

## MEDICINE PROGRAM STANDARDS

**CATEGORY:** System Level Clinical

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**TITLE:** **CENTRAL VENOUS ACCESS DEVICE (CVAD) -  
MAINTENANCE**

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<b>Approval:</b> Melissa Bertrand, Clinical Policy and Procedures Committee  <i>Melissa Bertrand</i>	<b>Date: Nov 2, 2022</b>

### PURPOSE

To ensure the care and maintenance of central venous access devices (CVADs) following established best practice guidelines.

### STANDARDS

Tip Placement	<ul style="list-style-type: none"> <li>• Tip location of a CVAD is determined radiographically post insertion or when clinical signs and symptoms suggest tip malposition.</li> <li>• The recommended tip position with the greatest safety is the cavoatrial junction (CAJ). However, acceptable diagnostic imaging tip position landmarks may include the distal 1/3 of the superior vena cava (SVC) or upper right atrium (RA) just central to the CAJ.</li> <li>• On average, the catheter tip may move 3.2 cm upward depending on patient position (i.e. from supine to sitting position; adduction or abduction of arm).</li> <li>• Clinical assessment of the patient every shift to ensure the line has not migrated includes: reports of ear or neck pain on the side of placement or by asking the patient if he/she hears a swishing or gurgling sound, palpitations, arrhythmias or spontaneous backflow of blood into the catheter.</li> <li>• Advantages of using lines that are in an optimal position include: <ul style="list-style-type: none"> <li>○ Increased hemodilution of the infusates</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>○ Less trauma to the vessel wall, thus decreasing the incidence of catheter-related complications</li> <li>○ Increased cardiac pulsatility</li> <li>○ Limiting platelet aggregation</li> <li>• Risks of using lines that are in a sub-optimal position include: <ul style="list-style-type: none"> <li>○ Cardiac tamponade and arrhythmias</li> <li>○ Thrombosis and catheter-related sepsis</li> <li>○ Extravasation</li> </ul> </li> <li>• If the tip of the line is in a sub-optimal position and the physician opts to proceed with the use of the line, it is the physician's responsibility to: <ul style="list-style-type: none"> <li>○ Provide a written order to proceed with treatment</li> <li>○ Explain the risks involved to the patient</li> <li>○ Obtain consent</li> </ul> </li> </ul> <p>If optimal tip placement cannot be achieved, the line should be replaced or exchanged.</p>
Infusion	<ul style="list-style-type: none"> <li>• Administer all infusions via an infusion pump. A limited number of chemotherapy drugs are infused via gravity on a central line and must be performed by a certified chemotherapy-trained nurse who is to remain present throughout the infusion.</li> <li>• CVADs may be used for the infusion of medications, blood products, IV fluids, total parenteral nutrition (TPN) and chemotherapy.</li> <li>• Dialysis catheters are only accessed by Nephrology staff unless in an emergency situation or if specifically ordered by a nephrologist. Prior to accessing, ensure 5 mL is removed from the catheter and discarded. For care and maintenance of Nephrology hemodialysis catheters, please refer to Nephrology training documents on The Hub.</li> <li>• If infusing a solution through a percutaneous sheath introducer (Cordis), infuse at a minimum rate of <b>30 mL per hour</b>. If a solution is no longer required, obtain an order from the physician to discontinue the introducer.</li> <li>• <b>A percutaneous sheath introducer (Cordis) must always have a solution infusing through it until it is discontinued. It should never be saline locked.</b></li> <li>• All CVADs must have a free flowing blood return prior to infusions. If unable to aspirate blood, follow the procedure for catheter occlusion.</li> <li>• Monitor the infusion rate and site Q1H.</li> <li>• Change the IV infusion solution and assess the need for the CVAD Q24H.</li> </ul>
Maintenance	<p>A nurse certified in the management of CVADs should:</p> <ul style="list-style-type: none"> <li>• Refer to the insertion procedure orders in the patient chart to determine if the device is ready for use.</li> <li>• Upon insertion of a PICC and with every dressing change and PRN, note the exit mark and document on the Central Venous Catheters Maintenance Record. For Groshong catheters, measure and document the length of the catheter from the insertion site to the beginning of the hub.</li> </ul>
Needleless Connector	

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70% Alcohol and 2% CHG Swab



Luer Lock Connectors



- If line displacement is suspected, or if the line has migrated out 3 cm or more from the initial measurement, obtain an order for a chest x-ray to confirm tip placement.
- Access all CVADs through a needleless connector (do not access directly to the catheter hub).
- **Exception:** A 3-way stopcock may be used in place of a connector on a percutaneous sheath introducer (Cordis) in Critical Care areas. Prior to transfer out of Critical Care (to Surgical or Cardiology units only), a single lumen infusion catheter will be inserted by the physician through the introducer. During fluid resuscitation, the physician may choose to withhold the displacement connector in order to connect the fluid directly to the central line. Reconnect a needleless connector as soon as the patient has stabilized.
- Use clean technique when accessing a CVAD through a connector (or stopcock). It is highly recommended that a cleansing solution containing 70% alcohol and 2% Chlorhexidine Gluconate (CHG) be used, if available, to cleanse connections before accessing for flushing and/or infusion. Otherwise a solution of 70% alcohol may be used.
- A 15-30 second scrub of the connector and luer threads is required to ensure appropriate antimicrobial action. Connectors should be allowed to dry 15-30 secs before accessing.
- Use strict aseptic technique when changing connectors.
- Prior to changing a connector, ensure the catheter is clamped (if present).
- Have atraumatic clamps available on the unit.
- Luer lock connections are required on all connectors and tubing.
- **See Appendix A** for other maintenance guidelines.

## Flushing

- All CVADs are flushed and aspirated for a blood return prior to each infusion to assess catheter function and prevent complications. Flush 2-3 mL normal saline, aspirate gently (pull back 1 mL and pause for 1-2 seconds) for blood return, then flush the remaining normal saline to last 0.5 mL, then disconnect the syringe while injecting to the last 0.5 mL.
- Flush all CVADs with 20 mL normal saline after all medications, infusions and when changing connectors.
- For double lumen catheters, flush each lumen post intermittent infusions (medications or solutions), whether utilized or not.
- Do not flush with anything smaller than a 10 mL syringe.
- Do not flush against resistance.

## Lumens

- CVADs may be single or multiple lumens.
- For multi-lumen catheters, choose lumens by the size of lumen, flow rate and viscosity of solution.

• Function	Proximal	Middle	Distal
IV Fluid Administration	X	X	X
Medication Administration	X	X	X
Blood Administration			X
TPN		X	X
Rapid Fluid Administration			X

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	Colloid Fluid Administration			X
	Blood Sampling	X		X
	CVP Monitoring			X
	<ul style="list-style-type: none"> <li>For double lumen PICC catheters check size of lumen for decision on which lumen to use based on flow rate and viscosity of solution (for the most part lumen sizes will be equal in diameter)</li> </ul>			
Tubing Changes	<ul style="list-style-type: none"> <li>Follow Peripheral IV Therapy and Intermittent Device (Saline lock); Blood Product policy and procedure, TPN policy and procedure and specific IV monographs for recommended tubing changes.</li> </ul>			

## EDUCATION AND TRAINING

## References and Related Documents

Canadian Vascular Access Association (2019). *Canadian Vascular Access and Infusion Therapy Guidelines*. Pembroke, ON: Pappin Communications

Center for Disease Control (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections, August 9, 2002.

Infection Control Today. Choosing the Best Design for Intravenous Needleless Connectors to Prevent Bloodstream Infections. 2010.

Infusion Nurses Society. (January/February 2021). Infusion therapy standards of practice. *Journal of Infusion Nursing*. 44.

Oncology Nursing Society (ONS), Access Device Guidelines Recommendations for Nursing Practice and Education, Second Edition, ONS, Pittsburgh, 2004.

Registered Nurses' Association of Ontario (RNAO), Care and Maintenance to Reduce Vascular Access Complications, Nursing Best Practice Guideline, 2005.

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### APPENDIX

#### CVAD Maintenance Guidelines

**Flush all catheters with 20 mL 0.9% Normal Saline (NS) post blood withdrawal, blood infusion, TPN, and any viscous medications.**

**Note: Pediatric patients require administration of heparin 100units/mL when deaccessing CVADs. Please follow the unit specific protocol/individual patient passports provided by the tertiary centre.**

CVAD Type	Dressing Change	Cleansing Solution	Flush Solution	Blood Withdrawal Discard	Connector Change
<b>PICC</b>	Dressing change 24 hours post insertion, every 7 days and PRN. Gauze dressing change every 2 days and PRN.	2% Chlorhexidine with 70% Alcohol	20 mL NS weekly and post use	5 mL	Weekly
<b>Tunneled</b> (Hickman, Broviac)	Dressing change 24 hours post insertion, every 7 days and PRN. Gauze dressing change every 2 days and PRN.	2% Chlorhexidine with 70% Alcohol	20 mL NS weekly and post use	5 mL	Weekly
<b>Short Term Non-Tunneled</b> (jugular, femoral)	Dressing change 24 hours post insertion, every 7 days and PRN. Gauze dressing change every 2 days and PRN.	2% Chlorhexidine with 70% Alcohol	20 mL NS weekly and post use	5 mL	Change connector or stopcock weekly
<b>Percutaneous Sheath Introducer (Cordis)</b>	Dressing change 24 hours post insertion, every 7 days and PRN. Gauze dressing change every 2 days and PRN.	2% Chlorhexidine with 70% Alcohol	<b>Is never saline locked. An IV solution must be infusing at all times (minimum 30 cc/hour).</b>	5 mL	Change stopcock weekly
<b>Dialysis</b> (Accessed by dialysis staff only, in	Dressing change 24 hours post insertion, every	2% Chlorhexidine with 70% Alcohol	Withdraw 5 mL 4% Sodium Citrate prior to NS. 10 mL NS pre and post use.	5 mL	Post dialysis or weekly if catheter not being used

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emergency situations or if specifically ordered by Nephrology)	7 days and PRN. Gauze dressing change every 2 days and PRN.		Followed by 4% Sodium Citrate to volume of hemodialysis catheter post dialysis or weekly if catheter not being used.		
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<b>Implanted Port</b> (Port-a-Cath)	If accessed, every 7 days and PRN	2% Chlorhexidine with 70% Alcohol	Flush 20 mL NS monthly and post use.	5 mL	Weekly with non-coring needle set change
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