CENTRAL VENOUS CATHETER & MIDLINE PERIPHERAL VENOUS CATHETER

PURPOSE: To outline the management of the patient with central venous and midline peripheral venous catheters.

SUPPORTIVE DATA:

Central Venous Catheters (CVC) are used for long, medium or short-term infusion therapy. Long term catheters may remain in place for years. Implantable ports (e.g., Portacath™), tunneled catheters (e.g., Hickman™, Broviac™, Groshong™), and peripherally inserted central catheters (PICC) (e.g., Groshong™), are examples of long-term catheters. Triple/multi-lumen, introducer (e.g., Cordis™ or Arrow™) and temporary dialysis catheters are short-term catheters. Complications of CVCs include air embolism, deep venous thrombosis, pneumothorax and sepsis.

Midline catheters are peripheral lines but are managed as CVCs. These catheters are clearly labeled as "midline". The following may not be administered via a midline catheter:

- Vesicant therapy
- Central Total Parenteral Nutrition
- Hyperosmolar solutions greater than 900 mOsm/L
- Infusions requiring central venous access (e.g. chemotherapy, 3% saline)

Introducers are restricted to the ICU and Emergency Department.

Power injectors may not be used with any PICC lines except for PowerPICC™

The use of a "Vacutainer™" on medium and long-term catheters is prohibited. The pressure created by the Vacutainer™ may change the position of the catheter or damage the wall of the vein.

Placement of all midline peripheral venous catheters and CVCs, requires hand hygiene and the use of all five sterile barrier precautions: sterile gloves, sterile gown, a bouffant cap, a mask and a sterile drape.

Removal of all central venous catheters and midline catheters requires a provider's order. They are removed by Physicians, Physician's Assistants and Nurse Practitioners (as approved) as follows:

Type of Catheter	Who May Remove
Short-term CVCs **in adults** (except for hemodialysis catheters)	ICU Registered Nurses whose competency has been validated annually. (See CVC Care, Maintenance, Troubleshooting, and Removal Procedure)
PICCs	PICC certified nurses
Midline Catheters	PICC certified nurses and home health nurses

Nurses may access and change the valve of the "pigtail" lumen of the triple lumen dialysis catheter, but only dialysis nurses may access and change valves of the dialysis lumens. Nurses may change dialysis catheter dressings.

All central line (including dialysis catheters) and midline catheter dressings are to be changed according to the Central Venous Catheter Care, Maintenance, Troubleshooting and Removal Procedure.

ASSESSMENT:

1. Assess for allergies prior to insertion of the central venous catheter.
   - Heparin should not be used if patient is allergic
2. Assess the following after insertion, upon admission, transfer, with each dressing change, and a minimum of every 4 hours:
   - Catheter site
     - Redness, tenderness, swelling, drainage
     - Signs of dislodgement (e.g., cuff protrusion, increased length of exposed line)
   - Dressing should be dry, intact and occlusive
   - Biopatch™ (Except NICU)
   - All ports are capped with alcohol port protector (inpatients only), and clamped if applicable, when not in use (except introducers).
     EXCEPTION: DO NOT use alcohol port protector cap on lines that have closed system transfer devices attached
   - IV connections must be luer locked
   - Positive pressure reflux valves must be in place
3. Assess for signs/symptoms of complications (e.g., systemic infection, pneumothorax, air embolism every 4 hours):
   - Change in vital signs from baseline
     - Increase/decrease temperature, HR, RR
   - Deterioration in LOC
   - Anxiety
   - Shortness of breath
   - Chest pain
   - Subcutaneous emphysema
   - Swelling of extremity
   - Hematoma
4. Assess arm post-PICC or midline catheter insertion for swelling.
   - If swelling is present elevate extremity and notify physician or PICC certified nurse for evaluation/ possible catheter removal.
5. Assess lab results as drawn.

POST-CATHETER INSERTION:

6. Ensure catheter tip position has been confirmed by provider prior to administration of intravenous fluids/medications/blood products/ TPN.
   - Xray is used to confirm post insertion position for central lines placement.
   - Exception: Introducers require a continuous infusion of IV solution at a minimum rate of 10 mL/hour to prevent clotting at all times. **Do not cap introducer**.

CARE/ MAINTENANCE GUIDELINES

7. See Central Venous Catheter & Midline Peripheral Venous Catheter Care table for catheter flushing, dressing, positive pressure reflux valve change, alcohol port protector cap, Statlock™ change, and blood withdrawal.
8. Scrub port vigorously with Chloraprep™ (scrub for 15-30 seconds, allow to dry for 15 seconds):
   - When accessing (e.g. for medication administration, blood draws, tubing changes, and flushes) if the port has not had alcohol cap protector on for at least 1 minute or if unable to use a cap
   - When visibly soiled
   - Between consecutive medication administration
9. Use "push-pause" technique when flushing ports.
   If resistance is felt, troubleshoot the line (e.g. attempt to draw back blood, check for kinking or clamps). If resistance is not resolved do NOT use and notify the provider.

SAFETY:

10. Use only positive pressure reflux valves on central lines and midline catheters.
11. Follow these safety measures for PICC LINES and midline catheters:
    - Do not obtain BP measurements or withdraw blood from extremity with catheter
    - Transfuse blood using 20 gauge/3 French or larger
    - Measure length of PICC and midline catheter from insertion site to the hub with each dressing change and compare to post insertion length (PICCs and midline catheters are not usually sutured so they may migrate). If length is inconsistent with post insertion length, notify PICC Team.
    - Measure length of PICC and midline catheter and save catheter for physician or PICC nurse if it becomes dislodged
12. Follow these safety measures with **ALL CENTRAL VENOUS CATHETERS and MIDLINE**

CATHETERS:

- Prevent dislodgement of line:
  - May apply restraints/immobilizers when behavior/developmental age prevents compliance
  - May apply an undershirt fashioned with tubular elastic dressing for chest wall catheters (except NICU)
  - Secure catheter loop under dressing (or to the dressing of the pediatric patient)
- Ensure maximum occlusion pressure is set at 300 mmHg on volumetric pump
- For infusion pumps that measure resistance, monitor the trend of resistance
  - If resistance is increasing, assess for catheter patency
- Change all valves to needleless positive pressure reflux valves
- Replace temporary/vented caps with a non-vented cap/positive pressure valve.
- Do not rub central catheters directly with alcohol or acetone. Both solutions promote dryness and cracking of catheters
- Do not apply antimicrobial ointments at catheter insertion site unless ordered by the physician.

POST REMOVAL

13. Inspect the catheter after removal to ensure the tip is intact (if catheter is removed by the nurse).
14. Apply direct, manual pressure over site for 5-10 minutes after central line removal/ dislodgement. If site continues to bleed, maintain pressure until bleeding stops.
15. Cover site with an occlusive dressing.
16. Assess for bleeding every 15 minutes x 4, then every 30 minutes x 2, then every hour x 2 post catheter removal. (PICC and midline catheters, every 15 minutes x2).

REPORTABLE CONDITIONS

17. Notify physician/PICC team immediately for:
    - Leakage, redness, swelling, tenderness at insertion site
    - Continuous bleeding at insertion site
    - Increased circumference or swelling of extremity
    - Loose or not intact sutures, or cuff exposure
    - Signs/Symptoms of sepsis, pneumothorax, or air embolism
    - Exposed length different from exposed length documented upon insertion (PICC and midline catheter only)
    - Catheter occlusion or dislodgement
    - Catheter tip not intact upon removal of catheter

ADDITIONAL STANDARDS:

18. Refer to the following as indicated:
    - Intravenous Therapy
    - Blood/Blood Products
    - Restraints

PATIENT/ FAMILY TEACHING

19. Instruct on the following:
    - Purpose for CVC or midline catheter
    - Proper flushing if patient to be discharged with CVC or midline catheter
    - Maintenance if patient is to be discharged with CVC or midline catheter
    - S/S infection
    - Hazards of holding patient with umbilical line (NICU only)
    - Importance of notifying RN for:
      - Catheter dislodgement, leakage
      - Dressing soiled/loose
      - Respiratory distress
      - Need for dressing change

DOCUMENTATION:

20. Document in accordance with documentation standards.
21. Document the exposed length of PICC or midline catheter upon insertion in Electronic Health Record (EHR)
    - If inserted during current hospital stay, documented by PICC nurse
    - If patient is admitted with PICC or midline, documented by unit nurse when dressing change is done upon admission. (After post-insertion confirmation Xray is done for PICC placement)
22. Document length of exposed PICC or midline catheter in centimeters with each dressing change.
23. Document the following when catheter is removed:
    - Removal of catheter
    - The name of the person who removes the catheter

- That tip was visually inspected and was intact (if removed by nurse)
- Application of digital pressure and length of time pressure was held (if removed by nurse)
- Application of occlusive dressing

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Consult: LAC+USC Department of Epidemiology