Central Venous Access Device Overview

Definition of Central Venous Access:	
Tunneled:	
Non-tunneled:	
Power Injectable:	
Open Ended:	
Valved or Closed Ended:	
Patent:	
Partial Occlusion:	
Full Occlusion:	
The most important action to prevent any infection:	

Infusion Therapy Standards of Practice, 2016. *Journal of Infusion Nursing, Supplement.* 39(15). Infusion Nurses Society, Wolters Kluwer. Used with permission of Infusion Nurses Society (INS). Complete publication free to INS members and available for purchase for non-members at www.ins1.org.

- The following excerpts are taken from the above source regarding central venous access devices (CVAD). It is not meant to replace the complete Standards of Practice.

Standard 5—Competency Assessment and Validation: Identify procedures/skills/tasks for ongoing competency validation by using clinical outcomes data. Use a standardized approach to competency assessment and validation.

Standard 6—Quality Improvement: Important CVAD clinical quality indicators: Central Line Associated Blood Stream Infection (CLABSI) rates, reasons for removal, number of attempts for insertion, confirmation of distal tip location.

Standard 10—Documentation standards:

- **Initial catheter insertion** (pertains to both central line and peripheral catheter placement): Patient/family education and their response, site prep used, safety precautions taken, type/length/gauge of device, lot number if applicable, date/time of insertion, number of attempts, functionality of device, local anesthetic if used, assistive technology (ie ultrasound).
    - Confirmation of distal tip location prior to use for all CVAD, any evaluation of dysfunction, site care performed, type of stabilization.
        - For PICC lines (and midlines): External catheter length and length of catheter inserted, arm circumference (10 cm above antecubital fossa) before insertion.
- **Ongoing line care**: Daily assessment of the need for the CVAD, condition of dressing, type of securement, s/s of complication, type of therapy delivered, condition of site prior to and after therapy, results of VAD functionality test (patency, resistance with flushing, presence of blood

return), any actions taken to resolve complication, and subsequent status, patient response to therapies. If multi-lumen catheter or multiple lines in use, documentation should clearly indicate what solutions and medications are infused through each lumen and/or device.

- **Removal**: condition of site, nursing interventions during removal, condition of catheter and length, reason for removal, site care including type of dressing post removal, any ordered testing such as catheter tip culture done, any complications related to removal and actions taken.

Standard 23—Distal Tip Location for Central Venous Access (CVAD): Ascertain prior to use and/or when clinical assessment suggests tip malposition. For adults and children, the CVAD tip location with greatest safety profile is the cavo-atrial junction.

Standard 28—Implanted Port Access: Adhere to aseptic technique during access, including sterile gloves and mask; >0.5% chlorhexidine in alcohol solution preferred. Use a sterile dressing while port is accessed. If used, change gauze at least every 2 days. Use 10cc syringe (or one that generates low pressure) to flush. Verify the port is power-injectable by two sources before using for power injection; use power injection compatible non-coring needle. No recommendation on the frequency of non-coring needle change when the port is used for continuous infusions. When possible, orient the bevel of the non-coring needle in the opposite direction of the outflow channel of the implanted port to increase clearance of reservoir.

Standard 34—Needleless connectors: Primary purpose of the needless connector is to protect healthcare workers from needle sticks. Access only with a sterile device (ie sterile syringe). Avoid using when rapid flow rates are needed. No consensus on design or type of connector. Consider standardizing the type of connector throughout the facility. Vigorous mechanical scrub (5-60 seconds—depends on the device) and allow to dry. Use vigorous mechanical scrubbing method even if catheter has antimicrobial properties. Change connectors no more frequently than every 96 hours; change them with primary set and when malfunction is suspected (changing more frequently adds no benefit, and may increase CLABSI risk). **Disinfection caps** have been shown to reduce intraluminal microbial contamination. Once removed, disinfection caps should never be replaced. Once cap is removed to deliver medications, if multiple accesses to the line are needed for different medications, consider vigorous scrub between each medication.

Standard 35—Filtration: Parenteral Nutrition solutions are filtered (0.2 micron if no lipids, 1.2 micron if 3:1 solution). Use filter needle for medications drawn from ampule. Consider using filters for all critically ill patients as filtration has been associated with a reduction in complications in pediatric critical care.

Standard 37—Stabilization: Securement device cannot interfere with assessment; consider engineered stabilization device (adhesive based). Avoid tape or sutures as securement. Do not rely on dressings to stabilize. Do not use rolled bandage (with or without elastic properties) to secure the catheter.

Standard 40—Flushing and Locking: CVADs are flushed and aspirated for blood return prior to each infusion to assess catheter function and prevent complications. Flush after each infusion to clear the medication from the lumen. Use single dose systems for flush. Do not use IV bags to obtain flush solution.

- **Flushing Technique:** Use 10 ml syringe (or one designed to generate low pressures). During flush, slowly aspirate for blood; aspirate should be consistency of whole blood. DO NOT forcibly flush any CVAD. If resistance is met and/or no blood return is noted, take corrective steps. Leave 0.5-1 ml flush solution in syringe when done to prevent bounce back of blood into catheter. Consider using pulsatile flow during flushing. Recognize risk of contamination with each manipulation.

- **Safety with IV push medications**: Once patency confirmed, use a syringe appropriately sized for the medication dose—do not transfer to a larger syringe. Do not use pre-filled saline syringes for dilution of meds.
- **Flush Solution**: CVADs can be locked with either 0.9% sodium chloride or heparin (10 units/ml) according to manufacturer instructions for that device (equivalent outcomes).

Standard 41—Assessment, Site Care, Dressing change: (TSM = transparent semipermeable membrane)

- **Site care** is to be done at established intervals and immediately if the dressing integrity is impaired. Sterile dressing is applied/maintained on all peripheral, nontunneled, PICCs, accessed ports, and tunneled cuffed VAD (until well healed). Use aseptic technique during site care/dressing change.
- **Frequency of site assessment**: In all groups, assess more often if vesicant.
    - CVAD and midlines—assess at least daily
    - Short PIV—minimally q 4 hour, every 1-2 hours if patient is critically ill, sedated, or has cognitive deficit; hourly for neonate/peds.
- Measure external CVAD length (from hub to insertion site) and compare to insertion.
- Measure arm circumference when clinically indicated—10 cm above arm circumference. A 3 cm increase and edema are associated with upper arm DVT.
- Skin antisepsis with site care: > 0.5% chlorhexidine in alcohol solution preferred, can use alcohol, tincture of iodine. Allow to fully dry.
- Frequency—Change TSM q 5-7 days, gauze dressing (includes gauze under TSM) at least every 2 days. Choose gauze if drainage is present. Change external stabilization device per manufacturer.
    - Use **chlorhexidine-impregnated** dressings over CVADs to reduce infection risk when the extra-luminal route is the primary source of infection (first 14 days). Even with low baseline CLABSI rates, further reduction has been seen. The efficacy of these dressings beyond 14 days (when intraluminal sources of infection are the primary source) has not been shown. Consider CHG bathing daily. May use hemostatic agent to stop bleeding t site.
    - Be aware of patients at risk for medical adhesive related skin injury (MARSI).

Standard 42—Administration (tubing) set change: See Below. Should be changed whenever the peripheral site is changed or new central line is placed and at intervals below.

- Primary/secondary continuous administration sets--no more frequently than every 96 hours
- Avoid disconnecting primary continuous administration sets from VAD (central and peripheral)
- Intermittent sets (any set disconnected, capped, reconnected later)--every 24 hours
- Secondary set that is detached from primary and capped off--every 24 hours
- If any tubing is disconnected, use a sterile cap—do not loop tip back to Y site.
- TPN tubing with bag--every 24 hours; Lipid administration sets--every 12 hours

Standard 43—Blood Draw from CVAD: Avoid using a CVAD for obtaining blood sampling for culturing as these samples are more likely to produce false-positive results. Use of a CVAD for this purpose should be limited to the absence of peripheral venipuncture sites or when there is a need to confirm catheter related blood stream infection (CRBSI). Do not routinely use CVADs infusing parenteral nutrition for blood sampling as this is a significant risk for CRBSI.

Standard 44—Removal of CVAD in suspected CRBSI: Decision to remove or salvage this catheter should be based on careful consideration of patient condition, need of catheter, culture results, treatment response.