

POLICY

Umbilical catheter insertion will occur in a procedure room whenever possible. Placement and removal of umbilical catheters is a physician responsibility.

Infants <29 weeks, admitted from LDR, will have umbilical catheters placed while inside the polyethylene bag (for thermoregulation).

Anterior-Posterior (AP) and lateral radiological evaluation to confirm line placement is required for initial and subsequent x-rays.

An umbilical venous catheter (UVC) tip malpositioned in the liver is to be withdrawn to “low position” below the liver and alternative access - peripheral or peripheral inserted central catheter (PICC) – should be considered as soon as possible.

Congenital Diaphragmatic Hernia (CDH) Infants:

All UVCs must be removed and replaced with an adequate central access (e.g. double lumen PICC) prior to congenital diaphragmatic hernia repair.

All malpositioned UVCs (e.g. suspected to lie within portal system) to be immediately withdrawn to a low position and must be replaced with adequate central access, prior to CDH repair (e.g. double lumen PICC)

Umbilical arterial catheter (UAC) placement must be reviewed with clinical team (neonatal, surgical and anesthesia) prior to CDH repair.

Applicability: Umbilical line insertion occurs in the Neonatal Intensive Care Unit.

PROCEDURE

Gather Equipment

1. Intravenous solutions for umbilical arterial line
 - 0.45% NaCl with heparin 1 unit/mL
2. Intravenous solutions for umbilical venous line (depending on the number of lumens available)
 - Primene C
 - D10W with/ without heparin 1 unit/mL; plain or with electrolytes
 - Other solutions including 0.9% NaCl, nutralipids and medication infusions
3. Umbilical line cart
4. Sterile gown (for physician)
5. Sterile gloves (for physician)
6. Caps (2)
7. Masks (2)
8. Umbilical arterial tray
9. Single lumen umbilical catheter for arterial line (3.5 Fr or 5.0 Fr) and single, double or triple lumen umbilical catheter for venous line (3.5 Fr or 5.0 Fr)
10. 3.0 silk suture
11. 10 mL pre-filled 0.9% NaCl syringe(s)
12. 3-way stopcock (for arterial line only)
13. Dexidin 2 antiseptic solution (2% chlorhexidin gluconate in 4% isopropyl alcohol solution)
14. Sterile 0.9%NaCl or sterile water (as required)
15. Hydrocolloid Duoderm dressing
16. Sterile 2x2 gauze(4)
17. Sterile Q tips (4)



18. Paper tape
19. Caviwipes (for cleaning work surface)
20. Blood collection tubes (e.g., blood culture bottle, gas syringe, EDTA tubes and the glucose meter)
21. X-ray and blood work requisitions
22. NICU Central Line Insertion Checklist and NICU Central Catheters Registry

Procedure	Notes
1. Bring the umbilical line cart to the bedside.	
2. Prepare infusions for lines.	- Physician will identify umbilical catheter size - See policy: Line infusion, central/peripheral (preparation of). - Umbilical arterial catheter is transduced. - Solutions for central line infusion may be prepared up to 4 hours in advance.
3. Restrain infant in supine position.	Use developmentally appropriate positioning. Legs should be together. Place a diaper roll under the knees. Restrain legs with cloth over infant's thighs secured by placing tape across the legs and the bed. More vigorous infant will require clove hitch restraints around the ankles but avoiding frog leg positioning. Arms should be slightly abducted and flexed when restrained.
4. Adjust radiant warmer light to give maximum visualization.	Ensure infant's eyes are covered.
5. Obtain baseline vital signs and perform focused physical assessment.	Document baseline findings as they will be used as a comparison for future assessments should procedural complications arise. Leave BP cuff in place.
6. Safely position the infant with careful attention to airway monitoring and maintenance. Ensure head and ETT are visible to the observer under drapes.	Head should be positioned midline, not 90 degrees to the side - may contribute to IVH.
7. Obtain the Arterial and Central Venous Catheter (CVC) Registry form with the Central Catheter(s) Insertion Checklist on the back.	
8. Follow NICU Central Line Insertion Checklist to ensure maximum barrier precautions are taken during central catheter insertions.	
9. Clean working surface with Caviwipes	To ensure sterility is not compromised and to decrease risk from central catheter-related bloodstream infection during the insertion of central catheters.
10. Wash hands for 1 minute	



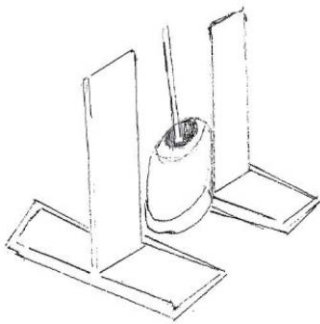
Procedure	Notes
11. Prepare sterile tray: - open umbilical arterial tray - open and add sterile disposable blade to tray - add equipment #9 to #16 to tray	- Umbilical catheterization is a sterile procedure. - Sterile disposable blade is taped on top of the umbilical tray (prepared by SPD).
12. Assist physician to gown and glove.	
13. Assist as required to: - Measure the depth of catheter insertion(s). - Hold umbilical cord with cord clamp attached up and away from abdomen using a Kelly clamp	If infant is in food grade polyethylene bag, make a small slit in the bag when physician is ready. Dry exposed surface and expose the cord area. After the insertion procedure, re-seal bag with tape.
14. Clean skin for all infants as follows: - Clean abdomen with sterile 2x2 gauze moistened with 0.9% NaCl - Moisten a q-tip with Dexidin 2 and gently clean the cord and base of umbilicus for 30 seconds - Allow the solution to dry for 60 seconds to maximize bacteriostatic actions - Remove the Dexidin 2 solution with 0.9% NaCl prior to the procedure	- Watch dependent skin areas for pooling of antiseptic solution. - To avoid skin burn secondary to antiseptic solution. Remove linen that is saturated with antiseptic solution once the procedure is complete. - Visualize the skin and surrounding surfaces for pooling/dripping of solution or 0.9% NaCl prior to starting the procedure - Gently clean to prevent friction injury (e.g. do not rub or scrub)
15. Assist to drape the infant	
16. Monitor vital signs throughout the procedure.	- Watch for both hypothermia and hyperthermia. - ELBW infants may benefit from pre-warmed sterile drapes to avoid hypothermia while covered. - Do cuff BP at least q 1h.
Once catheters are sutured in place: <u>Umbilical arterial catheter:</u>	Umbilical artery should have brisk spontaneous blood back flow.
17. Assist physician in obtaining blood samples as needed and deposit in appropriate labelled container.	
18. Connect infusion directly to umbilical arterial catheter once stopcock is removed.	Stopcock is used on arterial catheter for blood sampling only.
19. Start infusion at minimum infusion rate required for arterial line infusion.	
<u>Umbilical venous catheter:</u>	Do not start critical infusions prior to x-ray



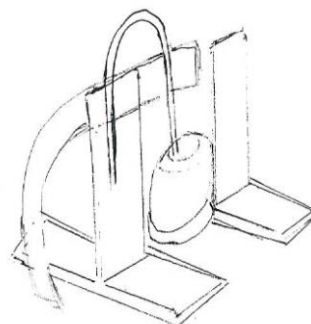
Procedure	Notes
20. Intermittently flush the catheter using 0.9% NaCl flush to keep the catheter patent or start maintenance infusion(s) at minimal rate prior to x-ray confirmation.	confirmation.
21. Remove sterile drapes. Inspect toes, buttocks, and back for any signs of circulatory compromise.	- With transient ischemia seen as mottling or bluish discoloration, warm moist towels may be applied to the opposite limb to encourage a sympathetic (vasodilatation) response in the affected limb. Under no circumstances should heat be applied to the affected limb. - When ischemia persists for > 5-10 minutes, or severe impairment is suspected where an area is white, notify physician immediately. UAC may need to be removed immediately. - Arterial catheter should also be removed in the event of inability to withdraw blood or absence of waveform trace. - Catheter is never advanced once sterility is compromised.
22. Visualize the skin and surrounding surfaces for pooling/dripping of solution or 0.9% NaCl that may have occurred. Clean skin with 0.9% NaCl if necessary. Remove any linen or diapers that may still have solution present.	
23. Send x-ray requisition.	- For infants < 29 weeks, the x-ray is done with infant remaining in the food grade polyethylene bag. - AP and Lateral radiograph is required for initial placement and all subsequent evaluations.
Once catheter placements are confirmed: 24. Re-set infusion rates as ordered.	- Non-centrally/atypical/malposition placed UVCs will be pulled back to just below the liver. Plan for PICC or PIV access as soon as possible. - For CDH Infants: - Removal of all UVCs and placement of an adequate central access (e.g. double lumen PICC) prior to surgical repair. - All mal-positioned/atypical UVCs should be pulled immediately to a low position until they can be replaced with an adequate central access (e.g. double lumen PICC) prior to surgical repair. - Prior to CDH repair review by clinical team (neonatal, surgical and anaesthesia) the UAC placement.

Procedure	Notes
25. Calibrate arterial catheter blood pressure transducer and set alarm limits.	
26. Secure catheters (see diagram below).	This stabilizes umbilical catheters so that accidental tension will not displace catheters.
27. Loop catheter and tape in a "bridge" fashion (See illustrations below).	Hydrocolloid Duoderm dressing is used as a skin barrier.
28. Loosen the umbilical tie slowly and observe for bleeding.	If bleeding occurs, tighten the umbilical tie and reassess in 30-60 minutes.
29. Leave diaper unsecured at sides.	Diaper must not be fastened in such a manner as to obscure view of the umbilical stump. Toes must be visible for circulatory assessment; booties are not to be worn.
30. Discard equipment and supplies appropriately.	Remove all sharps from tray prior to sending for sterilization.
31. File the completed NICU Arterial and Central Venous (CVC) Registry with the NICU Insertion Checklist in the clipboard under the graphics section	When the catheter is removed the form can be filed in the graphic section in the blue binder.

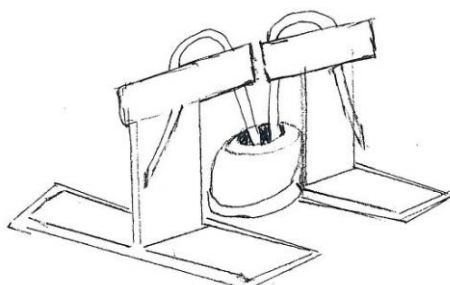
Bridge Taping Method of Line Securement



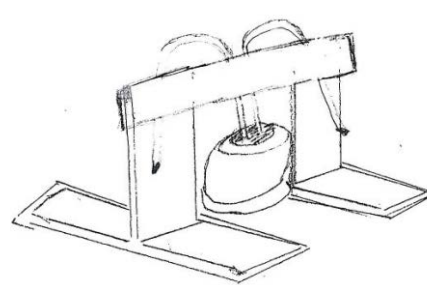
1. Cut two pieces of comfeel dressing and place on abdomen on either side of the umbilical stump. Secure two pieces ½ "of paper tape to the comfeel illustrated to form a vertical support. Consider using 1" tape in term infants.



2. Using ¼" paper tape, secure catheter to vertical support above umbilical stump forming a loop with the catheter



3. When two catheters are in situ they must be



4. Secure both catheters to each other with tape.

individually secured to a vertical support tape.

Ensure that all tapes are secure and catheter markings can be easily read.

DOCUMENTATION

In BC Women's NICU Arterial and Central Venous Catheter (CVC) Registry:

- Date/Time
- Catheter type and size
- Insertion site
- Catheter Tip location/Catheter length (in and outside patient), and any adjustments made.
- x-ray and final tip location (physician to complete information)
- Insertor/Adjuster's name

In Registered Nurses' Notes:

- The insertion procedure
- Circulation of buttocks, legs, toes, strength of femoral pulses before and after catheter placement

In Flow sheet:

- Blood tests and blood loss

Appendix

- Arterial Access Decision Algorithm - NN.11.27
- Anticipated Vascular Access Requirements Algorithm - NN.10.11

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