

CLINICAL MANUAL

Policy/Procedure

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The provision of Central Venous Access Device (CVAD) care by Registered Nurses (RNs) and Licensed Practical Nurses (LPNs) on the Pediatric Medical Unit (PMU) is a Beyond Entry Level Competency (BELC).

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PREAMBLE

Care & Maintenance of Central Venous Access Devices (CVADs), both long term/permanent and short term/temporary, is required to ensure that stable intravenous access is maintained for patients receiving intravenous treatment. CVADs will be maintained according to the following protocol.

POLICY STATEMENTS

- CVAD care may only be performed by LPNs on PMU and RNs that have met the requirements for initial and ongoing certification. Nurses are responsible and accountable for self-assessing their competency needs and completing the appropriate education as needed. Competencies documents are located on e-source under the specific care area. Competency documents for LPN’s on PMU are located on e-source under orientation, LPN BELC.
- Diagnostic imaging technicians will administer IV medications via a central line that are within their scope of practice and have been approved by their care team.
- For all procedures, determine the need for an assistant based on psychological assessment as related to support during the completion of the procedure.

PROTOCOL

NOTE: The various types of external CVADs are defined in Appendix I.

1. Hand Preparation

Perform hand hygiene as per Infection Prevention and Control Services (IPCS) Policy #205.2 – Hand Hygiene.

2. IV Access Site Preparation

Complete a vigorous 30 second scrub using a Health Centre approved antiseptic swab followed by a 30 second drying time prior to accessing a CVAD.

3. Skin Preparation

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The preferred antiseptic preparation for all CVAD's is **2% Chlorhexidine Gluconate (CHG) and 70% Alcohol**. Exception will be CVAD insertions and care for premature infants less than 34 weeks corrected age when 2% Aqueous Chlorhexidine Gluconate (CHG) (alcohol-free) will be used. Iodine (betadine) is an alternative preparation to be used for patients with known allergies, sensitivities or skin breakdown to CHG and/or alcohol.

4. **Masks, Gowns, and Sterile Gloves**

Wear masks, gowns and sterile gloves whenever the CVAD is accessed to change dressing, needleless connectors, accessing a port-a-cath (PAC), or line removal.

5. **Dressing Change**

- Initial dressing to be changed in 24-48 hours if site not visible and/or bleeding at site.
- **Transparent semi-permeable dressing (TSM)**: use for all inpatients. Change every 7 days and as needed.
- **Transparent with gauze dressing**: may be used as initial dressing or if site is oozing. Change every 24-48 hours.
- **Gauze dressings**: use this dressing for ambulatory care patients and patients requiring PAC access for less than 24 hours. If this type of dressing is required for inpatient care areas, change the dressing every 48 hours and as needed (when the integrity of the dressing is compromised).
- **Regular adhesive tape and gauze** (last option): change every 24 hours and as needed.
- **Transparent CVAD Dressings for PICCs in NICU change PRN**, i.e., when the integrity of the dressing is compromised, (e.g., the amount of lifting at edges allowed before a dressing change is required).
- **In other care areas with children greater than 1 years of age and with PICCs, frequency of dressing change**: Dressing change may be adjusted to PRN.
- Take C & S swab of the CVAD insertion/exit site **IF** purulent discharge is present **OR** when there is clear discharge with redness, tenderness and/or fever. Notify physician/NP.

6. **Cap Change (Needleless connector)**

Change cap every 7 days and as needed. Cap changes in NICU are **PRN** (i.e when unable to clear blood/medication or difficulty flushing).

7. **Tubing Change**

- Change tubing;
 - every 72-96 hours.
 - every 24 hours for intermittent lines.
 - When changing from a peripheral PIV to a central line.
 - When parenteral nutrition and lipid lines are disconnected and hanging for > 4 hours.

Exceptions include:

- 24-hour tubing changes for all fat emulsion infusions.
- Consider 24-hour tubing changes for parenteral nutrition.
- Tubing being used to administer blood and blood products should be changed every 4 hours.

8. Flushing & Locking

- In the Children's Health Program, CVADs should be heparin locked following each access or a minimum of every 24 hours if not being used daily. This procedure can be initiated by a CVAD certified RN as per [Policy #737 – Care Directive for Heparin Locking Central Venous Access devices](#).
- For the adult population in the Women's and Newborn Health Program, PICC lines should be saline locked with 20 mL of 0.9 % NaCl following each access or a minimum of every 24 hours.
- When an external catheter is not in use, perform heparin instillations every 24 hours as ordered.
- For implanted devices (port-a-caths) not accessed, flush with heparin a minimum of every 2 months.

NOTE: The amount of heparin depends on the size and length of the catheter and the addition of extension tubing. The Pediatric Central Venous Access Device Flushing & Locking Pre Printed Order (Form ID IWKHELO) provides the exact amount of heparin needed for various external CVADs for all inpatient care areas. PICC devices smaller than 2 Fr (26 G) do not tolerate being hepllocked for intermittent usage.

- In the NICU, an Authorized Prescriber's order, indicating the amount and concentration of heparin and the frequency of administration, is required. This order is to be written on an order sheet (IWKORSH) or indicated on the pre-printed order sheet (IWKHELO).
- Flush CVADs prior to heparin locking, between medication administration and after blood sampling using a prefilled 10 mL 0.9% NaCl syringe(s). The recommended volume for flushing of CVADs is 20mL, with a range of 2 - 20 mL, (depending on age, weight, fluid restriction and type of solution).
- Select home TPN patients use an alternate locking solution, Sodium Citrate 4%/Ethanol 30% as per The Pediatric Central Venous Access Device Flushing & Locking Pre Printed Order (Form ID IWKHELO).

NOTE: When withdrawing blood, additional flushing volume is required to flush the line. Proper flushing technique and use of adequate volume are essential for maintaining external CVAD patency. This is particularly important in PICCs because their catheter lumens are smaller and longer.

- Use a turbulent flush for effective flushing. To create this turbulence, use a "push/stop/push" pressure on syringe plunger to create intermittent bursts of fluid. This method is believed to create more effective cleansing of the external CVAD as opposed to a slow and steady flush.

9. Maintaining CVAD Patency

- Maintain infusion rates of 5 mL/hr or greater via large volume pump to preserve external CVAD patency and to reduce thrombus formation. Infusions via syringe pump may run at lower rates if necessary. If occlusion of the line becomes an issue, a driver solution may need to be added.
- Blood withdrawal and/or routine blood aspirations are not recommended for PICCs 2 Fr (26 G) or less.
- For PICCs 2 Fr (26 G) or less, add heparin (0.5-1 u/mL) to infusions running less than 20 mLs/hr. Maintain a minimum rate of 2 mL/hr, **DO NOT** heplock these lines.

10. Safety

- Ensure a transport kit (sterile gauze and blue clamp/s) accompanies the patient when leaving the nursing unit. (See Policy #735 N - CVAD Emergency Care for details).
- Connect continuous I.V. infusions **indirectly** using a needleless connector to prevent inadvertent disconnection and to minimize the risk of infection. In some care areas it may be required to **directly** connect to the hub of the catheter lumen (or extension set) for certain infusions. Use double and triple lumen connectors when the complexity of medication administration requires multiple IV lines. **Tape all connections.**

NOTE: Exception in PICU/NICU: In PICU and NICU, consider taping of connections when the patient assessment identifies a potential for accidental disconnect. See Medication Management Policy-10.15 for labeling details).

- To avoid stress on the catheter and to decrease the risk of dislodgement, loop any exposed external catheter under the dressing and cover with steri-strips. Secure the remaining external catheter with a securement device or tape to the skin. Next loop the IV tubing so that stress points are well secured. Secure heavy tubing (filters, connectors) in a manner that avoids pull or drag on the IV tubing and catheter.

NOTE: It is strongly recommended that all external CVADs and associated tubing be secured at 2-3 points, especially in toddlers and others identified as being at high risk for accidentally dislodgement and/or removal.

- **Minimize** the number of entries into external CVAD's (such as blood withdrawal, administration of medications) in an attempt to decrease the risk of infection. The

increased number of times the external CVAD system is accessed, the greater the risk of external CVAD infection from external contamination.

- Administer all external CVAD infusions via an infusion pump. Exceptions may occur in specific care areas such as the Operating Rooms and Recovery Rooms.

11. Documentation

Document routine care, complications and removal reasons on the CVA flow sheet (Form ID IWKCEVEAC). Document any additional information on the Interdisciplinary Progress Notes (Form ID IWKINPR).

PROCEDURES

DRESSING CHANGE (RN & LPN)

Equipment:

- Dressing Tray
- Mask/s
- Non-sterile gloves
- Sterile gloves
- Gown/s
- Antiseptic swab sticks (3)/solution
- Appropriate sterile dressing
- Securement device
- Steri-strips if applicable
- Skin protectant if applicable

1. Perform hand hygiene as per Infection Control Policy #205.
2. Immediately prior to use and wearing a mask and gown, assemble tray.
3. Don non-sterile gloves and remove the old dressing (or have the assistant nurse perform if necessary) by pulling all corners of the dressing towards the catheter, being careful not to touch the exit site or pull on catheter. During dressing removal, the catheter may be stabilized using swab stick or one finger and sterile gauze. Remove stabilization device if applicable. If steri-strips are present, moisten them with antiseptic solution to dampen and to assist with removal.
4. Repeat Hand Hygiene.
5. Don sterile gloves.
6. Assess exit site for signs of infection and notify physician or nurse practitioner (NP) if necessary. **IMPORTANT NOTE:** antiseptic properties are **less effective** when organic material such as **blood** is present. **Dried blood** or secretions **MUST be removed** with 0.9% NaCL **prior to disinfecting**.
7. **For PICC catheters**, note length of external catheter including “exposed” section of the catheter. If the amount of the ‘exposed’ catheter is greater than last dressing change

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and/or insertion, record on CVA flow sheet, interdisciplinary progress note and on nursing care plan. Notify physician/NP.

8. Drape the area with a sterile towel.
9. If the catheter can be lifted, use sterile gauze (or have the assistant nurse perform if necessary) to “gently” lift the CVAD to facilitate cleansing. Using the first swab stick, apply friction to the skin and cleanse in a horizontal (side to side) plane extending 5 cm from the catheter exit site. Using the second side of the swab stick, apply friction to the skin and cleanse in a vertical (up and down) plane and discard. Obtain the second swab stick and cleanse the skin beginning at the insertion site with a circular motion (middle to outward) extending in a 5 cm diameter going left to right. Repeat with the other side of the swab stick going right to left and discard. With the third swab stick, cleanse the line itself, beginning at the insertion site for the amount of line that will be covered by the dressing. Flip the swab stick over and repeat this step on the underside of the catheter.
10. Allow antiseptic solution to dry completely. **Do not assist in the drying process!** (Antiseptic solution needs to air dry and be in contact with the skin for 2 minutes to be most effective).
11. If the catheter is sutured in place, assess the condition of the sutures with each dressing change. Sutures usually stay intact for 14-21 days. When sutures loosen (i.e. Lose their intactness) they are generally not replaced. Use securement device and reinforce with steri-strips as necessary to ensure the catheter is as secure as possible. For non-power tunnelled catheters, loop tubing under dressing and secure with steri-strips. Power tunnelled catheters use the securement device for PICC lines.
12. Apply a sterile skin protectant if required if skin is irritated, sweaty or the dressing is lifting before the recommended duration. Skin protectant should cover all skin in contact with the dressing. **Allow skin to dry, (approximately 1-2 minutes) before applying dressing.**
13. Apply the appropriate dressing covering the exit site and catheter.
14. Secure catheter outside of the dressing and all IV tubing's with a securement device and/or tape to reduce tension and to minimize accidental dislodgment and/or removal. CVADs, especially in toddlers and other patients identified as being at high risk for accidental dislodgement and/or removal, need at least 2-3 point securements.
15. Chart on the CVA Flow sheet (Form ID IWKCEVEAC) any discharge, redness, inflammation, or tenderness. Document in the interdisciplinary progress notes if any sutures and/or the cuff have become dislodged and report to physician/NP.

NEEDLELESS CONNECTOR CHANGE (RN & LPN)

Equipment:

- Sterile tray
- Sterile Gloves
- Mask/s
- Gown/s

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- Adhesive Tape
 - Antiseptic swab stick(s)
 - Prefilled 10 mL 0.9% NaCl syringe (1 per each lumen and/or CVAD)
 - Needleless connector(s)
 - Hep-lock solution (if applicable)
1. Perform hand hygiene as per Infection Control Policy #205.2.
 2. Stop all infusions and clamp lumen(s) if applicable.
 3. Immediately prior to use, wearing a mask and gown, assemble equipment on tray.
 4. Apply sterile gloves.
 5. Flush the new needleless connector to remove all air.
 6. Using sterile gauze from the tray lift up the catheter and **vigorously scrub** cap/catheter connection site for **30 seconds**, using antiseptic swab. Dry for **30 seconds**.
 7. Remove old needleless connector.
 8. Fill the air space with 0.9 % NaCl. Attach the new cap and ensure it is luer-locked in place.
 9. Unclamp the lumen and slowly drawback to check for blood return. Then flush with 10-20 mL of 0.9% NaCl using a turbulent technique. **Note: There is no blood withdrawal for PICCs 2 Fr (26G) or smaller.**
 10. Following the 0.9 % NaCl flush, either heparinize the CVAD or connect to continuous infusion(s).
 11. Ensure that the connection is luer- locked and well secured with adhesive tape, if applicable. If CVAD is heparinized, ensure line is clamped. Secure catheter and/or tubing to prevent tension on the catheter
 12. Chart cap change on Central Venous Access (CVAD) flow sheet, Form ID IWKCEVEAC. Use Interdisciplinary progress notes, Form ID IWKINPR for documentation of unusual findings and notify physician/NP.

TUBING CHANGE (RN & LPN)

Equipment:

- Appropriate IV tubing for solution
1. Prime and label IV lines, *according to Clinical Policy 1155 Maintaining Peripheral IV Therapy, and Medication Management Policy 30.05 Intravenous Infusions.* Scrub all needleless connectors with Health Centre approved antiseptic swab for **30 seconds**, then allow to dry for **30 seconds**. Tape connection site in same direction that the line is screwed on. **TAPING PROCEDURES EXCEPTION: PICU/NICU/WOMEN'S HEALTH.**
 2. Consider the taping of connections in PICU/NICU/WOMEN'S HEALTH when the patient assessment identifies a potential for accidental disconnect. Secure catheter and/or tubing to prevent tension on the catheter. Ensure IV tubing is not wrapped around patient, hanging or dragging. Consider multiple securements for very young/active patients.
 3. Document IV tubing changes on CVA flow sheet, (Form ID IWKCEVEAC).

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FLUSHING & LOCKING (RN, LPN & Diagnostic imaging technicians)

Equipment:

- Antiseptic swab(s)
- Prefilled 10 mL 0.9% NaCl syringe(s) (1-2 syringes per each lumen and/or CVAD)
- If required, appropriate locking solution as ordered on pre-printed order sheet (IWKHELO)
 - For routine heparin locking use prefilled preservative-free heparin 10 units/mL syringes

1. Perform hand hygiene as per [Policy #205.2 – Hand Hygiene](#).
2. Scrub injection cap for **30 seconds** using Health Centre approved antiseptic swab. Dry for **30 seconds**. **NOTE:** If needleless connector becomes contaminated (i.e., touches clothes/skin), re-clean the cap with an antiseptic swab prior to re-entry.
3. Attach prefilled 10 mL 0.9% NaCl syringe. Open clamp. Slowly draw back to check for blood return. **Do not attempt to check for blood return on PICC 2 Fr (26 G) or smaller.** Infuse saline, using a turbulent “push/stop/push” flushing technique).
4. For daily locking,
 - a. Heparin locking – flush with 10-20 mL of 0.9% NaCl followed by appropriate volume and concentration of heparin.
 - b. Saline locking – flush with 20 mLs of 0.9% NaCl.
5. When locking following the administration of a medication, blood infusion or blood withdrawal, flush with 10-20 mL of 0.9% NaCl prior to administration of heparin if applicable (may be less in patients with fluid restrictions and/or neonates, minimum 0.5-3 mL).
6. Clamp and disconnect the 0.9% NaCl syringe.
7. If required, attach prepared prefilled heparin syringe, unclamp and infuse heparin. Clamp and disconnect heparin syringe.
8. Document heparin or saline lock on the appropriate Medication Administration Record.

BLOOD SPECIMEN COLLECTION (RN & LPN)

Enter authorized prescriber’s ordered blood work in the MEDITECH order entry system and obtain labels for patient verification.

Equipment:

- Antiseptic swab(s)
- 2-3 prefilled 10 mL NaCl 0.9% syringes
- 1 Large Sterile Gauze
- Extra syringe(s) required for blood work (3 or more)
- Blood tubes/bottles and Labels
- 1 x 10 mL syringe

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- Heparin 10 units/mL pre-filled syringe, if required
 - Adhesive Tape
 - Non-sterile gloves
1. Perform hand hygiene.
 2. Immediately prior to use, assemble supplies, as required.
 3. If receiving continuous IV infusion(s), pause infusion pump(s) **approximately 1 minute**. When blood withdrawal is from double or triple lumen CVAD, pause all infusions and clamp all lumens. Ensure the end of the IV tubing's remains sterile.
 4. Don non-sterile gloves.
 5. **Vigorously** scrub needleless connector for **30 seconds** using antiseptic swab. Dry for **30 seconds**.
 6. Connect 0.9% NaCl syringe to connector. Unclamp. Flush catheter with 10 mL of 0.9 % NaCl, then withdraw discard. Discard approximately 3-5 mL (amount may vary depending on size of catheter and/or patient's condition).
NOTE: Minimal amount of discard is 3 times the priming volume of the CVAD.
Example: the priming volume of a single lumen 5 Fr-D Cook is 0.2 mL, therefore the minimal discard is 0.2 mL x 3 = 0.6 mL (Appendix B).
 7. Attach empty syringe(s) and withdraw required amount of blood
 8. When blood withdrawal is complete, flush catheter with **10-20mLs** of 0.9% NaCl using a turbulent flushing technique. Unclamp all remaining lumens as applicable. There should be no visual blood remaining in needleless connector following flush. If unable to remove all the blood, change the needleless connector. Place blood in the correct tubes/bottles and label appropriately. **When multiple blood specimens are required**, send the first specimen for culture (most likely to contain the bacteria) and the last one for coagulation studies (maximizes the accuracy of specimen's lab values).
- Note:** All **coagulation tests** collected through the central line should always **indicate source of draw** in the comments. This will prevent the lab from automatically running an inhibitor screen. **If locked with heparin** immediately prior to the draw, do not infuse the heparin. **Withdraw it first.** If abnormal results are obtained, the physician/nurse practitioner will decide if to repeat the sample peripherally.
9. Ensure the connection is luer-locked if applicable and well secured with adhesive tape. If CVAD is heparin locked, ensure the line is clamped. Secure the catheter and/or tubing to prevent tension on the catheter.
 10. If heparin locked, document on the Medication Administration Record appropriate to the care area.

MEDICATION ADMINISTRATION (RN, LPN & Diagnostic imaging technician)

Equipment:

- Antiseptic Swab(s)
- Minimum two (2) prefilled 0.9% NaCl 10 mL syringes or alternate flush solution;

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- Intravenous Medication
 - Preservative free Heparin 10 units/mL syringe (if Heparin Locking)
1. Perform hand hygiene as per Infection Prevention and Control Policy 205.2.
 2. Gather required supplies
 3. Vigorously scrub the chosen access site (needleless connector or side port) for 30 seconds using antiseptic swab. Allow to air dry for 30 seconds. **Note:** when administering drugs with known and/or multiple incompatibles, the needleless connector is the recommended site.
 4. Maintaining aseptic technique, connect prefilled 0.9 % NaCl syringe to the chosen access site. Check for blood return. **DO NOT check for blood return in PICC 2 Fr (26 gauge) or smaller.** Flush with a minimum of 10 mL 0.9 % NaCl prior to administering medication (may be less in patients with fluid restrictions and/or neonates, minimum 0.5-3 mL). This reduces the possibility of medication compatibilities as well as assessing line patency.
 5. Disconnect 0.9% NaCl flush.
 6. Administer the medication using the appropriate method of delivery as per drug monograph (see Policy 1140- Administration of Intravenous Medications).
 7. Upon completion of the IV medication, disconnect from the access port. Flush as required with a minimum of 10-20 mL 0.9 % NaCl, or compatible solution (may be less in patients with fluid restrictions and/or neonates, minimum 0.5-3 mL), using turbulent technique.
 8. Heparin lock or resume previous intravenous infusion/s as per Clinical Policy 20.10.
 9. Document the intravenous medication and heparin lock on the medication administration record (MAR). If required, document the volume of fluid administered on the intake and output record.

Note: A syringe smaller than a 10 mL syringe may be used to administer a slow IV push medication as the volume of medication in a 10 mL syringe creates a risk of incorrect medication dosage. **Important:** When using a smaller size syringe for the administration of the IV medication, the pre and post flush **MUST** be done with 10 mL syringes. This ensures that the CVAD is functioning properly.

SHORT TERM REMOVAL (RN ONLY)

Obtain an authorized prescriber's order prior to removal.

Equipment:

- Dressing tray
- Surgical mask/s
- Pair of non-sterile gloves
- Pair of sterile gloves
- Gown/s
- Antiseptic swab stick/solution

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- Small sterile dressing or band aid
 - Sterile petroleum based ointment/jelonet (for cook/arrow removal)
 - Suture removal kit if required
 - Clamp
1. Perform hand hygiene as per Infection Control Policy #205.
 2. Assemble sterile tray just prior to use.
 3. When removing short-term CVAD, place patient in supine or Trendelenburg position if possible. If not, place in semi-fowlers. For PICC removal, position patient with arm extended alongside of body.
 4. Use non-sterile gloves and remove old dressing while stabilizing catheter. If assistant is present, he/she applies gloves and removes dressing.
 5. Remove gloves and repeat hand hygiene as per Infection Control Policy #205.
 6. Don sterile gloves and drape area with sterile towel.
 7. Disinfect insertion site using approved antiseptic
 8. **For short term, non-tunnelled removal (Cooks, Arrows):**
 - a. Remove suture(s) if required
 - b. While removing catheter, cover insertion site with sterile gauze. For babies and younger children, remove during exhalation, if possible. For older children, ask them to “push down” using Valsalva manoeuvre while removing.
 9. **For PICC line removal:**
 - a. Gently grasp catheter at the insertion site and slowly remove, pulling straight out, parallel to the skin for approximately 2-3 cm. Release and then start back at the insertion site each time until the catheter is removed.
 - b. While removing the catheter, do not apply pressure at the site or along the course of the vein.
 - c. If resistance is noted **or** the patient reports sharp pain, **STOP. DO NOT FORCEFULLY REMOVE THE CATHETER.**
 - d. If unable to completely remove the catheter, apply a sterile dressing, coiling the exposed catheter under the dressing.
 - e. Apply a warm compress. Wait 30-60 minutes then re-attempt removal. If still unsuccessful, notify physician/NP to determine next steps.
 - f. In the event the catheter breaks during removal, clamp the exposed portion of the catheter above the break and notify physician/NP. If catheter breaks internally, immobilize limb, apply pressure at insertion site and notify physician **IMMEDIATELY.**
 10. Following successful removal, apply pressure at the insertion site, using sterile gauze, for approximately 2-5 minutes or until bleeding stops. Expect some bleeding with removal of non-tunnelled lines. PICCs have minimal to no bleeding.
 11. If catheter tip culture is required, aseptically cut the last 3-5 centimetres of catheter and place in sterile container. Label appropriately and transport to lab.

12. For non-tunnelled lines (cook/arrow), apply petroleum-based ointment or a piece of jelonet to the access site to seal the skin-to vein tract.
13. Cover with a sterile dressing or band aid for 24 hours.
14. For PICC lines, measure length removed and compare to insertion record. Notify physician/NP immediately of any discrepancies.
15. Educate patient and family about care of removal site.
16. Document the removal reason on the CVA Flow sheet, (Form ID IWKCEVEAC).

IMPLANTED DEVICE (port-a-cath) ACCESS AND DE-ACCESS (RN ONLY)

Accessing and Dressing Application:

Palpate skin for port's perimeter and dome-shaped septum prior to the application of topical anesthetic and skin disinfectant, especially if patient has a history of difficult access. Apply topical anesthesia as needed prior to the planned procedure according to Medication Management policy 20.77, Care Directive for the Application of Topical Anesthetics. Determine the need for an assistant if indicated by patient assessment and/or if additional support is required for the procedure.

Equipment:

- Dressing Tray
 - Mask/s
 - Sterile Gloves
 - Gown/s
 - Non-coring Infusion set(s) (appropriate length for patient)
 - Needleless connector(s)
 - (2) antiseptic swabsticks/solution
 - 1-2 10 mL sterile 0.9% NaCl pre-filled syringe(s)
 - Sterile dressing
 - Steri-strips (if applicable)
 - Tape
 - Heparin syringe if applicable
 - Skin protectant (optional)
1. Perform hand hygiene as per Infection Prevention and Control Services Policy 205.2.
 2. **Immediately prior to use** and wearing a mask and gown, assemble tray. NOTE: Appropriate length of non-coring needle to be obtained from observation, chart, palpation and/or past accesses.
 3. Remove topical anesthetic if necessary.
 4. Repeat hand hygiene and put on sterile gloves.
 5. Drape the area with a sterile towel.
 6. Using the first swab stick, apply friction to the skin and cleanse in a horizontal (side to side) plane extending 5 cm from the access site. Using the second side of the swab

- stick, apply friction to the skin and cleanse in a vertical (up and down) plane and discard. Obtain the second swab stick and cleanse the skin beginning at the access site with a circular motion (middle to outward) extending in a 5 cm diameter going left to right. Repeat with the other side of the swab stick going right to left and discard.
7. Allow antiseptic solution to dry completely. **Do not assist in the drying process!** (Antiseptic solution needs to air dry and be in contact with the skin for 2 minutes to be most effective). **Note:** If not dry at end of 2 minutes, too much antiseptic solution was used.
 8. Prepare non-coring infusion set by placing a needleless connector onto the end of the infusion set. Attach a prefilled 10 mL 0.9% NaCl syringe. Flush connector and extension tubing, removing all the air. Clamp and leave syringe attached. Place in tray.
 9. Using your non-dominant hand, locate PAC, palpate for the septum. Stabilize between fingers and thumb and continue to hold while inserting non-coring needle.
 10. Using the other hand, pick up prepared infusion set. Push the needle firmly through the skin at a 90 degree angle until the needle penetrates the septum and you feel the bottom of the port's chamber (**See Appendix III for specific instructions on Health Centre approved non-coring infusion set**).
 11. Check for placement by opening clamp and aspirating for blood. If brisk blood return is obtained, flush the port with 10 mL of 0.9% NaCl solution using a turbulent technique then clamp.
 12. If unable to aspirate blood, instil a small amount of 0.9% NaCl followed by another attempt at aspiration. Changing the patient's position, raising the arms, coughing, etc., may move the catheter tip away from the vessel wall. Instillation of 0.9% NaCl without swelling and no complaints of pain when infusing are assessments that ensure proper placement of non-coring needle into port chamber that does not provide blood return. Refer to Medication Management policy 30.52, CVAD: Management of Occlusions for next steps.
 13. Secure non-coring needle by applying a steri-strip over the top.
 14. Apply a sterile skin protectant if required. Skin protectant should cover all skin in contact with the dressing. **Allow skin to dry, (approximately 1-2 minutes) before applying dressing.**
 15. Apply sterile dressing.
 16. Heplock or connect to a continuous infusion.
 17. Tape all connections and secure catheter outside of the dressing and all IV tubing's with a securement device and/or tape to reduce tension and to minimize accidental dislodgment and/or removal. CVADs, especially in toddlers and other patients identified as being at high risk for accidental dislodgement and/or removal, need at least 2-3 point securements.
 18. Document on the CVA Flow sheet (Form ID IWKCEVEAC).
NOTE: Accessing a double implanted device involves the same procedure as above, except two non-coring infusion sets will be used and both lumens of the double port

need to be palpated and identified prior to cleansing the skin. One dressing is used for a double port-a-cath, therefore if dual access is needed, access at the same time.

Dressing Change ONLY:

1. Remove old dressing by pulling all corners toward the needle, stabilizing the needle.
2. For hand hygiene and gathering supplies, follow steps 3-6 as outlined above.
3. For skin disinfection, follow steps 5-6 above. Using sterile gauze, stabilize the non-coring infusion set with your non-dominant hand during the procedure.
4. Follow steps 14-15 for dressing application.
5. Tape connections, secure lines and document according to steps 21-22.

Removal of Non-coring Needle:

Equipment:

- Non-sterile gloves
- Anti-septic swab
- 1-2 x 10 mL sterile 0.9% NaCl pre-filled syringe(s)
- Pre-filled heparin 10 u/mL syringe
- 2x2 gauze, if required
- Band-Aid, if required

1. Perform hand hygiene as per Infection Prevention and Control Services Policy 205.2.
2. Apply non-sterile gloves.
3. Scrub needleless connector for **30 seconds** using health centre approved antiseptic swab. Dry for **30 second**.
4. Maintaining sterility of the needleless connector, attach the pre-filled 0.9% NaCl syringe. Check for blood return and flush 10- 20 mL using turbulent flow technique. Remove syringe.
5. Maintaining sterility of the needleless connector, attach the heparin syringe and lock according to CVAD Heparin Locking Pediatric and Neonatal pre-printed order sheet (IWKHELO). Remove syringe.
6. Remove the dressing. Using non-dominant hand to stabilize the port, remove non-coring needle out of the port using a slow but firm action.
7. If bleeding occurs, apply slight pressure with 2x2 gauze.
8. Apply a band aid if needed.
9. If dual lumen device, repeat steps 3-8.
10. Discard non-coring needle(s) in the appropriate sharps container.
Document heparinization on patient's MAR and document needle removal on CVA flow sheet (Form ID IWKCEVEAC).

REFERENCES

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Pedivan (2010). *Best Practice Guidelines in the care and Maintenance of Pediatric Central Venous Catheters*. A pediatric vascular access network of the Association for Vascular Access (AVA).

Potter, P.A., & Perry, A.G. (2013). Insertion and care of central vascular access devices. *Clinical Nursing Skills and Techniques* (8th ed.), St. Louis: Mosby.

Registered Nurses of Ontario (RNOA) (2008). Nursing best practice guidelines; care and maintenance to reduce vascular access complications. Access 09/09/10.
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RELATED DOCUMENTS

Policies

IWK Clinical Policy 736 - Care Directive for Accessing Central Venous Access Devices Prior to surgery and/or Medical Treatment in Children's Health Program

IWK Clinical Policy 737 - Care Directive for Heparin Locking Central Venous Access devices in Children's Health Program

IWK Infection Prevention and Control Services (IPCS) Policy 205.2 - Hand Hygiene

IWK Medication Management Policy 20.10 - Injectable Medications

IWK Clinical Policy 735 N – CVAD: Care Guidelines for Patients, Families & Health Care Providers

IWK Clinical Policy 1155 - Maintaining Peripheral IV Therapy

Forms

CVA flow sheet Form ID IWKCEVEAC

CVAD Heparin Locking Pediatric and Neonatal pre-printed order sheet Form ID IWKHELO

IWK Order Sheet Form ID IWKORSH

APPENDICES

Appendix A: Types of Central Venous Access Devices

Appendix B: Priming Volumes

APPENDIX A - Types of Central Venous Access Devices

Central Venous Access Devices (CVAD)

CVAD's are multipurpose catheters that are generally inserted through a deep vein of the arm, neck, chest or legs, terminating in a (major vein) such as superior or inferior vena cava. These catheters vary in lumen size, number of lumens, placement and usage, i.e. short term (weeks to a few months) or long term (months to years). Catheters are considered either: Short Term/Temporary [i.e. non-tunneled (Cook/Arrows) and peripherally inserted central catheter (PICC)] OR Long Term/Permanent [i.e. tunneled (Broviac/Hickman) or implanted (PAC)].

Long Term/Permanent External CVAD's

Long Term/permanent External CVAD's are inserted in patients who need long term venous access. These catheters are inserted under sterile conditions in the operating room. Fluoroscopy taken during insertion confirms tip placement.

There are **two** types of long term/permanent external CVAD's:

1. Tunneled CVADS

Tunneled CVAD's are a type of long term device that are tunneled under the skin, separating the skin exit site on the anterior chest wall from the vein entry site (subclavian, internal or external jugular). Tunneling lowers the risk of infection. Subcutaneous tissue granulates into the cuff portion (placed directly under the skin and/or up the tunnel about 2-3 mm), providing stability. An additional cuff (vita) cuff is sometimes added. This cuff also provides a mechanical barrier to microorganisms. They can be either single or double lumen. There are two common types used within the Health Centre.

- a. Broviac –single lumen, white silicone catheter.
- b. Hickman – double lumen, white silicone catheter, has a larger lumen size.
- c. Power Hickman-double lumen, purple polyurethane catheter that can be used for CT injection.

2. Implanted CVAD: port-a-cath (PAC)

Implanted CVAD is a type of device where the port chamber, with a self-sealing septum, is placed in a surgically created pocket in the chest wall or arm. Then the catheter, connected to the port chamber, is tunneled under the skin (similar to tunneled external CVAD). Palpating the port body and inserting a non-coring needle through the septum into the port reservoir obtains access. Care and management of Implanted CVADs are in clinical policy 745).

Short Term/Temporary CVADs

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Short term/Temporary CVAD's are inserted in patients that require short term/temporary therapy. A physician, RN PICC inserter, or a neonatal nurse practitioner (NNP) inserts these CVADs using sterile technique, at the bedside, in the operating room or the intensive care units. Some of these non-tunneled CVADs are sutured to the skin to provide stability and securement. PICCs are generally not sutured in place. Proper securement and dressing technique maintains the security and stability of this external CVAD. An x-ray is required after placement and before use to confirm placement.

There are 2 types of short term/temporary CVAD's:

1. **Non-tunneled percutaneous CVADs**, e.g. Cook/Arrow.
These **polyurethane** catheters are inserted directly into the jugular, subclavian or femoral vein. These catheters can be single, double or triple lumens. These devices have the highest reported rate of infection.
2. **Peripherally Inserted Central Catheter (PICC)**. These **polyurethane** catheters are inserted percutaneously or by modified seldinger technique (ultrasound guided) via a deep peripheral vein. Common insertion veins are the cephalic, basilic and brachial in the arm, and the saphenous in the legs. Scalp veins may be used for babies under one year. On occasion, the catheter may not be able to be threaded into a major vessel near the heart. This placement is considered non-central. These lines may be referred to as **non-central PICC**. Care and management of these non-central PICCs are the same as a PICC placed centrally.

Hemodialysis/Apheresis CVADs.

Hemodialysis/Apheresis CVADs are a special type of CVAD used for the blood exchange, using "venous" and "arterial" lumens. The lumens have a larger internal volume and require higher dosage and concentration of heparin and a decreased frequency of heparinization than CVADs. Prior to usage, the instilled heparin **MUST** be withdrawn. The catheter can either be temporary (non-cuffed) or permanent (cuffed). Hemodialysis catheters are not used for intravenous infusions unless ordered. Apheresis catheters are occasionally used for Bone Marrow Transplant patients. The care and management of these catheters is the same as any tunneled CVAD.

APPENDIX B

Manufacturer	Non-tunneled CVAD	Approximate priming volume
COOK	Single lumen 3 Fr	0.1 mL
	Single lumen 4 Fr	0.1 mL
	Double lumen 4 Fr	0.2/0.1 mL
	Double lumen 5 Fr	0.2/0.2 mL
	Double lumen 7 Fr	0.6/0.2 mL
	Triple lumen 5 Fr	0.3/0.2/0.2 mL
	Triple lumen 7 Fr	0.5/0.3/0.3 mL

Manufacturer	PICC	Approximate priming volume
Med comp	Single lumen 1.9 Fr	0.1 mL
BARD power	Single lumen 3 Fr	0.4 mL
	Single lumen 4 Fr	0.6 mL
	Double lumen 4 Fr	0.4/0.4 mL
Vygon	Single lumen 1 Fr	0.1 mL
	Single lumen 2 Fr	0.15 mL

Manufacturer	Tunneled CVAD	Approximate priming volume
BARD (non-power)	Single lumen 2.7 Fr	0.15 mL
	Single lumen 4.2 Fr	0.3 mL
	Single lumen 6.6Fr	0.7 mL
	Double lumen 7 Fr	0.6/0.8 mL
BARD power	Double lumen 6 Fr	0.3/0.3 mL

Manufacturer	Port-a-Caths	Approximate priming volume
BARD power	Single lumen 6 Fr	1.6 mL
	Double lumen 9.5 Fr	1.6/1.6 mL
BARD non-power	Double lumen 7 Fr	1.0/1.0 mL

Non-coring needles:

Smith’s Medical micro-gripper 0.3 mL

BARD power injectable 0.3 mL

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District Health Authority/IWK Policies Being Replaced

Version History

(To Be Completed by the Policy Office)

Major Revisions (e.g. Standard 4 year review)	Minor Revisions (e.g. spelling correction, wording changes, etc.)