

## SELF READ PACKAGE

### REMOVAL OF PERIPHERALLY INSERTED CENTRAL CATHETER (PICC)

#### PURPOSE:

To provide a standardized, evidence-informed process, for the safe removal of a peripherally inserted central catheter (PICC).

#### DEFINITIONS:

- **Peripherally Inserted Central Catheter:**

A catheter that is inserted peripherally into the basilic, cephalic or brachial vein, and then advanced so the tip is positioned in the lower third of the superior vena cava or caval atrial junction.

#### IMPORTANT POINTS TO CONSIDER:

- The removal of a PICC can be performed by the nurse or authorized prescriber who have received training and demonstrated competency by:
  - Attendance at CVAD Care & Maintenance Session offered at Site
  - Experience with providing care and maintenance of PICC lines
  - Reading this Self Read package
  - Demonstrating PICC removal to educator while answering Oral Quiz during procedure.
  - Successful completion of competency checklist performed with educator or designate
- The need for the PICC should be reviewed daily.
- The PICC should be removed when therapy is completed, in the presence of unresolved complications, or when deemed no longer necessary for the plan of care.
- Currently an authorized prescriber's order is required for PICC removal.
- PICC removal is a clean technique.
- Never pull against resistance or stretch the catheter, as there is a risk of catheter breakage or vein wall damage. See Appendix A.
- Air embolism during PICC removal could occur. Air embolism is an uncommon, but potentially catastrophic, event that occurs as a consequence of the entry of air into the vasculature. The risk of catheter-related venous air embolism appears to be increased by the following factors with catheter removal:
  - Fracture or detachment of catheter connections (no valves)
  - Presence of a persistent catheter tract following the removal of a PICC line
  - Deep inspiration during removal, which increases the magnitude of negative pressure within the thorax
  - Hypovolemia, which reduces central venous pressure
  - Upright positioning of the patient, which reduces central venous pressure to below atmospheric pressure and places the patient at particular risk for entraining air very rapidly into the venous circulation.

- The following interventions must be done when removing a PICC to reduce the risk of embolism:
  - Positioning the patient supine (if patient is unable to lay flat, raise the head of the bed until the patient is comfortable)
  - Use of Valsalva maneuver
  - Use of petroleum based dressing
  - Maintaining supine bed rest for 30 minutes post removal
- Valsalva is contraindicated in patients with aortic stenosis, recent MI, glaucoma, retinopathy and increased intracranial pressure. If unable to perform Valsalva maneuver, have the patient hold their breath at end of expiration when the last 15 cm is removed.
- If a patient displays symptoms of air embolization following PICC removal, they should be immediately placed into the left lateral Trendelenburg position. This places the right ventricular outflow tract inferior to the right ventricular cavity, causing the air to migrate superiorly into a position within the right ventricle from which air is less likely to embolize.
- Prior to the removal of a PICC from a patient who has developed a catheter related deep vein thrombosis (CRDVT), discussion with the authorized prescriber should occur. The PICC does not need to be removed if the device is functional, tip is correctly positioned, is still required for therapy, and there is absence of severe CRDVT related symptoms (risk of loss of limb due to impaired circulation related to swelling). The authorized prescribing practitioner should initiate appropriate therapy for treatment of the DVT. It is advised that a vascular access nurse be notified to assist with decision making regarding line preservation.
- Prior to the removal of a PICC from a patient who has a suspected catheter related bloodstream infection (CRBSI) discussion with the authorized prescriber should occur. Removing a PICC solely on temperature elevation alone without confirmatory evidence of catheters-associated infection is not recommended. Check with authorized prescriber about obtaining blood cultures (one set from the line and a peripheral site). It is advised that a vascular access nurse be notified to assist with this situation. If a local cellulitis is suspected at exit site, take a microbial swab for culture.
- Sending the PICC tip for culture should not be routinely done. Recent literature indicates that when a line infection is suspected, obtaining blood cultures from both the line and peripheral site is a more sensitive test. If the tip is ordered for culture, refer to Appendix B.

**PROCEDURAL STEPS:**

1	Review patient chart and reason for PICC removal. Verify authorized prescriber's order for PICC removal.	Consideration should be given to patient's coagulation status (e.g., INR, PT, PTT, platelets) prior to removal as increased time may be needed for hemostasis to occur. Discuss any concerns with authorized prescriber.
2	Check the patient's chart for the exact trimmed length of the PICC upon insertion for an open ended PICC (Power PICC) or note if it was a close-ended PICC (Groshong).	This can then be compared with the length of the PICC upon removal if it was open ended. If it was a closed ended PICC, clinician can check for a closed, intact tip.
3	Verify correct patient using two identifiers.	
4	Explain procedure to patient.	
5	Perform hand hygiene.	

6	Clean working area (e.g. bedside table) with disinfectant wipe. Arrange supplies and open sterile dressings.	
7	Perform hand hygiene.	
8	Remove IV administration set and clamp lumens if necessary. Use gloves if exposure to body fluids is likely. Dispose of IV administration set in appropriate receptacle, remove gloves and perform hand hygiene.	If the PICC is non-valved then the lumens must be clamped prior to disconnection from the IV administration set.
9	Place patient in supine position with their arm abducted out but below level of the heart.	
10	Place a non-sterile waterproof pad underneath arm.	
11	Perform hand hygiene.	
12	Don non-sterile gloves.	
13	Remove dressing from insertion site.	
14	Remove PICC from stabilization device.	
15	Remove stabilization device from skin using an alcohol swab.	The alcohol helps to loosen the adhesive making removal easier. If a subcutaneous engineered stabilization device is in place, follow manufacturer's directions for removal.
16	Conduct a site assessment.	If a local cellulitis is suspected, take a microbial swab for culture and send to microbiology.
17	Cleanse the exit site with the CHG/alcohol swab stick and allow the air to dry completely (approx. 2 minutes).	Drying time is important for antiseptic effect and to minimize skin reaction when adhesive from dressing comes in contact with antiseptic.  If PICC tip is ordered to be sent for cultures, refer to Appendix B for procedure.
18	Remove gloves and perform hand hygiene.	
19	Don new non-sterile gloves.	
20	Place folded petroleum gauze directly over site and cover with a sterile 2.2 gauze.	Petroleum gauze will seal the skin/vein tract and reduce the risk of air embolism.
21	Prior to removal, explain to patient that you will be asking them to hold their breath before the PICC is completely removed.	Ask patient to hold their breath at the <b>end of expiration</b> before the last 15cm of the PICC is removed.  During inspiration, negative intrathoracic pressure can encourage air to enter the exit site and cause an air embolism.  If patient is unable to cooperate with instructions or is on mechanical ventilation, remove the PICC during exhalation.

22	Hold 2x2 gauze (with petroleum-based gauze underneath) directly to exit site with non-dominant hand. With dominant hand, slowly remove catheter using gentle even pressure. Place PICC on a waterproof pad to prevent contamination of the patient care/work area.	If resistance is met, discontinue the procedure, secure the PICC in place and apply a sterile dressing over the site.  Refer to Appendix A for troubleshooting techniques.
23	Apply pressure to exit site with the petroleum-based gauze dressing until hemostasis is achieved.	Do not remove dressing to directly assess insertion site.
24	Apply a transparent semi-permeable dressing to the site on top of the gauze once bleeding has stopped. If gauze is bloody, replace with clean gauze before applying TSM.	Dressing should remain in place for at least 24 hours. After 24-48 hours, dressing may be removed. If exit site has not closed over, cover with a sterile adhesive dressing and change every 24 hours until healed.
25	Measure the length of the removed PICC for comparison with the insertion record. Inspect for an intact tip and that it is not jagged.	Any discrepancies must be reported immediately to the authorized prescriber.
26	Dispose of PICC into garbage.	
27	Remove gloves and perform hand hygiene.	
28	Leave patient in a supine position for 30 minutes post removal.	The supine position with head of bed flat is preferred to prevent an air embolus, if tolerated by the patient.  If the patient is unable to lay flat, raise the head of the bed until the patient is comfortable.
29	During this time, the patient should be observed for symptoms of air embolus.	Symptoms can include: <ul style="list-style-type: none"> <li>• Shortness of breath</li> <li>• Chest pain</li> <li>• Dizziness</li> <li>• Hypotension</li> <li>• Change in level of consciousness</li> </ul>
30	If an air embolus is suspected, immediately place patient on their left side in Trendelenburg position, administer O2, and call for medical assistance or code team as needed.	Place patient in Trendelenburg if not contraindicated by other conditions such as increased intracranial pressure.
31	Document the PICC removal including: <ul style="list-style-type: none"> <li>• Date and time of removal</li> <li>• Position of patient for procedure</li> <li>• The length of time the patient remained supine</li> <li>• Site appearance</li> <li>• Catheters measurement upon removal and if the tip is intact (not jagged)</li> <li>• Patient tolerance to the procedure</li> <li>• Any complications or concerns with removal process</li> <li>• Dressing application</li> </ul>	Any discrepancies in measurement or if the tip is jagged must be reported immediately to the authorized prescriber.

	<ul style="list-style-type: none"><li>• If skin swab, catheter tip or blood cultures were sent for culture</li><li>• All teaching and patient instructions</li></ul>	
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**EQUIPMENT/SUPPLIES:**

- Two to three pairs non-sterile gloves
- One to two packages of sterile 2x2 non-woven gauze
- One sterile transparent semi-permeable dressing (TSM)
- One to two alcohol swabs
- One 2% chlorhexidine (CHG) with 70% isopropyl alcohol swab stick
- One sterile petroleum-based dressing
- One non-sterile waterproof pad
- One disposable measuring tape
- Microbial swab for culture if a site infection is suspected

**SUPPORTING DOCUMENTS:**

**Appendix A**

**Troubleshooting Tips for Difficult PICC Removal**

PICC lines should never be removed against resistance. When resistance occurs, it may be for the following reasons:

- Venous Spasm
- Malposition or coiling of the catheter
- Thrombus formation

If resistance is met, stop removal and try one of the following troubleshooting techniques:

<b>Action</b>	<b>Rationale</b>
Apply warm compress to the entire arm for twenty minutes.	Warmth will encourage vasodilation.
Ensure patient is placed supine (shoulders on bed) and abduct arm away from body.	This will help to straighten out the venous pathway.
Mental relaxation and distraction of patient.	Helps to decrease venous spasm.
Perform chest x-ray to assess location of catheter.	Ensure that the catheter has not coiled or knotted within the vasculature.
Cover with a sterile dressing and re-attempt after 24 hours.	Allows the vessel to relax and alleviate any possible spasm.

If the above actions are not successful, the authorized prescriber should be notified as a referral to vascular surgery or interventional radiology may be required to assist in removal.

**SUPPORTING DOCUMENTS (CONTINUED):**

**Appendix B  
Sending Catheter Tip for Culture**

**Equipment:**

- Sterile dressing tray
- Sterile microbiology container
- Equipment for removal

Prepare for PICC removal as outlined above but in addition to opening up sterile dressings, also open up a sterile dressing tray.	
Follow procedure for PICC removal as above except when removing the PICC avoid contact with surrounding skin, and place on sterile dressing tray ensuring that the tip of the catheter doesn't come in contact with the part of the PICC that was external to the patient.	
With the other hand, cover exit site with a sterile 2x2 gauze (with petroleum-based gauze underneath) as described in removal procedure. Cover with a TSM once hemostasis is achieved.	Once site is dressed, prepare tip for culture.
Uncap culture container.	
Using sterile scissors, trim catheter 5cm from the distal top being careful only to handle the trimmed piece with sterile utensils.	
Using sterile forceps transfer the trimmed 5cm piece into the culture container and apply cap.	
Label culture container with the type of specimen, date and time of removal and initials.	

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