Purpose

Provides guidance on when and how to heparin lock central venous lines, including external short term and tunneled central venous catheters (CVC), apheresis central venous catheters, peripherally inserted central catheters (PICC) and implanted ports.

Policy Statements

All central venous lines, including external cuffed CVCs, external short term CVCs, PICCs and implanted ports, must be heparin locked when converting from a continuous infusion to a capped line, following blood sampling from a capped line, and routinely as per chart if not in use. If both lumens of a double-lumen line are capped, then both lumens must be heparin locked separately.

Type of CVL	Amount of Heparin Locking Solution	Frequency of Heparin Locking	Saline Flush (if required)
External Cuffed CVC <10 kgs	1.5 mL	2 times/week	3 mL
External Cuffed CVC > 10 kgs	2.5 mL	2 times/week	9 mL
External Short-term CVC	1.5 mL	Every 24 hours	3 mL
Implanted Port <10 kgs	2.5 mL	Every 28 days when not in use	9 mL
Implanted Port > 10 kgs	2.5 mL	Every 28 days when not in use	18 mL
PICC and cuffed PICC <10 kg	1.5 mL	Every 24 hours	3 mL
PICC and cuffed PICC >10 kg	1.5 mL	Every 24 hours	9 mL
Apheresis CVC Medcomp® and PowerLine® ** Oncology/ Hematology patients	2.5 mL	Every 24 hours	9 mL
Hemodialysis or CRRT CVC: Renal patients	See Hemodialysis CVC Citrate Locking Procedure		18 mL

For oncology/hematology patients with an apheresis Medcomp® or PowerLine® catheter,1:10 heparin solution is used **daily for maintaining catheter patency**

For renal patients outside of PICU with a hemodialysis CVC, a nephrologist's order is required prior to accessing the CVC for all nursing care provided on that hemodialysis CVC. The renal nurse on call can be contacted through hospital paging at local 2161 for clarification of orders and care required. See Hemodialysis CVC citrate locking procedure for further information. **All hemodialysis CVCs will be identified with a hemodialysis medication label.**

The accepted standard heparin concentration for locking central lines is 10 units of heparin per milliliter, unless otherwise ordered. A prescriber order is required if any solution other than 10 units per mL (1:10) heparin is to be instilled into the central line (e.g. heparin 1:100, 1:1000, sodium citrate, ethanol).

If any solution other than the standard heparin concentration of 10 units/mL is instilled a label must be placed on the line indicating drug, dosage, concentration, amount/volume instilled, the date the line was locked and initials of RN.

Site Applicability

Applicable in all BC Children's Hospital areas where patients with central venous lines are cared for.

Practice Level/Competencies

Heparin locking a CVL is considered a **foundational nursing skill** and is practiced once the nurse has:

- Attended the Vascular Access Workshop,
- Practiced the procedure in the lab setting,
- Performs at least 3 heparin lock flushes on patients under supervision of a CVL competent RN, and
- Has completed the CVL validation tool at the bedside with the appropriate clinical support person (i.e. clinical nurse educator, clinical resource nurse, CVL competent RN).

Definitions

Central Venous Line (CVL): Any venous catheter with the distal tip dwelling in central circulation. Best practice standards – distal tip dwelling in the lower one third of the superior vena cava (SVC) to the junction of the SVC and right atrium.

Aseptic no-touch technique (ANTT): a standardized technique that is used during clinical procedures to identify and prevent microbial contamination of aseptic key parts and key sites by ensuring that they are not touched either directly or indirectly. A 'key part' is the part of the equipment that must remain sterile and must only contact other key parts or key sites. Or it is the area on the patient such as a wound, or IV insertion site that must be protected from microorganisms. Aseptic key parts can only contact other aseptic key parts/sites. If it is necessary to touch key parts/sites, sterile gloves are to be worn to ensure asepsis is maintained.

Equipment

- Hospital grade surface disinfectant wipe (ie: Caviwipe®)
- 2% Chlorhexidine in 70% alcohol swabs (2 per lumen)
- 10 mL syringe pre-filled with 5 mL heparin 10 units/mL (1 per lumen)
- Swabcap™ (1 per lumen)
- Sterile dead-end cap (1 per lumen) if required
- 10 mL sterile pre-filled normal saline syringe (2 – 4 as required)

If also doing needless connector change:

- Mask
- 1 needleless connector (cap) per lumen – Neutron caps are used for all central venous lines

Neutron Cap

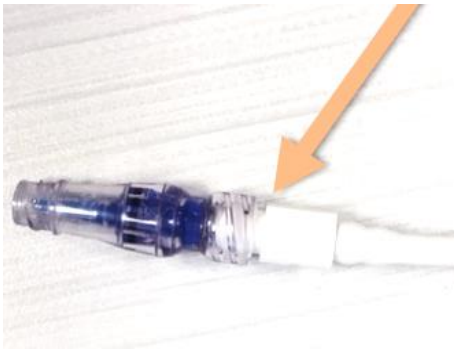
Procedure

Steps	*Rationale*
1. **ASSESS** the need for heparin locking.	*Refer to chart under policy statement.*
2. **ASSESS** the need for changing the one-piece needleless connectors (cap).	

3. **ASSEMBLE** equipment .	*Facilitates completion of task in a timely manner.*
4. **PERFORM** hand hygiene, full one minute hand wash for CVL care.	*Routine Infection Control Practices; reduces transmission of microorganisms*.
5. **CLEAN** work surface with hospital grade surface disinfectant wipe (e.g. CaviWipes®) and let dry for recommended contact time. Aseptically **PREPARE** equipment on clean work surface.	*Routine infection control practices; reduces transmission of microorganisms.*
6. **IDENTIFY** patient and **EXPLAIN** procedure.	*Ensures identification mechanism is present to prevent treatments, medications, and procedures to wrong patient.*
7. **ENSURE** there is a needleless connector attached to the end of the vascular access line. If converting from continuous infusion to a locked line; **CLAMP** the catheter, **TURN** pump off. **REMOVE** tubing and discard. If tubing is to be re-used within 24 hours, place sterile dead- end cap on end of tubing and place in sterile gauze package.	*IV lines will be disconnected with old needless connector. Stopping the infusion will ensure no freeflow of fluid onto patient, floor, workspace etc.*
8. **PERFORM** hand hygiene and **DON** non-sterile gloves and **MASK** if performing needless connector change as well.	*Routine Infection Control Practices; reduces transmission of microorganisms*. *May use Microsan. Protect self from exposure to patient's blood and harmful drugs/fluids.*
9. **ENSURE** catheter is **CLAMPED.** If bloodwork is also required from the CVL, this is the time to perform bloodwork. Please refer to the Blood Sampling from a Central Venous Line procedures for vacutainer or syringe method. Once line is clamped, **HEPARIN LOCK** as follows**:** **Heparin locking withOUT cap change** • **WRAP** first chlorhexidine/alcohol swab around once-piece needleless connector and SCRUB the top for 30 seconds. With second swab, **WIPE** up the line toward the patient including clamp. **DISCARD** all swabs and **ALLOW** to dry for 1 minute. 	*Aseptic technique for accessing vascular access reduces transmission of microorganisms.*

Heparin locking WITH cap change

- **WRAP** first chlorhexidine/alcohol swab around connection between connector and catheter hub and **SCRUB** for 30 seconds. With second swab, **WIPE** up the line toward the patient including clamp. **DISCARD** all swabs and **ALLOW** to dry for 1 minute.



- **REMOVE** existing cap and **DISCARD**.
- **QUICKLY ATTACH** new cap ensuring a secure luer lock connection.

10. If converting from an infusion to heparin lock, **FLUSH** catheter with normal saline using a turbulent flush. Then **REMOVE** saline syringe and discard. If just heparin locking, omit saline flush.

The turbulent (start-stop) technique is recommended in order to create turbulence during flushing to clear the internal catheter and has been shown to have a more effective cleansing action than passive injection.

Type of CVL	Saline Flush
Cuffed CVC < 10 kgs	3 mL
Cuffed CVC > 10 kgs	9 mL
Short-term CVC	3 mL
Implanted Port	18 mL (use 2 x 10 mL)
PICC and cuffed PICC < 10 kgs	3 mL
PICC and cuffed PICC > 10 kgs	9 mL
Hemodialysis/Apheresis	9 mL

11. **ATTACH** heparin solution syringe. **UNCLAMP** catheter, **FLUSH** catheter using turbulent flushing with heparin solution. CLAMP catheter/extension tubing. **REMOVE** syringe.

Saline flush clears the line of IVF, blood or any lingering medication in the line. Turbulent flushing key to reduce catheters from occlusions. Not require if just re-heparinizing line.

Type of CVL	Heparin
External Cuffed CVC <10 kgs	1.5 mL
External Cuffed CVC > 10 kgs	2.5 mL
External Short-term CVC	1.5 mL
Implanted Port <10 kgs	2.5 mL
Implanted Port > 10 kgs	2.5 mL
PICC and cuffed PICC <10 kg	1.5 mL
PICC and cuffed PICC >10 kg	1.5 mL
Apheresis CVC Medcomp® and PowerLine® ** Oncology/ Hematology patients	2.5 mL

12. **ATTACH** Swabcap™ to needleless connector. **NOTE:** If caregiver does not want to use Swabcap™ then leave needleless connector as is.	*Keeps end of needless connector clean. May be choking hazard for some patients so okay to omit.*
13. **REPEAT** procedure if heparin locking 2nd lumen.	
14. **DISCARD** used supplies and **PERFORM** hand hygiene.	*Routine Infection Control Practices.*

Documentation

DOCUMENT procedure on Central Line Flowsheet:

- Date and time
- Lumen heparin locked
- Volume and concentration of heparin if different from standard
- Cap change date/time if applicable
- Complications with flushing if applicable (i.e. difficulty flushing, occlusion)

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Version History

DATE	DOCUMENT NUMBER and TITLE	ACTION TAKEN
03-Oct-2018	CV.03.37 Heparin Locking Central Venous Lines (CVL)	Approved at: BCCH Best Practice Committee

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