



Clinical Practice Policy:	Exchange of Peripherally Inserted Central Catheter (PICC) Using Modified Seldinger Technique (MST)
Effective Date:	

I. Purpose

To provide policies and procedures specific to the NICU RN PICC Team members and neonatal physicians for the exchange of a PICC

II. Presumes Knowledge:

[WNH Standard Policy](#)

[Statements. WNH I.1 Infant](#)

[Identification.](#)

[WNH S.4 Infant Safety Pause](#)

[NICU C.4 Use and Care of Central Venous Catheters and Peripherally Inserted Central](#)

[Catheters. NICU I.2 Intravenous Angiocatheter Placement.](#)

[NICU I.3 Changing of Intravenous Solution and Tubing.](#)

[NICU IV Compatibility Chart](#)

III. Clinical Qualifications for PICC Line Insertion

1. NICU RN PICC Team members and neonatal physicians must meet the following criteria prior to operating independently:
 - Attend a comprehensive didactic course on PICC insertions and PICC management.
 - Perform a simulation PICC insertion with unit-designated instructor.
 - Assist/observe a PICC placement with unit-designated instructor.
 - Place a minimum of six PICC lines under the supervision of an attending neonatologist, qualified neonatal fellow or member of the PICC Team. This includes: two upper extremity lines, two lower extremity lines and at least one of each size line (1.1 Fr and 1.9 Fr).
 - At least four out of the six lines must be successfully placed PICC lines. Must be familiar with National Association of Neonatal Nurses publication Peripherally Inserted Central Catheters: Guidelines for Practice, 2nd edition.
 - Must maintain competency once sanctioned independent by placing a minimum of five successfully placed PICC lines in a calendar year.
2. Licensed Independent Practitioner (LIP) order is required for PICC line placement.
3. A PICC line may be pulled back or advanced if sterility is maintained and only at the time of insertion
4. Catheters are not to be exchanged in the presence of suspected bacteremia and site should be free of complications (ie: redness, edema, and/or cording).



IV. Indication for PICC Exchange

- The catheter needs to be replaced to maintain suitable vascular access but is malpositioned or needs to be changed because of size.

V. Equipment

Appropriate PICC insertion kit
Semipermeable Transparent Dressings
Sterile barriers – drapes, gowns, 2 pairs of gloves (powder and latex free)
Needleless connector
Heparinized saline (1/2 NS with 1/2 unit heparin/mL)
Neonatal MST Kit
Stat Seal® Disc Extra Small
BioPatch® disc (1.9 cm)

VI. Procedure

1. Review LIP order prior to PICC placement.
 - Determination of need is done by LIP/RN.
 - Ascertain that the catheter is malpositioned or needs to be changed because of size.
2. Perform safety pause.
3. Measure the length of the catheter to be inserted:
 - For **upper-body insertion**: Measure from the insertion site along the course of the vein, to the right of the sternal border, to the third intercostal space. Keep arm at naturally flexed position during measurement.
 - For **lower-extremity insertion**: Measure from the insertion site along the course of the vein, to the right of the umbilicus and up to the xiphoid process.
 - Cut catheter to appropriate length using the guillotine with no more than 1-2 cm excess.
 - Inserting the catheter to a premeasured depth helps to ensure the desired placement is central or placed within the superior vena cava (SVC) or inferior vena cava (IVC).
4. Assemble all needed equipment and supplies prior to procedure set-up including observations checklist (CVL).
5. Select the largest size catheter that will meet the infant's needs.
 - Catheter size 1.1Fr is available for ELBW infants if necessary
 - Catheter guide for infants weighing:
 - <1000 gms use 1.4 Fr.
 - 1000 – 1500 gms, use 1.4 or 2.0 Fr
 - >1500 gms, use 1.9, 2.0 or 2.6 Fr catheter
6. Offer pacifier and sucrose and administer pain medication as ordered.
 - Developmentally supportive care, swaddling, pacifiers and/or pharmacological support should all be considered prior to procedure.
7. Clean work surface to be used for sterile field with aseptic wipes and allow area to dry completely prior to setting up sterile field.



8. Apply hair cover and face mask.
9. Perform hand hygiene using an alcohol-based waterless cleanser or antimicrobial soap and water.
10. Open equipment and prepare sterile field.
 - Restrict traffic near sterile field to reduce the risk of contamination.
11. Repeat hand hygiene then don sterile gown and gloves.
 - Maximal sterile barrier precautions, including the use of hair covering, face mask, sterile gown and gloves and large sterile drapes have been shown to reduce the risk of infection by 6-7 times over the use of sterile gloves and drapes alone.
12. Prepare the catheter by:
 - Attaching the needleless connector to end of catheter.
 - Cutting the catheter with the “V” cutter to predetermined length
 - Flushing the catheter with sterile heparinized saline.
 - Use only a 10 mL syringe for flushing.
13. Position the infant and secure limb as needed.
 - Catheter introduction may be facilitated by altering alignment position of limbs/body.
 - Remove old PICC dressing and change sterile gloves
14. For infants < 29 weeks: Prep insertion site and surrounding skin with povidine iodine (PI).
 - Begin prep at insertion site and prep in a circular motion for 30 seconds.
 - Repeat prep and drying 2 more times for a total of 3 times.
 - Allow PI to dry at least 2 minutes prior to insertion.
 - Clean site with wet alcohol after PI prep has been completed.
 - For infants > 29 weeks or 28 weeks plus DOL 7, use chlorhexidine (CHG) scrub over entire area.
 - A large prepped area reduces the risk of contamination. Wrap the foot or hand with sterile gauze to hold while prepping a wide area of the skin at and around the insertion site.
 - PI should be removed from the skin after the procedure to prevent tissue injury and the absorption of iodine percutaneously.
15. Place a sterile drape underneath and above the insertion area. Cover as much of the infant as possible without compromising visibility.
16. Holding the “old” catheter at the insertion site, pull back the old catheter until there is only 3-4 cm remaining in the vessel. Carefully cut the terminal end of the catheter using sterile scissors while holding onto the catheter at the insertion site with forceps.
 - Holding with forceps will prevent embolization through the old catheter
17. Insert tip of guide wire from the Neonatal MST kit into the lumen of old catheter and gently advance into the catheter lumen. Leave excess guide wire exposed. Do not pass the guide wire beyond the shoulder in the upper extremity or beyond the groin in the lower extremity so as to prevent the catheter from entering the central circulation.



18. Holding the guide wire, slowly pull the old catheter out of the skin and onto the guidewire careful to not pull the guide wire out.
19. Remove the old catheter over the wire until completely off. Hold pressure at the insertion site over the guide wire with sterile gauze to reduce blood loss.
20. A small nick in the skin may need to be made at this time to accommodate the dilator sheath over the wire and into the skin and vessel. This can be done with a TB syringe needle or a sterile disposable scalpel. The nick should be made adjacent to the wire.
21. Pass the Neonatal MST kit tearaway introducer over the guide wire and into the vein, gently sliding all the way to the hub of the tearaway introducer. (guide wire must remain in control of the clinician at all times)
22. Remove the guide wire and dilator, leaving the tear-away sheath in place. Cover the tear-away sheath lumen with finger to prevent excessive blood loss or air embolus.
23. When ready to advance the catheter, remove finger from the tear away sheath lumen and immediately thread the new catheter through the tear-away sheath to the desired pre-measured tip location.
24. Gently pull the tear-away sheath out a few centimeters over the catheter. Snap the tear-away sheath wings apart and peel away from the catheter and discard.
25. Advance remaining catheter into the vein lumen to ensure that the catheter is at the premeasured length.
26. Aspirate for a blood return and flush the catheter.
27. Secure the catheter to the site using no more than 2-3 sterile pieces of tape. This maintains sterility while x-ray is being taken.
28. Confirm that LIP has ordered stat x-ray to confirm line placement.
29. Cover site with sterile drape during x-ray.
30. Keep catheter patent by flushing it intermittently with heparinized normal saline flush with a 10 mL syringe until position of catheter tip is verified.
 - Intermittent flushing is done pending x-ray.
31. Confirm catheter tip position with LIP.
32. Attempt to stop bleeding prior to dressing to decrease blood remaining on skin which can serve as a medium for bacterial growth.
33. Secure catheter to skin per PICC dressing procedure allowing for visualization of the



site.

- Refer to [NICU C.4 Use and Care of Central Venous Catheters and Peripherally Inserted Central Catheters](#)

34. Document the PICC insertion procedure in the infant's electronic health record. Record the following information:

- Reason for PICC exchange
- PICC site
- Limb circumference
- Brand, type size and lot number of catheter.
- Length of catheter and final position.
- Radiographic location of catheter tip
- Infant's tolerance of procedure.

VII. Education: PICC Parent Education sheet (See PICC Parent Sheet)



VIII. References

Doellman, D. & Nicholas, I. (2009). Modified Seldinger Technique with Ultrasound for PICC Placement in the Pediatric Population: A Precise Advantage. *Journal of the Association for Vascular Access*, 14(2), 93-99.

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