

MADISON MEMORIAL HOSPITAL

**Title: Care and Management of Central Lines**

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Department(s): Medical/Surgical Unit, Intensive Care Unit, Emergency Department, Surgery, Infusion Therapy, Oncology

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**Purpose:** Establish procedures for nursing staff to implement related to proper care and management of central lines.

**Summary:** A central venous access device (CVAD) provides direct access into the body for fluids and various medications and provides a place to quickly and easily draw blood samples. Because of the prevalence of CVAD use, and nature of the placement, they pose a risk for patient infection development. The breach in skin that is required to place the catheter creates a susceptible point of entry for bacteria and other pathogens. It is critically important for healthcare professionals to ensure aseptic technique is strictly followed when dressing, accessing, and caring for a patient's catheter or CVAD to prevent complications.

**Definitions:**

- Biopatch - a sponge impregnated with chlorhexidine gluconate placed at entry site of central line
- Central line/CVAD (central venous access device) - a thin, flexible tube inserted into a vein with the tip placed in the superior vena cava to administer fluids, medications, or blood products
- CVAD dressing kit - a kit containing specific supplies (sterile gloves, mask, chlorhexidine prep stick, transparent dressing, sterile gauze, sterile drape) for a CVAD dressing change
- Midline - a thin catheter (20-25 cm length) inserted into the antecubital area with the tip ending near the axillary vein for administration of fluids and medications (Prasanna et al., 2021)
- PICC (peripherally inserted central catheter) - a thin tube inserted through a large arm vein towards the superior vena cava for the administration of fluids and medications
- Port - a surgically implanted catheter with the tip placed just outside the heart that is inserted underneath the skin in the chest or upper arm for administration of fluids or medications

Unless otherwise noted, all definitions came from the American College of Surgeons. (American College of Surgeons, n.d.)

**Goals and Objectives:**

**Title: Care and Management of Central Lines**

The goals and objectives of this process interrelate to the hospital's goals and objectives as follows:

1. Ensure patient safety before, during, and after central line management. (*Quality*)
2. Each person practicing any care related to open central lines is properly trained, licensed, and competent in the skill. (*Quality, Ensuring Our Future*)
3. Ensure the patient has an adequate understanding of personal central line care and procedure techniques. (*Providing the Exceptional Experience*)

**Equipment and Suitable Environment Needed:**

- Soap or hand sanitizer
- Gloves
- Face mask
- Catheter lumen and needleless connector
- Antiseptic cleaning solutions
- Clamps
- Antibiotics and fluid bags
- Dressing change kit
- Securement device
- Flushing syringes
- IV pump
- Biopatch

(American College of Surgeons, n.d.)

**Procedure:**

Overview	Details
Step 1 Assessment	<p>Assessments of the CVAD should be completed daily, or as indicated by the primary health care provider</p> <ol style="list-style-type: none"> <li>1. An assessment should include:               <ol style="list-style-type: none"> <li>a. The cannula site                   <ol style="list-style-type: none"> <li>i. compare the current external length of the catheter with the baseline measurement documented on the initial insertion of the cannula</li> </ol> </li> <li>b. The integrity of the patient's skin; the type of dressing</li> <li>c. Assessment for signs of complications or infection                   <ol style="list-style-type: none"> <li>i. pain, tenderness, firmness, blanching, moisture, edema, oozing, or phlebitis</li> </ol> </li> <li>d. Necessity for the device                   <ol style="list-style-type: none"> <li>i. ensure that the CVAD is still required based on patient's medical condition and treatment plan</li> </ol> </li> <li>e. Documentation                   <ol style="list-style-type: none"> <li>i. the external or exposed length of the CVC or PICC line to monitor migration</li> </ol> </li> </ol> </li> </ol>

**Title: Care and Management of Central Lines**

	<ol style="list-style-type: none"> <li>2. Hand hygiene must be performed prior to any CVAD assessment or procedure.</li> <li>3. An aseptic technique should be used for any CVAD procedure.</li> <li>4. A CVAD should be removed as soon as it is deemed no longer medically necessary.</li> </ol> <p>(Weston, 2019)</p>
<p>Step 2 Dressing change (Use for midline, PICC, and central lines)</p>	<ol style="list-style-type: none"> <li>1. Gather the necessary equipment and supplies.             <ol style="list-style-type: none"> <li>a. CVAD sterile dressing kit, antimicrobial patch (bio patch), alcohol wipes, skin protectant, and steri-strips (if indicated).</li> </ol> </li> <li>2. Perform hand hygiene.</li> <li>3. Position the patient in a comfortable position, with his or her head turned away from the insertion site. If the patient has a PICC or midline device, extend his or her arm with the line.</li> <li>4. Prepare a transparent, semipermeable dressing.</li> <li>5. Perform hand hygiene.</li> <li>6. Apply a mask and clean gloves.</li> <li>7. Remove the old dressing by lifting in the direction of the catheter insertion. Discard the old dressing in the appropriate biohazard container. (See Biohazard Waste Policy)</li> <li>8. Remove the catheter stabilization device, if one was used.</li> <li>9. Inspect the catheter, the insertion site, and the surrounding skin for redness, skin breakdown, and drainage. Measure the patient's mid-arm circumference above the insertion site to assess for thrombosis if the patient has a PICC line.</li> <li>10. Remove and discard clean gloves, and perform hand hygiene.</li> <li>11. Open the CVAD dressing kit using sterile technique. Open steri-strips if indicated and other sterile CVAD dressing supplies and place them on the sterile field.</li> <li>12. Don sterile gloves.</li> <li>13. Clean insertion site using chlorhexidine 0.5% (Hicks &amp; Lopez, 2020) in a back and forth motion ensuring all areas covered by dressing are cleaned. Allow to dry for 60 seconds.</li> <li>14. Apply a skin protectant to the entire area unless contraindicated, and allow to dry completely.</li> <li>15. Apply a chlorhexidine-impregnated disk or dressing for short-term CVADs.</li> <li>16. Apply a new catheter stabilization device or steri-strips according to the manufacturer's instructions if the catheter has not been sutured into place.</li> <li>17. Apply a sterile transparent semipermeable dressing over the insertion site.             <ol style="list-style-type: none"> <li>a. Place dressing beginning where the catheter exits the body. Smooth over skin.</li> </ol> </li> </ol>

**Title: Care and Management of Central Lines**

	<p>18. Remove gloves and perform hand hygiene.</p> <p>19. Apply a label to the dressing indicating the date and time the dressing was changed and initial.</p> <p style="padding-left: 40px;">a. Transparent dressings should be changed every 5-7 days or sooner if dressing becomes soiled, damp, or loosened (Gorski, 2017).</p> <p>20. Dispose of all soiled supplies and used equipment.</p> <p><b>Precautions:</b></p> <ul style="list-style-type: none"> <li>● Chlorhexidine hypersensitivity - use tincture of iodine, an iodophor, or 70% alcohol (Ling et al., 2016)</li> </ul> <p>Unless otherwise noted, all information came from the American College of Surgeons.</p> <p>(American College of Surgeons, n.d.)</p>
<p style="text-align: center;">Step 3 Administering medications and fluids</p>	<ol style="list-style-type: none"> <li>1. Clean and prepare the work area.</li> <li>2. Gather supplies.</li> <li>3. Obtain medication from the medication cart.</li> <li>4. Prepare medication.</li> <li>5. Check labels and ensure the 6 rights of medication administration.</li> <li>6. Prime the IV tubing.</li> <li>7. Clamp the tubing after priming is complete.</li> <li>8. Determine correct port for medication administration.</li> <li>9. Wash hands and don clean gloves.</li> <li>10. Remove alcohol-infused cap (per alcohol-infused cap policy).</li> <li>11. Flush central line using aseptic technique.</li> <li>12. Flush fluids slowly, assessing for patency of the line; the amount of fluid flushed is typically 3 mL of sodium chloride for infants and 10 mL of sodium chloride for adults.</li> <li>13. Attach the primed tubing to the needleless connector.</li> <li>14. Ensure the use of alcohol-infused caps on all line ports (see internal policy).</li> <li>15. Set the rate using a pump or flow meter; review MAR and physician orders to ensure the correct amount of fluid and amount of time administered over.</li> <li>16. Connect the primed tubing to the correct central line port.</li> <li>17. Press start on the pump and unclamp the tubing.</li> <li>18. Watch the drip chamber to make sure the fluid or medication is infusing.</li> <li>19. Remove and discard gloves and wash hands.</li> </ol> <p>(American College of Surgeons, n.d.)</p>

**Title: Care and Management of Central Lines**

<p>Step 4 Drawing blood</p>	<ol style="list-style-type: none"> <li>1. Adhere to standard aseptic technique.</li> <li>2. Explain the procedure and purpose to the patient/caregiver.</li> <li>3. Assemble the equipment on a clean area close to the patient.</li> <li>4. Place the patient in a comfortable position, while exposing the site to be assessed.</li> <li>5. Draw up normal saline and flushes, as ordered.</li> <li>6. Open protective coverings of the indicated injection port.</li> <li>7. Insert needle or needleless adapter into the center of the new injection port.</li> <li>8. Slowly inject normal saline flush to fill the injection port and then remove the needle or needleless adaptor.</li> <li>9. Clean connection of injection port and catheter with alcohol, using friction. Allow to air dry. Maintain sterility by avoiding contact between the port and other surfaces.</li> <li>10. Attach a 10 mL syringe filled with normal saline to the line. Unclamp the line and flush with normal saline. If any infusion is taking place, stop the infusion and flush with 20 mL normal saline.</li> <li>11. Pull back plunger and withdraw 5 mL of blood for discard. Reclamp the line.</li> <li>12. Discard the blood-filled syringe in a puncture-proof container.</li> <li>13. Attach collecting syringe, unclamp and withdraw the amount of blood necessary for lab tests and reclamp.</li> <li>14. Attach syringe with 10 mL of normal saline to line, unclamp and flush line to remove all blood from the line. Reclamp the line.</li> <li>15. General order of collecting samples: <ol style="list-style-type: none"> <li>a. First: Blood culture tubes or vials.</li> <li>b. Second: Coagulation tube (blue-top tubes).</li> <li>c. Third: Serum tube with or without clot activator or gel (red, gold or speckled-top tubes).</li> <li>d. Fourth: Heparin tubes (green-top tubes).</li> <li>e. Fifth: EDTA tubes (lavender-top tubes).</li> <li>f. Sixth: Oxalate/fluoride tubes (gray-top tubes).</li> </ol> </li> <li>16. If continuous infusion, attach a new pre-filled injection port, connect infusion with a needle or needleless adaptor, and start infusion.</li> <li>17. If the central line is used for intermittent injections, attach a pre-filled injection port. Insert a needle or needleless adaptor from a heparin syringe. Unclamp catheter and heparinize as ordered. Before the syringe is completely empty, clamp the line and apply pressure on the plunger while withdrawing the syringe and needle or needleless adaptor.</li> <li>18. Discard soiled supplies in appropriate containers.</li> </ol> <p>(Dolton, 2015)</p>
Step 5	<b>Access</b>

**Title: Care and Management of Central Lines**

<p>Accessing and de-accessing a port</p>	<ol style="list-style-type: none"> <li>1. Assess the location of port and septum to be accessed, note any redness, edema, pain or drainage and report any of these to the MD.</li> <li>2. Explain procedure to the patient.</li> <li>3. Assess appropriate Huber (non-coring) needle size based on the location of port septum and patient body type (patient may be aware of their usual needle gauge and length). Never use any other needle to access an implanted port, coring of the septum can occur causing damage. Ideally, the 90-degree turn of the Huber should rest as close to the skin as possible. (A gap greater than 1/4 inch indicates a shorter needle should be utilized for future accessing).</li> <li>4. Gather supplies.</li> <li>5. Wash hands thoroughly and palpate infusion port with clean gloves on.</li> <li>6. Apply mask.</li> <li>7. Open sterile gloves.</li> <li>8. Utilize inside of sterile glove wrapper as a sterile field.</li> <li>9. Drop cleansing stick provided in kit, Tegaderm dressing, needleless valve, skin prep, one sterile 10-cc syringe, one sterile Huber needle of appropriate size onto the sterile field, and one clave cap.</li> <li>10. Remove clean gloves.</li> <li>11. Don sterile gloves.</li> <li>12. Remove cap on end of sterile Huber needle connection tubing</li> <li>13. With non-dominant hand, hold sterile Huber needle connection tubing in preparation for priming. With the dominant hand, attach clave cap to tubing then attach a prefilled syringe to clave cap and prime Huber needle.</li> <li>14. With the non-dominant hand, lay primed Huber needle and tubing on the sterile field.</li> <li>15. Cleanse skin over port with a cleansing stick, using a scrubbing motion while cleaning in concentric circles.</li> <li>16. Allow skin to dry for 60 seconds.</li> <li>17. Grasp edge of port with non-dominant hand to stabilize the port.</li> <li>18. Insert the Huber needle into the center of the port septum going through the skin at a 90-degree angle. Apply steady pressure until the needle touches the base of the port reservoir.</li> <li>19. Aspirate to check for a blood return.</li> <li>20. Apply skin prep.</li> <li>21. Apply Tegaderm dressing.</li> </ol> <p>(Gorski et al., 2016)</p> <p><b>De-access</b></p> <ol style="list-style-type: none"> <li>1. Explain procedure to the patient.</li> <li>2. Gather supplies.</li> <li>3. Wash hands thoroughly.</li> </ol>
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**Title: Care and Management of Central Lines**

	<ol style="list-style-type: none"> <li>4. Apply mask.</li> <li>5. Open a sterile gauze 2x2 pad or a sterile band-aid.</li> <li>6. Don clean gloves.</li> <li>7. Flush port catheter with 10 mL normal saline.</li> <li>8. Heparin lock port catheter with the appropriate amount of heparin per order.</li> <li>9. Remove dressing.</li> <li>10. Use non-dominant hand to stabilize the port.</li> <li>11. Using dominant hand, gently remove the Huber needle using a safety needle device per the manufacturer's guidelines.</li> <li>12. Discard Huber needle in a sharps container.</li> <li>13. Cover site with dry sterile gauze dressing or bandaid.</li> <li>14. Document the procedure and patient tolerance in the EMR</li> </ol> <p>(Delengowski, 2017)</p>
Step 6 Monitoring and Measuring	<ol style="list-style-type: none"> <li>1. Chart audit each period to assess adherence to central line procedures and dressings changes every 7 days and identify areas of improvement.</li> <li>2. Performance audit to assess accurate completion of CVAD care procedure. <ol style="list-style-type: none"> <li>a. Assessments and dressing changes</li> <li>b. Accessing/de-accessing CVAD ports <ol style="list-style-type: none"> <li>i. Blood draws</li> <li>ii. Medication administration</li> </ol> </li> </ol> </li> <li>3. Five nurses each month will be randomly selected from the medical/surgical and oncology units to be observed on one of the aforementioned procedures.</li> <li>4. Department comparisons of adherence to central line management procedures to determine areas of improvement.</li> </ol>

**Internal References:**

- Health care provider orders
- Informed patient consent
- Electronic Health Record
- Internal Biohazard Waste Policy
- Alcohol Infused Caps

**External References:**

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### **Requirements:**

- “Infectious wastes must be handled and disposed of in accordance with the most current guidelines and recommendations of the Centers for Disease Control” (IDAPA 16, 2020, p. 7).
- Regarding blood specimen collection: “The laboratory must establish and follow written policies and procedures that ensure positive identification and optimum integrity of a patient's specimen from the time of collection or receipt of the specimen through completion of testing and reporting of results” (Electronic Code of Federal Regulations, Section 493.1232).

### **Quality Assurance and Sustainability:**

Policy and procedural training will be completed upon hire for new registered nurses in the aforementioned departments. This training will be taught by a hospital educator who is trained in this specific procedure. The training will contain evidence-based practice on central line dressing changes, medication administration, blood draw, and accessing and de-accessing a port. Upon completion of the training, staff will be assessed for understanding by the demonstration of this care. Adequate training will ensure that all staff members can provide quality central line care.

A yearly competency training will be required for all employees to reinforce what was taught at the initial training. This training will include a performance audit to assess the staff's competency concerning this policy. Staff interventions will be evaluated and reviewed annually

to ensure individual policy adherence. By continually keeping the staff educated and well-practiced, quality care will be provided to patients.

Within two weeks after each yearly competency training and performance audit, department comparisons will be completed to assess differences or similarities in performance accuracy and training attendance. These comparisons will provide a basis for understanding weaknesses in compliance rate and general management of central lines based on the skills listed in the procedure section of this policy. The results of the comparisons can be used to determine specific areas of weakness and hospital management can determine the course of action to improve results related to these specific areas.

**Disclaimer:**

This is a resource to assist staff and not all circumstances may apply. The policy does not guarantee safety. Clinical situations may warrant adaptation. Extenuating circumstances may apply.