

**PICC INSERTION USING  
ULTRASONOGRAPHY AND MICRO INTRODUCER TECHNIQUE**

**06/10/03 1**

**POLICY:**

General Information:

1. RN's validated to insert PICCs with the additional training in the use of ultrasonography (U/S) and microintroduction (MI) may perform this procedure.
2. U/S and MI validation includes 1-hour didactic lecture, 1-hour practicum, and 3 successful bedside insertions using U/S and MI performed under the guidance of a preceptor.
3. All inserters must demonstrate competency annually under the supervision of a PICC validated nurse, successfully completing skills checklist (Appendix A).
4. Currently all PICC's inserted at the bedside using U/S and MI are performed by NSS RN's trained in the technique.

Equipment:

Sterile probe sheath  
U/S imaging device (SiteRite)  
Microintroducer kit  
PICC equipment as outlined in policy #392.

<b><u>NURSING ACTION</u></b>	<b><u>STEP</u></b>	<b><u>IMPLEMENTATION</u></b>
<b>Obtain physician's order</b>	1.	<ul style="list-style-type: none"> <li>• Confirm and review physician's order.</li> <li>• Determine if PICC is the most appropriate device for IV therapy as prescribed.</li> <li>• Review the purpose of the PICC with the patient.</li> </ul>
<b>Patient Assessment</b>	2.	<ul style="list-style-type: none"> <li>• Apply tourniquet to upper extremities to evaluate venous anatomy.</li> <li>• Assess both arms, as appropriate, to identify all venous options.</li> <li>• Identify appropriate vein using U/S imaging.</li> </ul>
<b>Obtain Verbal Informed Consent</b>	3.	<ul style="list-style-type: none"> <li>• Provide education information to enable patient to make an informed decision. Document patients verbal consent in medical record.</li> <li>• Review and provide PICC patient handbook with patient regarding care and maintenance as well as potential complications associated with PICC. The inserter records the following information on the PICC patient handbook:               <ul style="list-style-type: none"> <li>* Date of insertion.</li> <li>* Lot Number.</li> <li>* Catheter size, length, and location.</li> <li>* Inserter's name and office number.</li> <li>* Instructions if the patient is discharged before CXR results are known that he/she may have to return to the hospital to relocate or replace the PICC.</li> </ul> </li> </ul>
<b>Prepare patient</b>	4.	<ul style="list-style-type: none"> <li>• Wash hands with antimicrobial soap.</li> <li>• Place the patient in the supine position.</li> <li>• Position arm at 90 degrees from body, palm up, and restrain if necessary.</li> <li>• Measure external landmarks to determine the length of the PICC (antecubital fossa to clavicular head to right third intercostal space)</li> </ul>
<b>Prepare patient</b>	4.	<ul style="list-style-type: none"> <li>• Don a mask and cap and place mask on patient.</li> </ul>

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<b><u>NURSING ACTION</u></b>	<b><u>STEP</u></b>	<b><u>IMPLEMENTATION</u></b>
<b>Prepare patient</b>		<ul style="list-style-type: none"> <li>Apply non-sterile U/S jelly to probe head.</li> </ul>
<b>Prepare sterile field</b>	5.	<ul style="list-style-type: none"> <li>Open PICC procedural tray; place extra towels, 1 cc syringe, extension tubing, microinducer kit and sterile probe sheath onto sterile field.</li> <li>Apply gown and sterile gloves.</li> <li>Draw up normal saline in a 10-cc syringe and prime PICC and extension tubing.</li> <li>Draw up local anesthetic in 1 cc syringe.</li> <li>Place sterile probe sheath cover over U/S probe.</li> </ul>
<b>Prepare the insertion site</b>	6.	<ul style="list-style-type: none"> <li>Clean the insertion site with chlorhexidine prep solution for 30 seconds</li> <li>Prepare an area at least 3 inches above and below the insertion site.</li> </ul>
<b>Remove 1<sup>st</sup> pair of gloves and apply tourniquet</b>	7.	
<b>Anesthetize insertion site.</b>	8.	<ul style="list-style-type: none"> <li>Don a new pair of sterile gloves.</li> <li>Position sterile drapes around insertion site.</li> <li>Apply <b>sterile</b> U/S jelly to upper arm.</li> <li>Using U/S visualize vein to be cannulated.</li> <li>Inject local anesthetic 1-3 cc intradermally at the insertion site.</li> </ul>
<b>Insert PICC with microintroducer</b>	9.	<ul style="list-style-type: none"> <li>Stabilize probe with 2 fingers on probe, 3 fingers on arm.</li> <li>Identify the artery in relation to the vein to be cannulated during assessment and again before cannulating vein.</li> <li>Demonstrate appropriate technique for vein cannulation.</li> <li>View the U/S screen, not the insertion hand, when advancing the needle at a 45-60 degree angle into the vessel.</li> <li>Optional - May advance needle through the vein.</li> <li>Once it appears needle has passed through vein, assess needle for blood in chamber.</li> <li>Remove introducer needle from plastic sheath.</li> <li>Slowly pull back on plastic introducer until blood drips out.</li> <li>Insert guidewire into introducer. It should advance smoothly. If resistance is met, stop advancing guidewire. Will need to repeat vein cannulation procedure until guidewire advances easily into vein.</li> <li>Once guidewire is in vein, remove plastic introducer.</li> <li>.</li> </ul>

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**06/10/03 3**

**NURSING ACTION****Insert PICC with microintroducer****STEP****IMPLEMENTATION**

- Demonstrate appropriate technique for scalpel incision.
- Make incision large enough to accommodate the dilator.  
Perform skin nick at insertion site  
Incision should be 2 mm in length at most
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- Demonstrate appropriate technique to insert dilator.
- **SAFETY PRECAUTION** To prevent embolization of the guidewire into the vessel, bend the guidewire 90 degrees as it comes out at the distal end of the dilator, BEFORE advancing the dilator into the vein.
- Advance dilator over guidewire.
- Insert into vein using a corkscrew motion, maintaining pressure as it advances.
- Advance dilator to wings. May feel a "pop" when the large portion enters the vein.
- Once dilator is inserted to hub, remove guidewire.
- Remove obturator from dilator.
- Insert PICC through dilator to predetermined length.
- Snap wings of dilator forward and back then peel away introducer.

**Check for patency and irrigate PICC**

10.

- Remove guidewire.
- Attach hub if applicable.
- Aspirate for a blood return with a 10 cc syringe.
- Flush PICC with 10 cc normal saline.
- Apply extension tubing and injection cap.
- Apply positive end pressure cap and disconnect syringe from injection cap; remove only if malfunctions.

**Secure PICC**

11.

- Place a folded 2x2 gauze at the insertion site to wick away any blood drainage.
- Suture prn
- Apply a piece of sterile tape over 2x2 and over catheter hub.
- Apply a transparent occlusive dressing over insertion site, catheter, and hub up to luerlock connection.

**Obtain radiographic confirmation**

12.

- Confirm catheter tip placement radiographically.
- If the patient is going home immediately after PICC inserted, the CXR results need to be verified before the patient is discharged, OR the patient should be instructed that she/he may have to return to the hospital for PICC revision/replacement. (See Step 3)

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<b><u>NURSING ACTION</u></b>	<b><u>STEP</u></b>	<b><u>IMPLEMENTATION</u></b>
<b>Document procedure (medical record or HDS)</b>	13.	<ul style="list-style-type: none"> <li>· Informed consent.</li> <li>· Prep style (maximum sterile barrier precautions).</li> <li>· Type and amount of local anesthetic administered.</li> <li>· Brand and size of catheter.</li> <li>· Manufacturer's lot number.</li> <li>· Location of insertion site (arm and vein).</li> <li>· Amount of anesthetic, if used.</li> <li>· Internal and external catheter length.</li> <li>· Number of insertion attempts.</li> <li>· Use of U/S and microintroduction.</li> <li>· Presence of blood return</li> <li>· Removal of guidewire.</li> <li>· Patient/family instruction.</li> <li>· Inserter</li> <li>· Catheter tip location.</li> <li>· Notify bedside nurse to proceed with use of PICC.</li> </ul>

## Ultrasonography and Microintroducer Competency Checklist

- A. Demonstrate understanding of anatomy and physiology associated with ultrasound use.
- \_\_\_\_\_ Demonstrate appropriate vein identification using ultrasound imaging.
  - \_\_\_\_\_ Verbalize understanding of the cross sectional image of venous anatomy as projected by ultrasonography.
  - \_\_\_\_\_ Identify the three key factors that differentiate an artery from a vein when using ultrasonography.
    - \_\_\_\_\_ Arteries pulse upon compression with probe.
    - \_\_\_\_\_ The location of the artery is generally below the vein.
    - \_\_\_\_\_ Veins are easily compressed with the probe; the artery requires extreme pressure with the probe to compress it.
  - \_\_\_\_\_ Demonstrate use of ultrasonography to track veins up arm above the bifurcation of the vessels.
- B. \_\_\_ Assess both arms, as appropriate, to identify all venous options.
- C. \_\_\_ Position arm at 90 degrees from body, palm up, restrain if necessary.
- D. \_\_\_ Stabilize probe with 2 fingers on probe, 3 fingers on arm.
- E. \_\_\_ Identify the artery in relation to the vein to be cannulated during assessment and again before cannulating vein.
- F. \_\_\_ Demonstrate appropriate technique for vein cannulation.
- \_\_\_\_\_ View the U/S screen, not the insertion hand, when advancing the needle at a 45-60 degree angle into the vessel.
  - \_\_\_\_\_ Optional - May advance needle through the vein.
  - \_\_\_\_\_ Once it appears needle has passed through vein, assess needle for blood in chamber.
  - \_\_\_\_\_ Remove introducer needle from plastic sheath.
  - \_\_\_\_\_ Slowly pull back on plastic introducer until blood drips out.
  - \_\_\_\_\_ Insert guidewire into introducer. It should advance smoothly. If resistance is met, stop advancing guidewire. Will need to repeat vein cannulation procedure until guidewire advances easily into vein.
  - \_\_\_\_\_ Once guidewire is in vein, remove plastic introducer.
- G. Demonstrate appropriate technique for scalpel incision.
- \_\_\_\_\_ Make incision large enough to accommodate the dilator.
  - \_\_\_\_\_ Advance scalpel into skin adjacent to guidewire.
  - \_\_\_\_\_ Incision should be 2 mm in length at most.
- H. Demonstrate appropriate technique to insert dilator.
- \_\_\_\_\_ Advance dilator over guidewire.
  - \_\_\_\_\_ Bend the guidewire 90 degrees as it comes out the distal end of the dilator before advancing dilator into the vein.
  - \_\_\_\_\_ Insert into vein using a corkscrew motion, maintaining pressure as it advances.
  - \_\_\_\_\_ Advance dilator to wings. May feel a "pop" when the large portion enters the vein.

- I. \_\_\_\_ Once dilator is inserted to hub, remove guidewire.
- J. \_\_\_\_ Remove obturator from dilator.
- K. \_\_\_\_ Insert PICC through dilator to predetermined length.
- L. \_\_\_\_ Snap wings of dilator forward and back then peel away introducer.
- M. \_\_\_\_ Obtain blood return and secure PICC.

Preceptor Name/Date

Insertor Name/Date