vacutainer and Syringe method below.

Vacutainer Method:

1. Insert blood tubes into barrel of device and push down to aspirate blood into the tube. Continue until all tubes have been collected (if blood flow slows or stops see troubleshooting guide above)
   For order of blood tube collection, see:
   VCH: Blood collection through a VASCULAR ACCESS DEVICE (CVC & ARTERIAL) Reference Guide
   PHC: Phlebotomy & CVAD Quick Reference
2. Remove the Luer-lock Access Device, Holder with Pre-Attached Multiple Sample Adapter (vacutainer holder) and discard in the sharps container.
3. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
4. Attach NS syringes and flush **immediately** using turbulent, stop start technique. Flush with a minimum of 20 mL NS or until no blood visible in needleless connector.
5. Remove syringe.
6. Wipe top of needleless connector with an alcohol swab to remove fluid residue.
7. Clamp Huber needle tubing if not reconnecting IV tubing.

8. a. If **reconnecting IV tubing:**

i. Connect IV tubing and resume IV infusions.

b. If **capping lumen**:

i. Lock non-valved IVAD lumen with 5 mL Heparin 10 units/mL or 100 units/mL
- If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction.

ii. Remove syringe

iii. Wipe top of needleless connector with alcohol swab to remove fluid residue

iv. Clamp non-coring needle tubing if non-valved IVAD

9. Label collected specimens, and send to the Lab as per lab guidelines. Refer to:
VCH: Label Samples [D-00-12-30098]
10. Invert tubes as per:
VCH: Blood collection through a VASCULAR ACCESS DEVICE (CVC & ARTERIAL) Reference Guide
PHC: Phlebotomy & CVAD Quick Reference
11. Remove gloves and wash hands thoroughly for 30 seconds.
12. Document procedure.

Note: if unable to draw blood using the vacutainer method, use the syringe method.

Syringe Method:

1. Attach empty syringe and withdraw the required amount of blood for your sample volumes, if blood flow slows or stops see troubleshooting guide above.
2. If coagulation tests are required, draw an additional syringe of blood after step 1.
3. Disconnect the syringe and attach to transfer device with a twist to lock it on (if applicable you will transfer coagulation syringe first).
4. Before transferring blood samples, scrub needleless connector with an alcohol swab using friction for 15 seconds. **ALLOW TO DRY COMPLETELY**.
5. Attach NS syringes and flush **immediately** using turbulent, stop start technique. Flush with a minimum of 20 mL NS or until no blood visible in needleless connector.
6. Remove syringe.
7. Wipe top of needleless connector with an alcohol swab to remove fluid residue.
8. Clamp Huber needle tubing if not reconnecting IV.
9. a If **reconnecting IV** tubing:

i. Connect IV tubing and resume IV infusions.

b. If **capping lumen**:

i. Lock non-valved IVAD lumen with 5 mL Heparin 10 units/mL or 100 units/mL
- If patient has heparin induced thrombocytopenia syndrome (HITS), contact Infusion Program Clinician/IV Educator for direction.

ii. Remove syringe

iii. Wipe top of needleless connector with alcohol swab to remove fluid residue

iv. Clamp non-coring needle tubing if non-valved IVAD

10. Wear eye protection when transferring blood from syringe to lab tubes.

11. With the syringe held vertically and the tip pointing down, insert blood-sampling vacuum tube into the barrel of device to collect blood sample. Allow vacuum to fill the tube (e.g. do not apply pressure to syringe plunger). Continue until all sample tubes have been collected into appropriate lab tubes.
12. For order of blood tube collection, see:
    VCH: Blood collection through a VASCULAR ACCESS DEVICE (CVC & ARTERIAL) Reference Guide
    PHC: Phlebotomy & CVAD Quick Reference
13. Dispose of needleless blood transfer assembly and syringe as one unit into the sharps container. Do not disassemble.
14. Label collected specimens, and send to the Lab as per lab guidelines, refer to:
    VCH: Label Samples [D-00-12-30098]
15. Invert tubes as per:
    VCH: Blood collection through a VASCULAR ACCESS DEVICE (CVC & ARTERIAL) Reference Guide
    PHC: Phlebotomy & CVAD Quick Reference
16. Remove gloves and wash hands thoroughly for 30 seconds.
17. Document procedure.

Patient/Client/Resident Education

Pamphlet: available from Patient Health Educator Materials Catalogue (VCH or PHC)

- All about Your IVAD ("Port") (Cat #FA.200.Im7)

Documentation

Document on site-specific documentation tools as per policy.

Related Documents

- Bard Groshong™ Ports & PowerPort™ (from Lions Gate, NHA, IHA, U.S.)
- VCH Online e-learning CVC Care and Maintenance Module
- VCH Port insertion in ambulatory care

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VCH: *(Regional SharePoint 2nd Reading)*
- Health Authority Profession Specific Advisory Council Chairs (HAPSAC)
- Health Authority & Area Specific Interprofessional Advisory Council Chairs (HAIAC)
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PHC IV Therapy

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Appendix A: PHC Practice Level/Education Requirements

RN (RPN at SPH Only): with additional education

- Successful completion of a Central Venous Catheter (CVC) Care & Maintenance Learning Module.
- Attendance of IV Specific Orientation session and CVC Care and Maintenance instruction lab as required by work site.
- Demonstrate competency through a site specific formal process *(may include observation by experienced RN/Educator/Clinical Resource Nurse).*
  - Specialized education is not required to perform a site assessment, change intravenous (IV) infusion bags or administer medication into a continuous IV infusion.

Additional specialized education is required for PICC:

- Insertion
- Tip confirmation prior to initial access
- Exchange
- Repair
- Occlusion Management
- PICC adjustment
- PICC removal

LPN requirements: (Practice limited to Acute sites only)

- Successful completion of a CVC Care & Maintenance Learning Module.
- Attendance of Orientation session on IV therapy as required by work site.
- A LPN who has completed the site specific relevant orientation may:
  - Report/consult with RN for suspected complications and problem solving (shared provision of care).
  - Assess PICC insertion site for complications and dressing status.

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Appendix B: VCH Practice Level/Education Requirements

RN: with additional education

ALL:

- Successful completion of the CVC Care & Maintenance E-Learning Module.
- Demonstrates competency through a formal process – (see Performance Checklists – pgs 32-35).

Acute:

- Attendance of Hospital Wide Orientation session on Parenteral Therapy.
- Attendance of CVC Care and Maintenance Instruction Lab.

Community:

- Attendance of IV Specific Orientation session as required by work site.

An RN who has completed the requirements may perform the following skills:

- Site assessment
- Flushing
- Tubing change
- Needleless connector change
- Dressing change
- De-accessing an IVAD
- Obtaining a blood sample

An RN who is new at performing the above skills, or who has identified a need for review, must be observed by an experienced RN, Educator, or Clinical Resource Nurse.

An RN who ***has not*** completed the relevant requirements may only:

- Perform a site assessment
- Change intravenous (IV) infusion bag
- Administer medication into a continuous IV infusion

An RN must contact Infusion Program Clinician/IV Educator for additional training beyond initial requirements for:

- Assessing an IVAD
- Occlusion Management

LPN requirements: (Practice limited to Acute sites only)

- Successful completion of Section A of the CVC Care & Maintenance E-Learning Module.
- Attendance of Hospital Wide Orientation session on Parenteral Therapy.
- A LPN who has completed the site specific relevant orientation may:
  - Report/consult with RN for suspected complications and problem solving (shared RN/LPN provision of care).
  - Assess the IVAD and non-coring needle insertion site for complications and dressing status.

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Appendix C: Management of Complications for IVAD

Complications	Signs & Symptoms	Management	Prevention
1. Air Embolism: Air is drawn through the catheter into the patient's vascular system.	• Light-headedness • Restlessness anxiety • Chest pain • A sense of impending doom • Nausea • Tachycardia • Hypotension • Dyspnea, tachypnea • Cyanosis changes in mental state, confusion, seizures • Rales or wheezing in the presence of pulmonary edema • Unresponsiveness	• Clamp the non-coring needle tubing. • Place patient on Left side (this permits the air bubble to rise to upper part of the Right Atrium). • Acute: call a code • Community: call 911 • Vital signs every 5 minutes • Administer O_2 • Remove damaged non-coring needle/tubing & insert new one.	• Use luer-lock connections and secure well • Clamp non-coring needle tubing when changing administration set/cap for non-valved IVAD. • Provide patient education re: non-coring needle displacement and disconnection.
2. Arrhythmias: Tip of catheter is placed within the R atrium; leads to cardiac muscle irritability and arrhythmias	• Irregular pulse • Chest Pain • Palpitations	• Obtain CXR to confirm tip position • If in Right Atrium contact Physician who inserted IVAD	• Confirm catheter tip placement prior to use
3. Infection: Could be local or systemic	*Local:* • Purulent drainage, erythema • Swelling • Tenderness at over IVAD *Systemic:* • Fever/chills • Increased WBC • Malaise • Hypotensive & shock (severe infection)	*Local:* • Contact physician. • Swab non-coring needle site for C&S prior to starting antibiotics. *Systemic:* • Contact physician • IVAD removal maybe necessary if treatment is unsuccessful. • Obtain peripheral blood cultures as well as blood cultures from the IVAD. • Send entire device for C&S if line is removed.	• Assess site every shift and PRN. • Aseptic technique to be used at all times during care & maintenance. • Monitor vital signs and temperature. • Monitor lab results.

Complications	Signs & Symptoms	Management	Prevention
4. Partial Occlusion: Able to infuse, but unable to withdraw blood. *Contributing factors:* • Failure to flush according to catheter flushing procedure. • Catheter opening may draw up against vein wall with aspiration. • Blood clot, fibrin sheath, or particulate matter obstructing catheter, when blood is being aspirated. • Non-coring needle incorrectly positioned. • Non-coring needle tubing kinked catheter. • Catheter kinked inside the body. • Malposition of catheter tip. • Patient active and/or vomiting, retching, straining.	• Sluggish flow of IV fluids. • Difficulty flushing. • Inability to aspirate blood.	• Have patient cough, do Valsalva's maneuver, turn head to opposite side, raise arms or change position. • Flush with NS 10 mL pre-filled syringe using a gentle push-pull technique. If resistance to flush is felt, stop. • If no resistance to flush is felt, pull back gently on the syringe plunger 2 to 3 mL pause and proceed with aspiration. • Change needleless connector. • Change non-coring needle. • Notify the physician; obtain order for Thrombolytic Therapy. • Notify Infusion Program Clinician/IV Educator to instill Thrombolytic Therapy. • If able to flush and aspirate blood, flush the lumen with 20 mL NS and continue with therapy. • Document the type of occlusion, intervention, patient response, and physician intervention. (e.g. CXR-venogram)	• Routine turbulent flushing with 20 mL NS after intermittent medications, blood product transfusions or following obtaining blood sample. • Follow guidelines for routine IVAD flush and lock. • Check for IVAD patency every shift if accessed and with monthly flush. • When inserting non-coring needle ensure needle makes contact with the back of the device. • Do not leave partial occlusion unresolved, as it will turn into total occlusion.
5. Total Occlusion: Inability to withdraw blood or infuse. *Contributing factors:* • Blood, drug precipitate or lipid deposits completely obstructs the IVAD. • Non-coring needle incorrectly positioned. • IVAD may be kinked, coiled or damaged. • Pinch Off Syndrome. • Patient active and/or vomiting, retching, straining.	• Unable to flush or aspirate blood.	• Do not force flush. • Assess non-coring needle and tubing for kinks in line. • Move the patient's arm, shoulder and head to see if a position change affects the ability to infuse. • Change non-coring needle. • Notify the physician and obtain order for Thrombolytic Therapy. • Notify Infusion Program Clinician/IV Educator to instill Thrombolytic Therapy. • If occlusion not fibrin/blood related (i.e. drug precipitate, lipid deposits), notify Infusion Program Clinician/IV Educator to identify source of occlusion and treat with appropriate agent. • Discuss Radiologic studies, e.g. CXR, Venogram • Report and document occlusion, interventions and response. •	• Routine turbulent flushing with 20 mL NS after intermittent medications, blood product transfusions or following obtaining blood sample. • Follow guidelines for routine IVAD flush and lock. • Check for IVAD patency every shift if accessed and with monthly flush. • When inserting non-coring needle ensure needle makes contact with the back of the device.

Complications	Signs & Symptoms	Management	Prevention
6. "Stuck" needleless connector cap	• Unable to remove cap for non-coring needle tubing • Two potential causes: a) Over-tightening of cap when accessing (see photos in 'prevention') b) Fluid has crystallized between cap and catheter lumen	• Reassess routinely • Change cap after collecting blood sample if flushing does not clear cap • If "stuck" cap, try using a latex Penrose drain for grip to remove • May try alcohol swab between cap and lumen hub to dissolve • If unable to remove, remove non-coring needle and re-access with new non-coring needle	• After priming new cap, tip excess fluid out of end of cap prior to attaching to non-coring needle tubing • When attaching new cap, finger tighten only **AND** • With any luer-access (syringe or IV tubing), **hold at base of cap.**  • When "turning on" to cap, continue to **hold cap at base** 
7. Venous Thrombosis: An extra luminal thrombus between the catheter and the vein. *Contributing factors:* • Improper flush of catheter lumen(s) causing fibrin sheath/clot formation in catheter or at tip of catheter in vein. • Predisposing patient history related to blood clotting (i.e. cancer) • Incorrect tip position (i.e. in Upper SVC or Brachiocephalic, or Subclavian vein)	• Edema/cyanosis of arm on the same side as the IVAD • Pain • Swelling of neck, face, shoulder, arm or chest. • External jugular vein distention. • Change in ability to infuse or withdraw. • Leaking around needle.	• Acute: contact Infusion Program Clinician/IV Educator and Physician. • Community: arrange for client to return to hospital for assessment. • After informing the above clinicians/physician observe the client hourly and PRN • Follow up with diagnostic studies (Ultrasound and/or venogram) • Anticoagulation therapy as directed by Physician. • Device removal is the responsibility of the physician (IVAD may be left in place during anticoagulation treatment).	• Assess for signs & symptoms of venous thrombosis every shift and PRN. • Check for IVAD patency every shift if accessed and with monthly flush. • Use turbulent flush (stop-start) technique. • Use needleless connector. •

Complications	Signs & Symptoms	Management	Prevention
8. Superior Vena Cava Syndrome: Occlusion of the SVC by a thrombus. SVC syndrome results in increased venous pressure and central nervous system disturbances. SVC syndrome can lead to death.	• Progressive edema of upper extremity, neck and face. • Dilatation of the superficial veins of the chest, neck, and arms. • Collateral veins of chest, neck. • Peri-orbital edema • Tachycardia • Hypotension	• Notify physician and Respiratory Therapist STAT/emergency response. • **Community client:** call 911 • Position patient comfortably. • Apply Oxygen. • Obtain peripheral venous access. • Vital signs every 5 minutes and PRN	• Assess every shift and PRN for signs of increased swelling of face, chest and eyes. • Assess for signs & symptoms of venous thrombosis every shift. • Check IVAD for patency with each use and every shift if accessed in acute setting.
9. Extravasation/ Infiltration **Extravasation:** Soft tissue damage due to leaking of **vesicant** or irritating drug from a vein into the surrounding tissue. **Infiltration:** Inadvertent administration of **nonvesicant** solution into the surrounding tissue. *Contributing Factors:* • Needle dislodged from implanted IVAD. • Vascular access broken, damaged, or separated. • Poor IVAD location. • Inadequate stabilization of IVAD or access needle. • Access needle too short. • Pinch Off Syndrome.	• Edema. • Erythema • Pain or burning during or after infusion in area of vascular access device. • Unable to obtain blood return with aspiration • Patient hears gurgling noises • Subcutaneous crepitus	• Stop infusion. • Notify physician STAT. • Apply warm or cold compress as per ordered medication protocol. • Attempt to aspirate the drug or solution from the IVAD • Follow Extravasation Protocol. • Document observation, assessment and treatment.	• Check site and IVAD patency every shift and PRN. • Secure needle with dressing/tape, attach tubing to client gown during drug/solution administration. • Do not administer vesicants unless able to aspirate blood prior to drug administration. • Review CXR to confirm correct tip position. • Have antidotes available when administering vesicant drugs • Check site and IVAD patency with each access, or every shift if accessed or with each monthly flush/lock for dormant IVAD. • When inserting non-coring needle ensure needle makes contact with the back of the device

Complications	Signs & Symptoms	Management	Prevention
10. Non-coring needle Dislodgement Non-coring needle is partially or totally dislodged.	*Partial Dislodgement:* • Swelling in the chest wall during infusion. • Leaking at non-coring Needle site. • Pain or discomfort with infusion. *Complete Dislodgement:* • Non-coring needle completely out of skin.	*Partial dislodgement:* • Stop IV • Assess for swelling • Remove non-coring needle • Insert new non-coring needle if able to palpate IVAD • Notify Infusion Program Clinician/IV Educator. *Complete Dislodgement:* • Insert new non-coring needle	• Secure needle with transparent dressing/ tape, attach tubing to client gown during drug/solution administration • When inserting non-coring needle ensure needle contacts with the back of the device • When IVAD accessed assess site every shift and PRN • Avoid pulling on non-coring needle tubing.
11. Non-coring needle tubing damage *Contributing factors:* • Cut with scissors during dressing removal • Rupture from attempt to irrigate an occluded catheter with a small syringe	• IV fluid leaking out of non-coring needle. • Signs & symptoms of Air Embolism if non-valved IVAD or valve is compromised.	• Clamp non-coring needle tubing close to the needle insertion site with a non-toothed forceps. • Prevent air emboli. • Remove non-coring needle and insert new non-coring needle. • If unable to aspirate or flush new non-coring needle follow total occlusion management protocol above. Notify Infusion Program Clinician/IV Educator.	• 10 mL syringe is the smallest size syringe used to flush an IVAD. • Secure non-coring needle tubing to skin/clothing to prevent pulling • Avoid pulling on IVAD when positioning patient • Do not use sharp objects near IVAD. • Ensure non-coring needle tubing is not twisted or kinked before flushing.
12. Blood noted in non-coring needle tubing *Contributing factors:* • Compromised valve if valved IVAD • Flushing protocols not followed. • Loosened cap • Fractured or hole in the non-coring needle tubing. • Use of unapproved cap on lumen(s)	• Blood seen in non-coring needle Tubing • Signs & symptoms of Air embolism if non-valved IVAD or valve is compromised.	• If non-coring needle tubing is fractured clamp non-coring needle extension tubing close to the needle insertion site with a non-toothed forceps. • Remove non-coring needle and insert new non-coring needle • Attempt to aspirate blood from the catheter. If blood aspirated flush with 20mL NS. If unable to aspirate blood, follow total occlusion management protocol (above). • Notify Infusion Program Clinician/IV Educator.	• Ensure needleless connector tubing connections are secure. • 10 mL syringe is the smallest size syringe used to flush an IVAD. • Secure non-coring needle tubing to skin/clothing to prevent pulling • Avoid pulling on non-coring needle tubing when moving patient. • No sharp objects near IVAD.

Complications	Signs & Symptoms	Management	Prevention
13. Air noted in non-coring needle tubing *Contributing factors:* • IV tubing /needleless connector not primed completely. • Hole in non-coring needle tubing • Compromised valve if valved IVAD.	• Air seen in non-coring needle tubing. • Signs & symptoms of Air Embolism	• Treat for Air embolism. • Attempt to aspirate air if possible. • Check the non-coring needle for leakage by flushing with NS after aspirating. • Change non-coring needle as required.	• Prime all IV tubing prior to connecting. • Ensure needleless connector, tubing connections are secure. • If valve is compromised, use clamp on non-coring needle tubing.
14. Fluid leakage from non-coring needle site. *Contributing factors:* • Non-coring needle tubing punctured by sharp object. • Catheter ruptured from attempt to irrigate an occluded catheter with a small syringe • Non-coring needle tubing dislodged	• Fluid visibly leaking from non-coring needle tubing or insertion site • Redness, inflammation may be present if fluid leak not visible.	• Infuse 10 mL NS and assess for signs of fluid extravasation/ infiltration under the skin. • Change non-coring needle tubing. • Notify Infusion Program Clinician/IV Educator • If leak is due to seeping edema, fold 2x2 gauze, create pressure point over the insertion site and cover with tegaderm. Change pressure dressing in 24 hours and PRN.	• No sharp objects near IVAD. • 10 mL syringe is the smallest size syringe used to flush an IVAD. • Avoid pulling on non-coring needle tubing when moving patient • When inserting non-coring needle ensure needle makes contact with the back of the device
15. Pinch off syndrome Compression of the catheter between the first rib and the clavicle. Pinch Off may result in mechanical occlusion of the catheter, comprimising its usefulness, and may lead to catheter fracture. Migration of catheter segment into the right heart or pulmonary artery.	• Difficulty with blood withdrawal. • Resistance to infuse fluids. • Client position changes required for infusion of fluids or blood withdrawal. • Chest wall swelling with infusion of fluids. • Feeling of discomfort, stinging, or fullness in the chest wall, shoulder, or supraclavicular area with infusion of fluids. • Pain and Edema into the subclavian. • New onset of chest pain, cough or palpations. • Catheter emboli-hypotension, tachycardia, diaphoresis, cyanosis, loss of consciousness •	• Stop the infusion STAT. • Aspirate the remaining drug/ solution via catheter. • Notify physician STAT. • Community: call 911. • Call the Infusion Program Clinician/IV Educator • Assess client for signs/ symptoms of emboli/infiltration. • If present proceed to an emergency response for a catheter emboli. • Prepare client for radiographic studies. • Patient indicating any degree of catheter distortion at the clavicle/first rib area should be followed diligently by the physician, the Infusion Program Clinician/IV Educator, and the primary care RN	• Recognize signs & symptoms of Pinch-Off Syndrome

Complications	Signs & Symptoms	Management	Prevention
	Radiologic signs: Linogram shows catheter fracture		
16. Attempt to power inject through non power related device	• Tubing will rupture • IVAD needle may become dislodged • Possible contrast medium infiltration • Pain swelling at the IVAD site	• Stop the infusion STAT • Notify physician STAT • Notify the Infusion Program Clinician/IV Educator STAT • Remove the needle • Apply cool compress	• Only use power related needle and tubing in power injectable device when doing CT under pressure • 2 identifiers of power injectable device are necessary • Confirm patency prior to infusion
17. Skin erosion over IVAD site	• Visible palpation bumps through skin • Eroded skin over septum • Black areas on IVAD surface	• Do not access IVAD • Consult Infusion Program Clinician/IV Educator • Notify physician • Follow suggestions of Infusion Program Clinician/IV Educator if access deemed necessary.	• If skin over IVAD is fragile due to client condition, cleanse using gentle friction. • Avoid re-needling through same puncture. • Educate patient to protect skin • Use caution when applying cover dressing to avoid pressure from huber needle on skin.

Appendix D: Checklists

Skills Performance Checklist
Accessing Implanted Vascular Access Device
additional education required prior to accessing

Name: _____ Unit: _____

Assessor: _____ Date: _____

RN requirements:

- Successful completion of the CVC Care & Maintenance E-Learning Module
- Attendance of CVC Care and Maintenance Instruction Lab
- Demonstrates competency through a formal process

Available resources: BD-00-12-40033: Implantable Venous Access Device (IVAD)

TASK	YES	NO	RELATED QUESTIONS
1. Clean work surface with surface disinfectant and let dry. Wash hands thoroughly for 30 seconds.			When is the non-coring needle and dressing changed?
2. Gather equipment. Put on mask. Position patient.			• How do you determine if an IVAD is safe for power injection? • How do you determine if it is a non-valved or valved IVAD? • What size needle is chosen?
3. Wash hands thoroughly. Set up dressing tray.			
4. Put on non-sterile gloves. Locate the septum of the IVAD by palpation.			Describe assessment of the site.
5. Wash hands and put on sterile gloves.			
6. Attach a sterile needleless connector to the non-coring needle tubing, prime with 10mL externally sterile (XS) pre-filled NS syringe. Leave connected in sterile tray.			
7. Clean the skin over the IVAD with 2% chlorhexidine with alcohol 70%, non-tinted swab sticks. Clean using friction in multiple directions 15 seconds per swabstick. Repeat x 1. Allow skin to dry **completely** (approximately 3 minutes) to prevent skin irritation.			
8. Place a sterile drape just below the IVAD site.			
9. With your dominant hand, grasp the non-coring needle and remove the protective needle cover. With your non-dominant hand, stabilize IVAD to prevent movement of IVAD.			Discuss complications with needle insertion.
10. With your dominant hand, insert the non-coring needle at 90° angle through the skin into the septum. Apply moderate pressure until the needle makes contact with the back of the device.			
11. Check for patency.			How is patency confirmed?
12. Flush with 20 mL NS syringe using turbulent, stop start technique.			
13. Apply transparent sterile dressing over the site, date and initial dressing.			

14. Remove syringe. Clamp non-coring needle tubing.			What solution is used to lock non infusing IVAD?
15. Ensure needleless connector is securely attached to extension set, and intravenous tubing is secured to prevent pulling and accidental dislodgement.			
16. Document procedure.			What is documented?

Skills Performance Checklist – Answer Key
Accessing Implanted Vascular Access Device

QUESTIONS	ANSWERS
When is the non-coring needle and dressing changed?	• Initial post insertion site must be assessed within 24 hours. • If not accessed, gauze dressing is changed a minimum of every 48 hours and when needed if loose, or if moisture, drainage, blood or signs or symptoms of infection are present. • When IVAD accessed, non-coring needle and transparent, semi-permeable dressing are changed every 7 to 8 days and as needed when loose, or if moisture, drainage, blood or signs or symptoms of infection are present.
How do you determine if it is an IVAD safe for power injection?	• **Prior to use, an IVAD that is safe for power injection must be identified by at least 2 identifiers.** • **IVADs safe for power injection** must be identified radiologically by CXR or scout scan prior to CT. The letters "CT" on the port body are only evident on CXR or fluoroscopy. Non-coring needles must also be verified (external label identifiers) for safe power injection and can also be used for regular infusions. • Only use power capable non-coring needles in power IVADs.
How do you determine if it is a non-valved or valved IVAD?	• IVAD will be either non-valved or valved. Verify type prior to use. Check patient identification card or insertion documentation. • Flush and lock procedure describing **saline use only** indicates IVAD is valved. • Flush and lock procedure describing use of heparinized saline indicates IVAD is non-valved.
What size needle is chosen?	• Choose a non-coring needle length and gauge based on reservoir depth, type, tissue thickness and type of solution to be infused. • If the IVAD is safe for power injection and power injection procedure required, ensure the non-coring needle is also safe for power injection PRIOR to procedure
Discuss assessment of the site.	• Assessment involves checking for signs of redness, swelling, tenderness, discharge, erosion of the IVAD septum through the skin. • See Appendix C for complications.
Discuss complications with needle insertion.	• If unable to aspirate blood from non-coring needle tubing: check non-coring needle tubing for kinks. • Have patient cough, do Valsalva's maneuver, turn head to opposite side, raise arms or change position. • Ensure non-coring needle is in contact with the back of the device. • Flush lumen with 5 mL NS solution using externally sterile (XS) syringe and if resistance to flush is felt, stop. • If unable to determine correct needle placement, remove the non-coring needle and re-access IVAD with a **new** non-coring needle. DO NOT pull the needle back to skin edge and re-access at a different angle. • If swelling around IVAD site, pain with infusion or resistance to injection is felt, refer to Troubleshooting Appendix.
How is patency confirmed?	• Catheter patency is confirmed by aspirating until blood visible in mid non-coring needle tubing and flushing without resistance.
What solution is used to lock non infusing IVAD?	• Flush procedure describing saline use only indicates IVAD is valved. • Flush procedure describing use of heparinized saline indicates IVAD is non-valved.
What is documented?	• Date of dressing and needle change, needle size, site condition, Power non-coring needle, lock flush.

Skills Performance Checklist
De-Accessing Implanted Vascular Access Device

Name: _____ Unit: _____

Assessor: _____ Date: _____

RN requirements:

- Successful completion of the CVC Care & Maintenance E-Learning Module
- Attendance of CVC Care and Maintenance Instruction Lab
- Demonstrates competency through a formal process

Available resources: BD-00-12-40033: Implantable Venous Access Device (IVAD)

TASK	YES	NO	RELATED QUESTIONS
1. Clean work surface with surface disinfectant and let dry. Wash hands thoroughly for 30 seconds.			• When is the non-coring needle removed?
2. Gather equipment.			• If IVAD not in use, how often is it flushed?
3. Wash hands thoroughly.			
4. Put on non-sterile gloves.			
5. Scrub top of needleless connector with an alcohol swab using friction for 15 seconds. ALLOW TO DRY COMPLETELY. Attach a 10 mL pre-filled NS syringe.			
6. Flush and LOCK as per protocol using turbulent, stop start technique.			• What solution is used to lock non infusing IVAD?
7. Remove dressing and assess IVAD site. Stabilize the IVAD by securely holding down the base of the non-coring needle against the IVAD. Grasp the top of the non-coring needle. Firmly pull the non-coring needle up, depending on the type of needle used, you may hear a "click".			• Describe assessment of the site.
8. Dispose of the non-coring needle tubing into sharps container.			
9. Apply band-aid or small dressing to site.			
10. Document procedure.			• What is documented?

Skills Performance Checklist – Answer Key
De-Accessing Implanted Vascular Access Device

QUESTIONS	ANSWERS
When is the non-coring needle removed?	• Remove non-coring needle when therapy/treatment complete. • If accessed for ongoing therapy, non-coring (huber) needle is changed every 7 to 8 days during treatment.
If IVAD not in use, how often is it flushed?	• Between therapy/treatment, maintain patency of IVAD with monthly access to flush and lock.
What solution is used to lock non infusing IVAD?	• IVAD will be either non-valved or valved. Verify type prior to de-access. • Interview patient, check patient identification card or insertion documentation. • Flush procedure describing saline use only indicates IVAD is valved. • Lock solution and procedure describing use of heparinized saline indicates IVAD is non-valved.
Describe assessment of the site.	• Assessment involves checking for signs of redness, swelling, tenderness, discharge, erosion of the IVAD septum through the skin.
What is documented?	• Date, needle size, site condition, flush and lock solution.

IVAD Procedure Resource Videos

1. **Set up**
    a. Cleaning work surface area
    b. Washing hands
    c. Clean hands with Gel
    d. Preparing and setup of dressing tray

2. **IV Infusion Access**
    a. Initiating IV Infusion
    b. Discontinuing IV Infusion

3. **IVAD Access**
    a. IVAD Accessing

4. **IVAD De-Access**
    a. IVAD Deaccessing

5. **Flushing**
    a. Valved Catheter
        i. Flushing of Valved Line CVC
    b. Non-Valved Catheter
        i. Flushing of Non-Valved CVC

6. **Blood Draw**
    a. Valved Catheter
        i. PICC – Blood Draw
    b. Non-Valved Catheter
        i. NT-CVC – Blood Draw