1.0 PURPOSE AND INTENT:

1.1 To provide a process for the management of centrally placed vascular access devices in neonates who are patients in the Neonatal Intensive Care Unit (NICU).

*Note: All recommendations are approximate guidelines only and practitioners must take in to account individual patient characteristics and situation. Concerns regarding appropriate treatment must be discussed with the attending neonatologist.*

2.0 PRACTICE OUTCOME:

2.1 Prevention of adverse events and sequelae related to indwelling central venous access devices

3.0 GUIDELINES:

3.1 Confirm device tip location by x-ray. Repeat the x-ray after any repositioning of the device or if there is suspicion that the CVAD has migrated either further in or out.

3.2 When setting up a solution on a syringe pump ensure that the pressure limit is set to low pressure. Confirm this setting once a shift a part of routine safety checks.

3.3 Review status of the CVAD at least once every 24 hours, typically during rounds, to determine continued need for the line.

3.4 For CVADs that are required for nutrition purposes only, consider removal of the device when the infant is tolerating 100-120 mL/kg/day of enteral feeding.

3.5 A physician order is not required to administer medication through a CVAD if the medication/infusion is compatible with other infusions running and is not a blood product.

3.6 Add heparin 0.5 international units/kg/mL to Total Parenteral Nutrition.

3.7 When a line breaks and needs repair, consider immediate removal or replacement of the line to avoid the significantly increased risk of infection that results.

3.8 Insertion of Central Venous Access Device

3.8.1 Complete the appropriate checklist for successful or unsuccessful insertion of every CVAD. (See site-specific forms and checklist in Appendix A)

3.8.2 Limit insertion attempts to two attempts per operator.

3.8.3 Before insertion cleanse the site with chlorhexidine with 70% alcohol and allowed to dry for 3 minutes. For very low birth weight infants (<1000g) in the first 3 weeks of life use chlorhexidine without alcohol. In the case of an umbilical line use chlorhexidine to dab the stump. Remove the chlorhexidine with sterile water before applying a dressing. For skin antisepsis see Appendix B

3.8.4 Minimize traffic around bedside during insertion of the central line. If personnel are within 1 meter of the area, they must wear a hat and mask.

3.8.5 Use a sterile introducer for every attempt.
3.9 **Catheter Site Care**

3.9.1 Cover all central venous line insertion sites, except umbilical sites, with a transparent semi permeable dressing.

3.9.2 If the site is bleeding or oozing after catheter insertion place an absorptive dressing material such as a calcium alginate or Aquacel® directly over the site. This dressing is to be changed within 24 hours.

3.9.3 Examine the insertion site at least every 8 hours and document placement, dressing integrity and site condition.

3.9.4 Replace catheter site dressing when the dressing becomes damp, loosened or soiled or when inspection of the site is necessary and an absorptive dressing is used.

3.9.5 Do dressing changes on a sterile field with the operator and assistant wearing a mask, hat and sterile gloves. When the dressing is changed cleanse the site with a 2% chlorhexidine-based preparation. Remove the chlorhexidine with sterile water before applying a dressing.

3.9.6 Do not apply topical antibiotic ointments.

3.9.7 Remove sutures placed for cutdown incisions after 7-10 days. Do not remove sutures used to hold the catheter in place until the catheter is removed.

3.10 **Line Access**

3.10.1 Every time the CVAD is accessed
   a) Routine hand washing
   b) Put on clean gloves
   c) Wear a mask
   d) Scrub the hub for (at least) 15 seconds with alcohol
   e) Allow the hub to dry for 15 – 30 seconds
   f) Use a sterile drape under the connection

3.10.2 Venous lines are flushed with normal saline prior to administration of medications or blood sampling. This ensures that the discard blood is not mixed with glucose in the syringe. Glucose and blood in a syringe causes hemolysis. This results in clots which are then reinfused into the line. Flushing is done before and after administering medication. Flushing prevents mixing of medication with incompatible IV solutions.

3.11 **Tubing Changes**

3.11.1 Use sterile technique when a complete change of administration sets is required. This includes, mask, sterile gloves and a sterile drape to create a sterile field. Bags must be spiked completely inserting the tubing (ie: no cuff outside of the bag).

3.11.2 Connect administration sets to the CVAD using Y-connector extension sets (pigtails).

3.11.3 Do not cover tubing connections with tape.

3.11.4 Cleans all ports or connection sites with 70% alcohol. Scrub the hubs for at least 15 seconds of contact time and then allow to dry for 15 – 30 seconds. See Appendix C.

3.11.5 Place a filter on all infusions except lipids and some drug infusions. (See Parenteral Drug Manual (HSC) or Pharmacy Parenteral Drug Manual (SBH))
3.11.6 Replace administration sets according to the guidelines below:

- Change tubing every 96 hours for:
  - Electrolyte solutions, medication tubing & transducers
  - Continuous infusion medications (unless a change of shorter duration is ordered)
  - TPN Basic
- Lipids – change tubing every 24 hours
- Blood products – Change tubing every 4 hours, or when the set has been idle for >30 minutes.

3.11.7 Extension sets that are part of the line from the sterile package are left in place for the duration of the line. Change all additional extension sets (single, double or triple) when administration sets are changed. Change injection caps that are on the hub of the device or on the extension sets every 96 hours.

3.11.8 When a new line is inserted, use a new sterile solution and new tubing whenever possible.

4.0 REFERENCES:


4.3 Delisio N. Infusion Nurses Society Educator, personal communication, Feb 7 2012.


5.0 PRIMARY AUTHORS:

5.1 Clinical Nurse Specialists: Barbara Wheeler, SBH NICU, Doris Sawatzky-Dickson, HSC
5.2 Ceceile Porter, SBH NICU Nurse Educator
5.3 Infection Control Practitioners: Janis Kennedy, SBH, Karen Olekson HSC
5.4 Clinical Resource Nurses/PICC Inserters: Val Caron, Michelle Jones, SBH NICU
5.5 SBH Wound Care Nurse: Nancy Vokey
Appendix A

Line Access Central / Peripheral / Arterial (Aseptic)
Stop and consider whether central access is necessary. This process is for both bolus and short-term infusion medication administration. Drugs with high osmolality (e.g., high percent glucose) or extreme pH, high or low (i.e., sodium bicarbonate, Vancomycin) are given centrally if a central line is available.

- Routine hand washing
- Put on clean gloves
- Alcohol scrub to injection port for 15 seconds and allow to air dry
- Inject fresh flush solution from pre-filled syringe
- Wipe once with remaining alcohol swab and allow to dry
- Inject medication (or connect medication infusion)
  - Repeat last 2 steps for each additional medication
- Inject flush solution from pre-filled syringe
- Remove gloves
- Routine hand washing
- Use a sterile field under the access point (can be a drape or sterile gauze)

All Solution/ Tubing Changes: Central / Peripheral / Arterial (Aseptic)

- Mask
- Routine hand washing
- Put on clean gloves
- Remove old solution/tubing
- Alcohol scrub to injection port for 15 seconds and allow to air dry for 15 – 30 seconds
- Attach new solution/primed tubing using aseptic technique
- Use a sterile field under the line.

Withdrawing Blood from Arterial or Venous Lines (Aseptic)

- Mask if baby is on open bed
- Routine hand washing & glove with clean gloves
- On a sterile field, lay 4x4 with 2 opened alcohol swabs under stopcock and/or port
- Alcohol scrub to injection port for 15 seconds and allow to air dry for 15 – 30 seconds
- Attach 3 cc syringe and withdraw sufficient blood to clear line
- Remove and attach 1 cc syringe to draw sample
- Remove 1 cc syringe and refeed contents of 3 cc syringe
- Alcohol scrub to port for 15 seconds and allow to air dry
- Attach FRESH flush syringe and flush to clear line
- Remove gloves
- Routine hand washing

Central Line Dressing Changes (Sterile)

- 2 nurse procedure
- Gather supplies
- Routine hand washing
- STERILE gloves for nurse doing dressing change
- Sterile drape
- Cleanse skin with appropriate solution and allow to dry
Skin and Device Antisepsis for Neonates

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Infants &lt; 1,000 grams and less than 3 weeks of age</th>
<th>Other infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Culture</td>
<td>2% chlorhexidine swab sticks or prep pads (no alcohol)</td>
<td>2% chlorhexidine with 70% alcohol prep pad</td>
</tr>
<tr>
<td>Invasive Procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central lines</td>
<td>2% chlorhexidine swab sticks (no alcohol)</td>
<td>2.0% chlorhexidine with 70% alcohol swab sticks or prep packs.</td>
</tr>
<tr>
<td>Lumbar punctures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suprapublic Taps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary Catheterization</td>
<td>Povidone-iodine – pour small amount from bottle or use prep packs</td>
<td>Povidone-iodine – pour small amount from bottle or use prep packs. (Chlorhexidine is not recommended for mucous membranes)</td>
</tr>
<tr>
<td>Peripheral Intravenous</td>
<td>2% chlorhexidine prep packs (no alcohol)</td>
<td>0.5% chlorhexidine with 70% alcohol prep pad</td>
</tr>
<tr>
<td>Access to Central Lines</td>
<td>70% alcohol prep packs (Alcohol has the best results for antisepsis on objects, while chlorhexidine is superior on skin)</td>
<td>70% alcohol prep packs (Alcohol has the best results for antisepsis on objects, while chlorhexidine is superior on skin)</td>
</tr>
<tr>
<td>Central Line Site Care</td>
<td>2% chlorhexidine swab sticks (no alcohol)</td>
<td>2% chlorhexidine swab sticks with 70% alcohol</td>
</tr>
<tr>
<td>Heel sticks</td>
<td>2% chlorhexidine prep packs (no alcohol)</td>
<td>70% alcohol prep pad</td>
</tr>
</tbody>
</table>

*If sensitivity or allergy to chlorhexidine has been demonstrated 10% povidone-iodine can be used for subsequent procedures.*
# APPENDIX C

## Sterile Tubing Change Procedure

(Follow these steps if infusion and administration set not assembled together under a laminar flow hood)

<table>
<thead>
<tr>
<th>Duties of the Sterile Nurse</th>
<th>Duties of the Clean Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gather all necessary tubing supplies, sterile gloves and sterile drape</td>
</tr>
<tr>
<td>2.</td>
<td>Verify new TPN or any infusion to be hung using 2 patient identifiers.</td>
</tr>
</tbody>
</table>
| 3.  | Mask  
    Routine handwashing |
| 4.  | Set up sterile field on appropriate table using sterile drape  
    Open all necessary tubings onto sterile field without contaminating tubing |
| 5.  | Put on STERILE gloves  
    Assemble tubings into correct configurations according to solution being hung including pig tails |
| 6.  | Begin with TPN tubing and spike new TPN bag |
| 7.  | Hold tubings to allow assistant to connect remaining solutions |
| 8.  |  
    Clamp off old pigtail (closest to baby)  
    Remove old pigtail from injection port on the end of the line  
    Alcohol scrub to port for 15 seconds and allow to air dry |
| 9.  | Maintaining sterility, twist new pigtail onto cleansed injection port on end of line |
| 10. |  
    Place all bags and/or syringes on infusions pumps and set rates etc. and discard old solutions and tubings. |
| 11. | Verify correct solution, correct rate and volume set, correct patient, correct site, and initial on the data record and Medication Administration Record. |
| 12. | Ensure that all tubings and pigtail are unclamped. |