



Capital Health

**LEARNING MODULE
FOR
CARE OF PERIPHERALLY
INSERTED CENTRAL CATHETERS
(PICC LINES)**

CC 80-018

POST-ENTRY LEVEL COMPETENCY

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LEARNING OBJECTIVES & METHOD – Registered Nurse

Following completion of the required learning activities, the RN will understand:

1. The indications and advantages for use of Peripherally Inserted Central Catheter (PICC) lines.
2. The contraindications for use of PICC lines.
3. The components and anatomical placement of the PICC.
4. The theory and procedure related to assessing patency, flushing, blood withdrawal, tubing and adaptor changes, dressing changes and removal of the line.
5. The importance of understanding neutral displacement and clamping of an unused PICC line.
6. The nursing interventions pre- and post-insertion of the PICC line.
7. The potential complications associated with a PICC removal and nursing actions to prevent and manage these complications.
8. The complications associated with PICC lines and nursing actions to prevent and treat these complications.
9. Approaches to effectively teach patients about the care of PICC line.

To be deemed competent in care of the PICC Line, the RN will:

1. Review the policy and procedure and learning module for nursing care of a PICC Line.
2. Complete the self-test.
3. Practice the procedure and demonstrate skills to clinical educator or delegate.
4. Maintain a record of competence.
5. Conduct a yearly self-assessment of competency level and develop a plan in conjunction with the unit manager to meet ongoing needs.

LEARNING OBJECTIVES & METHOD – Licensed Practical Nurse

Following the completion of this learning module, the LPN will understand:

1. The advantages and indications for use of the PICC line.
2. The components and placement of this device.
3. The theory and procedure related to dressing changes.
4. Complications that may arise during a dressing change and nursing actions to prevent and treat these complications.

To be deemed competent in the dressing change of the PICC line, the LPN will:

1. Review the Policy and Procedure & Learning Module associated with the PICC line. (pp 2 & 7-10 of policy and procedure and pp 4-7,11,12 & 15-17 only of learning module)
2. Complete questions 1, 2, 3, 6, 8, and 17 of the self-test.

3. Practice the procedure and demonstrate skill to the clinical educator or delegate.
4. Maintain a record of competence.
5. Conduct a yearly self-assessment of competency level and develop a plan in conjunction with the unit manager to meet ongoing needs.

LEARNING OBJECTIVES & METHOD - CT Technologist

Following the completion of this learning module, the CT technologist will understand:

1. The advantages and indications for use of the PICC line.
2. The components and placement of this device.
3. The theory and procedure related to flushing a PICC line and the IV therapy initiating and discontinuing.
4. Complications that may arise during a dressing change with the understanding they would report and delegate appropriately.

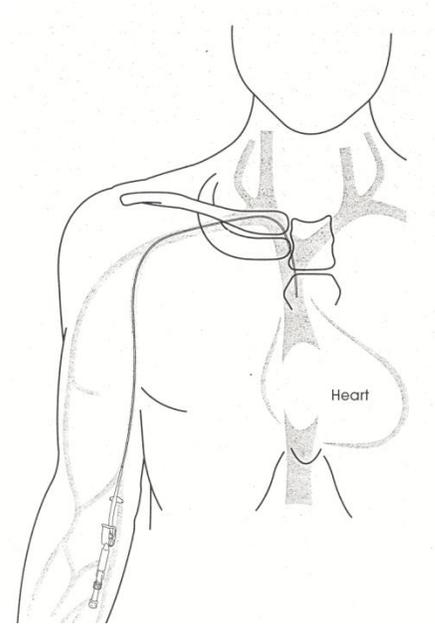
To be deemed competent in the flushing of the PICC line and the administration of an infusion (Contrast medium or existing IV Infusion only) the CT Technologist will:

1. Review the Policy and Procedure & Learning Module associated with the PICC line. (pp 2- 7 of policy and procedure and pp 4-17 of learning module)
2. Complete questions 1- 3, 7, and 9 - 15 of the self-test.
3. Practice the procedure and demonstrate skill to the clinical educator or delegate.
4. Maintain a record of competence.
5. Conduct a yearly self-assessment of competency level and develop a plan in conjunction with the unit manager to meet ongoing needs.

THEORY

INTRODUCTION

The Peripherally Inserted Central Catheter (PICC line) is a central venous access device that is inserted by accessing one of the large veins of the upper extremities, usually in the area of the basilic vein. The catheter is usually threaded into the vein until the tip rests in the superior vena cava just above the right atrium ([Picture 1](#)) The PICC can be used from seven days and up to six months or longer if necessary. If the PICC is functioning well and is not causing complications, it should be left in place for the entire therapy. PICC's used at CDHA are soft and flexible but can rupture if excessive pressure is applied such as when using a syringe less than 10mls.



Picture 1

PICC lines come in various types and number of lumens. Single or Dual lumen PICC's can be chosen at CDHA dependent on the needs of the patient. Unless there is an anticipated need for concurrent IV access, the single lumen PICC should be chosen. Unused lumens may potentially lead to increased incidence of occlusions and therefore increased risk of infection. There is also the option of choosing a power injectable PICC (BARD PowerPICC®). Unlike the regular PICCs this type of PICC has the strength in the catheter for high bolus infusions or high pressure infusions. Power injectable PICCs can be chosen for the patient that is anticipating the need for a CT scan.

Like other central venous access devices (CVAD's) PICC lines are chosen when patients require venous access for greater than 7 days, administration of hyperosmolar solutions (TPN), and continuous infusion of irritant or vesicant drugs. They allow repeated access for blood sampling and IV administration without the trauma of repeated venipunctures. The tip rests in the superior vena cava therefore maximizing hemodilution and potentially decreasing venous irritation.

Unlike other CVADs, PICC lines require adequate antecubital veins and the absence of trauma or infection at this site. It also may be a safer method for accessing the central venous system as complications from insertion such as hemothorax and pneumothorax are eliminated. The risk of venous air embolism is reduced because the insertion site is below the level of the heart.

NURSING PRACTICE STATEMENTS

Pre Insertion Care

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1. Provide and document patient teaching. Include the following: Explanation of the purpose, placement, insertion procedure and post insertion care including what to report to the nurse.
2. The following blood work should be considered: CBC, INR, PTT.
3. Consideration should be given for the type of PICC lines that is most appropriate for the patient. (ie. Power injectable vs non power injectable, single lumen vs multi-lumen)

Insertion Care

PICC's are inserted by nurses, radiologists and the radiology residents/fellows in the interventional radiology departments of CDHA. In some nursing areas across Capital Health, physicians are placing PICC lines in at the bedside with assistance of an RN. The procedure takes less than hour and requires only local anaesthesia. Lines placed at the bedside require x-ray verification of placement prior to use.

Insertion is a sterile procedure (a gown, gloves and mask will be worn, the skin at the insertion site will be cleansed with a antiseptic, sterile equipment and drapes will be used). Patients are required to lie still with arm (usually non-dominant) extended at a 90-degree angle. A tourniquet is applied to the upper arm and a needle is inserted into the cephalic or basilic vein at the antecubital fossa. To prevent cannulation of the internal jugular the physician will ask the patient to turn their head and tilt their chin to their chest as the line is threaded into position.

Check progress note and health record for insertion information. Documentation of PICC length at insertion is required for comparison at time of removal.

The line is saline flushed, capped and stabilized with a securement device. A gauze dressing is placed over the insertion site for the first 24 hours.

Post Insertion Care

Assess the insertion site for bleeding, redness or swelling minimally every 12 hours. Swelling of the upper arm and bleeding at the insertion site are normal for the first 24-48 hours. Assess the arm, shoulder and neck on the side of the PICC for complications (i.e. pain, swelling).

If complications are noted, carry out nursing care as outlined in the complications section.

All patients should be aware of safety precautions and signs and symptoms to report to the health care professionals.

Information for patients on bathing with a PICC line

Do not submerge the catheter under water. Swimming should be avoided. Showering should be permitted if precautions can be taken to reduce the

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likelihood of introducing organisms into the catheter (e.g., if the catheter and connecting device are protected with an impermeable cover during the shower)

Nursing Approach to Patient Teaching:

- begin teaching home care as early as possible for patients in hospital - involve a family member if able;
- assess patients readiness to learn;
- assess most effective method of learning for patient (i.e., pictures, booklet, demonstration, discussion);
- design a teaching schedule so others may reinforce and add to what has been taught;
- explain procedures in terms appropriate for the individual patient;
- encourage the patient/family member to practice in hospital;
- consistently evaluate effectiveness of teaching.

Care and Maintenance of the PICC

Occlusion Prevention:

Regular flushing of the PICC is required to prevent or delay catheter occlusion related to fibrin formation or drug precipitate. This is accomplished by flushing the PICC with 20mLs normal saline following drug administration or blood sampling and every 7 days when not in use. The flushing technique should be a start/stop method, otherwise known as “turbulent flush”. This type of flushing technique helps clear the walls of the PICC line more efficiently than a straight flush. If blood is noted in the catheter or at the hub, flush the PICC with 20mLs normal saline. Always close the clamp of the PICC line after flushing. This will help to prevent backward flow of blood into the catheter during times of changing intrathoracic pressure (e.g. vigorous coughing, vomiting).

- Scrub the hub of the adaptor with a 15 second juicing technique using an alcohol swab
- Flush through the adaptor with two 10mLs preservative free pre filled normal saline syringes using turbulent flushing technique
- Close the clamp during the last mL
- Disconnect the syringe

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p>Occlusion of line -- IV will not infuse.</p> <p>Pump occlusion alarm sounding.</p> <p>Inability to aspirate blood but can flush PICC (Partial occlusion). Inability to aspirate blood or flush PICC (Complete occlusion)</p>	<p>IV tubing or catheter kinked</p> <p>Clamp on IV tubing closed</p> <p>Precipitate or clot in IV tubing or catheter</p> <p>Dressing placed on too tightly</p> <p>Catheter tip lying against the side of the vein</p>	<p>Check IV tubing and PICC for kinks - correct kinks if present.</p> <p>Check clamps to see if closed - release if closed.</p> <p>Check to see if dressing is too tight over the PICC.</p> <p>Check IV tubing, PICC and PICC adaptor for presence of precipitate. Immediately withdraw 6-10mls of blood, flush with normal saline and change IV tubing.</p> <p>Have the patient change his/her position and the position of the arm.</p> <p>Attach a 10ml prefilled syringe of normal saline to adaptor of the PICC, aspirate gently, inject 3-5mls of normal saline and attempt to aspirate again.</p> <p>Do not force.</p> <p>If occlusion persists, notify the doctor and refer to the policy Management of Occluded Central Venous Access Devices. EARLY INTERVENTION IS IMPORTANT.</p> <p>If occlusion problems continue to occur, consider increasing the frequency of flushes.</p>	<p>Do not let IV lines run dry.</p> <p>Flush PICC with saline before and after medication to prevent clogging from drug precipitates.</p> <p>Use good dressing technique to prevent kinking.</p> <p>Ensure dressing is not applied tightly as to occlude the PICC line.</p> <p>Be certain to flush after taking blood samples.</p>

Infection:

Systemic and local infections are possible complications of a central line. A common source of infection is the catheter hub but other potential causes include migration of skin flora up the catheter tract, hematogenous seeding from another site of infection, catheter related thrombus and rarely, contaminated infusate. To decrease the risk of infection from the catheter, aseptic technique is used at all times. Hand hygiene is critical before performing any aspect of line care. Clean non-sterile gloves are worn to minimize the risk of transferring microorganisms from the caregiver’s hands to the patient as well as for the caregiver’s protection. Catheter hubs/connection sites must be disinfected with 70% alcohol or 2% Chlorhexidine Gluconate with 70% Isopropyl Alcohol swabs for 15 seconds using a juicing technique before the system is accessed. A mask is to be worn any time the system is open or the dressing is removed.

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p>Catheter sepsis -- Rise in temperature, increased pulse, chills, malaise, drainage from the insertion site and elevated white blood cell count.</p>	<p>Infection present at insertion site or bacteremia</p>	<p>Obtain blood samples for culture and sensitivity. If drainage is noted from insertion site - send a swab for culture and sensitivity.</p> <p>Notify the physician</p> <p>If PICC is removed, send catheter tip for culture and sensitivity</p> <p>Two potential modes of treatment --</p> <p>(1) Leave catheter in place, treat with antibiotics</p> <p>(2) Remove the catheter -- when infection is resolved, insert another PICC</p> <p>The decision to remove the catheter depends upon the causative organism, the type of catheter and the condition of the patient (e.g., immunocompromised).</p>	<p>Use aseptic technique during all aspects of PICC care</p> <p>Perform hand hygiene thoroughly with antibacterial soap or use alcohol based hand rub and wear clean gloves before caring for the PICC line</p> <p>Change dressings and adaptors as outlined in nursing procedures</p> <p>Scrub adaptor for at least 15 seconds prior to accessing the PICC</p>

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p>Phlebitis -- redness, swelling, heat, pain at PICC insertion site.</p> <p>Usually occurs 48 to 72 hours after insertion</p> <p>Palpable venous cord</p>	<p>Sterile mechanical phlebitis -- this is body's response to a foreign material inside a blood vessel</p>	<ul style="list-style-type: none"> • Assess insertion site for redness and spreading of redness at beginning of each shift. • If no other symptoms (e.g., purulent drainage), there is generally no cause for concern. • If there is some redness, slight swelling and pain with no induration present, do the following: <ol style="list-style-type: none"> 1. Apply warm, moist compresses to the upper arm between the insertion site and shoulder for 20 minutes four times a day. 2. Elevate the extremity 3. Encourage mild exercise of the arm to resolve and control phlebitis <p>*If there is increased redness and swelling at the IV site, a palpable venous cord three or more inches above the insertion site and pain or discomfort is more severe - Notify the physician the catheter may have to be removed.</p>	
<p>Cellulitis - Swelling, heat, pain, purulent drainage, redness which spreads in a circular pattern into the surrounding subcutaneous tissue</p>	<p>Localized insertion site infection</p> <p>Most frequent causative micro-organisms -- staphylococcus epidermidis, staphylococcus aureus</p>	<p>Assess the exit site for signs of cellulitis every shift. If present, notify physician. Antibiotics may be ordered.</p> <p>If purulent drainage, apply a gauze dressing and change this daily and prn. Obtain a swab culture specimen.</p> <p>Increase the number of times per day the dressing is changed if drainage is present.</p>	<p>Use aseptic technique during all aspects of care</p> <p>Perform hand hygiene thoroughly and wear clean gloves before caring for the PICC line</p> <p>Change dressing as outlined in Nursing procedure</p> <p>Change dressing if it becomes soiled or wet</p>

Venous Air Embolism:

To prevent venous air embolus and decrease the risk of infection, open the system only when it is absolutely necessary. Lines should always be clamped when they are not in use. All lines must be clamped before the system is opened. An open system or cleansed connection site should never be set down.

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p><u>Venous Air Embolism</u> -- Chest pain, dyspnea, tachycardia, cyanosis, decreased blood pressure, nausea, confusion</p> <p>*Air embolisms are rare because the PICC insertion site is located in the periphery where there is increased venous pressure.</p>	<p>When 10-20ml of air is trapped in the vein it is carried quickly to the right ventricle. Here it blocks the flow of blood from the right ventricle into the pulmonary arteries thus the right side of the heart overfills. The right ventricle forcefully contracts in an attempt to eject the blood. However, this causes the air bubble to break into smaller air bubbles, which cause more obstruction and pulmonary hypoxia. Pulmonary hypoxia causes vasoconstriction in the lung. This leads to an even greater workload for the right ventricle. Eventually, left ventricular filling is reduced and cardiac output drops, shock and death rapidly occur.</p> <p>May occur on insertion and removal, if catheter is punctured, during adaptor change or if air not removed from IV tubing</p>	<p>If signs and symptoms are noted, place on the left side with feet above the heart (this allows air to enter the right atrium and disperse via the pulmonary artery)</p> <p>Notify the physician</p> <p>Monitor vital signs</p> <p>Oxygen by mask is usually required</p> <p>Stay with the patient</p>	<p>Avoid use of instruments which may puncture catheter (i.e. hemostats, scissors, safety pins)</p> <p>Remove all air from IV tubing prior to use</p> <p>When changing adaptor - close clamp on PICC prior to removing the old adaptor.</p> <p>Advise patient to avoid activities which could dislodge or remove the PICC</p>

Removal of the PICC line

An RN certified in the removal of PICC lines may complete removal of the PICC line. PICC lines are removed following a physician order when therapy is completed or complications such as line sepsis, thrombosis or phlebitis require removal. The removal of a PICC line is not a sterile procedure. Up to 12% of removal procedures experience some form of complication (Macklin, 2000). See table below for details.

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p>An inability to remove PICC-Resistance will be felt when attempting to remove line. If this occurs before 10 cm of the catheter is removed it is possible that a DVT is preventing the removal. Sharp pain and numbness over vein track is an indication of venous spasm.</p>	<p>Venous Spasm- This is most common. The movement of the catheter through valves and curves may stimulate the smooth muscles in the middle layer of the vein to contract. If the removal is for phlebitis this increases the risk of this complication. Vagal reactions may also cause venous constriction and spasm.</p> <p>Thrombosis formation may prevent the catheter from moving in the vein and is the most common cause of resistance when less than 10 cm is removed because there are no valves in the large veins.</p>	<p>Stop reposition arm and try again If unsuccessful and less than 10 cm notify physician, if more than 10 cm try to relax muscle with moist heat to upper arm for 15-20 minutes. A warm drink may also be helpful If still unsuccessful, coil exposed catheter, cover with dressing and notify physician. Often left alone the spasm will subside within 12-24 hours.</p>	<p>Pull catheter 2.5 cm at a time parallel to skin with slow even strokes.</p>

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p>Vagal Reactions- pallor cold sweats nausea, hypotension, and bradycardia resulting in dizziness and fainting.</p>	<p>Emotional reaction to procedure</p>	<p>Stop procedure Place patient in supine position Place cold cloth to forehead and back of neck Use relaxation techniques Provide emotional support</p>	<p>Assess patient's anxiety and explain procedure prior to starting removal.</p>
<p>Catheter Fracture-</p>	<p>Too much tension on the catheter during removal.</p>	<p>Clamp the exposed end if possible and continue removal, if the break is at the insertion site apply tourniquet around upper arm, place patient in high Fowler's position, instruct patient to keep arm still and notify physician.</p>	<p>Pull catheter 2.5 cm at a time parallel to skin with slow even strokes.</p>
<p>The PICC is accidentally removed</p>	<p>Accidental pulling on the catheter</p>	<p>Tell the patient to call immediately for the nurse</p> <p>Place gauze over the exit site and hold in place for 5 to 10 minutes.</p> <p>Apply gauze dressing covered with waterproof tape.</p> <p>Measure PICC and compare to insertion note</p> <p>Call the physician</p> <p>Assess for venous air embolism and take nursing actions listed for this if signs are noted.</p>	<p>Teach patient to:</p> <p>Avoid pulling on the catheter</p> <p>Not engage in activities which could dislodge the catheter</p>

PICC LINE - OTHER COMPLICATIONS

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p><u>Bleeding from the catheter insertion site</u></p> <ul style="list-style-type: none"> Excessive bleeding for more than 24-48 hours after insertion is unusual 	<p>Bleeding occurs if the patient:</p> <ul style="list-style-type: none"> Has some form of coagulopathy Is on an anti-coagulant Is taking over the counter medications which affect platelet count Has undergone a traumatic insertion procedure Has been extremely active post insertion <p>Or if there is:</p> <ul style="list-style-type: none"> Use of a large bore catheter Use of a catheter made of non-flexible material. 	<p>If bleeding is excessive, notify the doctor. The cannula may have to be removed and direct pressure applied to the insertion site.</p> <p>If bleeding occurs immediately post insertion, apply a mild pressure dressing.</p> <p>More frequent dressing changes as well as mild pressure may be needed to control bleeding.</p> <p>The initial dressing should have gauze above the insertion site to absorb the drainage.</p>	<p>Thorough patient assessment to determine the presence of factors which may cause bleeding post insertion (i.e. bleeding disorders, abnormal clotting blood levels)</p> <p>Careful venipuncture technique performed by a competent clinician.</p>
<p><u>Skin sensitivity at insertion site</u> –</p> <ul style="list-style-type: none"> Irritated or inflamed skin in the area of the transparent dressing -Patient complains of discomfort under the dressing 	<p>Sensitivity to 2% Chlorhexidine Gluconate with 70% Isopropyl Alcohol</p> <p>Sensitivity to the transparent dressing</p> <p>Not allowing complete</p>	<p>Consider changing the antiseptic of choice to 0.5% Chlorhexidine Gluconate with 70% Isopropyl Alcohol.</p> <p>Consider changing the antiseptic to 10% Povidine Iodine. To achieve the maximum antiseptic effectiveness it must be applied for a total of 2 minutes and allowed to remain on the skin once</p>	<p>Allow antiseptic and skin protectant to completely dry prior to applying the new dressing.</p>

PICC LINE - OTHER COMPLICATIONS

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
	drying of antiseptic prior to dressing application	dry. Try an alternate transparent dressing (e.g. IV 3000™) or gauze dressing.	
<p><u>Catheter tip migration</u> - referred pain in the jaw, ear or teeth;</p> <ul style="list-style-type: none"> - distended veins on the side of the PICC; - the length of the catheter from the insertion site is increased - pain during infusion or flushing. - sluggish drip rate during infusion. - inability to aspirate blood. 	<p>Types of patients most susceptible:</p> <ul style="list-style-type: none"> • Oncology patients who experience frequent nausea and vomiting • Patients who are physically active • Respiratory patients who have severe bouts of coughing. <p>In these three instances there may be an increase in intrathoracic pressure causing spontaneous migration of the tip of the catheter.</p> <p>A pull on the PICC could cause dislodgement of the catheter</p>	<p>Assess for signs and symptoms of catheter migration (see signs and symptoms).</p> <p>Teach the patient to observe for these and notify RN if present.</p> <p>Measure the length of the catheter from the insertion site and compare this to the baseline to determine if increased.</p> <p>If these are present, notify the physician. The physician will have catheter tip placement verified by x-ray.</p> <p>**Do not attempt to reinsert**</p>	<p>Medicate conditions that could cause nausea and vomiting, severe bouts of coughing.</p> <p>Teach patients to engage in activities that require less physical activity (i.e. brisk walking).</p> <p>Avoid pulling on the catheter -- Teach the patient to avoid activities which could dislodge the catheter.</p> <p>Ensure the transparent dressing and securement device are applied securely.</p>

PICC LINE - OTHER COMPLICATIONS

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p><u>Pain during infusion</u> -- Most frequent in cephalic vein placement and mid arm and midline catheters due to reduced blood flow and decreased hemodilution to these areas</p>	<p>The pain along the catheter tract is usually due to chemical properties of the infusate, which causes irritation, vasospasm, and phlebitis.</p> <p>Rate and frequency of infusate have found to be factors, which cause chemical phlebitis.</p>	<p>Slow the rate of administration</p> <p>Increase the dilution of the infusate.</p> <p>Apply warm compresses during infusion -- this will decrease pain by increasing hemodilution around the catheter.</p> <p>If vesicant or irritant cancer chemotherapy - follow the Policy and Procedure for cancer chemotherapy.</p>	
<p><u>Leaking or Broken catheter</u> -- Blood or fluid leaking from the PICC</p>	<p>Tear or hole in the catheter caused by:</p> <p>Clamping the PICC with instruments (i.e. hemostats) Clamping devices should never be used on PICC lines because they may cause tears.</p> <p>Accidental cut with a sharp instrument during a dressing change</p> <p>Improper dressing change (i.e. catheter is left exposed)</p> <p>Rupture caused by use of a small syringe</p>	<p>Clamp the tubing between the break and the skin with rubber clad or gauze wrapped hemostats</p> <p>If the break is at the insertion site, apply tourniquet around upper arm, place patient in high Fowler's position, instruct patient to keep arm still</p> <p>Notify physician</p>	<p>Never use any type of clamping device on the PICC.</p> <p>Do not use sharp instruments or scissors during dressing changes.</p> <p>Use a 10ml syringe to flush the PICC</p> <p>Use gentle pressure on the plunger.</p> <p>Use dressing and tape to secure the PICC connector.</p>

PICC LINE - OTHER COMPLICATIONS

Complications Signs and Symptoms	Possible Cause	Nursing Actions	Best Practice
<p>Fluid Leaking from the cap/IV connection of the PICC</p>	<p>Loose tubing connection.</p>	<p>Tighten adaptor and IV tubing. May need to change adaptor. If PICC was saline locked, the catheter will have to be saline locked again.</p>	<p>Use leur lock connectors. Ensure adaptors are screwed on tightly to the hub of the PICC or extension set.</p> <p>May need to consider using tape to secure connection in some circumstances.</p>
<p>Deep vein thrombosis of the subclavian vein -- This is rare. Swelling in the arm, distension of the veins of the arm and neck on the side in which the PICC is located. The IV solution may not infuse and the patient may have pain in the neck, scapula, arm or ear.</p>	<p>Injury to the intima of the wall of the vein.</p> <p>Obstructed blood flow by clot formation.</p> <p>Changes in composition of the blood.</p>	<p>Measure upper arm circumference in both arms in the same area and compare measurements. Notify the physician</p>	

Self-Test

1. Three indications for use of the PICC lines are:

2. Two contraindications for use of the PICC lines are:

3. Describe placement of the PICC. Include the two major veins used and placement of the catheter tip.

4. Two nursing responsibilities prior to insertion of the PICC are:

5. Three nursing responsibilities following the insertion of the PICC are:

6. Twelve hours post-insertion the nurse notices the insertion site to be slightly reddened and swollen. Three nursing responsibilities at this time are:

7. The IV solution will not infuse. Nursing actions at this time are/CT Technologist actions are:

8. Signs and symptoms the patient will experience if catheter migration occurs are:

9. Two reasons for flushing the PICC line are:

10. When administering medications intermittently, the SAS method must be used. Describe the SAS method:

11. The adaptor of the PICC should be changed every ____ days.

12. When flushing the PICC line, the RN/CT technolgist uses a 10ml syringe. The reason for this is:

13. Describe turbulent flush and explain the reason for using this technique:

14. When flushing the PICC line, why is it important to clamp after flushing?

15. Before using the PICC line, the RN/CT Technolgist must check for patency and catheter placement in the vein. This is accomplished by:_____

16. What are two signs and symptoms of a partial occluded PICC line that would prompt the nurse to contact a physician for occlusion management of the PICC?

_____ or _____

17. Following the initial dressing change, the PICC line dressing is changed _____ times per week.

18. The following four questions concern withdrawing of blood from a PICC.
- a) When taking blood samples (not a blood culture) from a PICC, the first blood sample is withdrawn and discarded. The reason for this is:

 - b) The amount of blood to be discarded prior to collecting the blood samples except for blood cultures is:
_____.
 - c) Following blood collection the PICC is always flushed with ___ mL normal saline. The reason for this is:
_____.
19. When removing the PICC line the RN grasps the line just below the insertion site and slowly pulls out 1 inch then grasps the line at the insertion site and pulls out another inch.

The reasons for this are:

- 20 Following removal of the PICC line the RN observes the line for:
_____ and _____

21. What is the most common complication encountered when removing a PICC and what nursing actions are needed?

- 22 .What nursing actions are required for a PICC that breaks during removal?

Self-test Answers

1. Long-term venous access more than seven days
Infusion of hyperosmolar solution -- leads to reduced risk of venous irritation because of greater hemodilution
Repeated access to the venous system
Continuous intravenous infusion of irritants or vesicants.
2. Patient with inadequate veins in the antecubital area
Inability of the clinician to locate veins in the antecubital area
Presence of an infection in the antecubital area
Patients with injury or trauma to the antecubital area
3. The PICC is inserted under sterile conditions. The catheter is placed in the Basilic or Cephalic vein via the antecubital fossa of the arm. The catheter is threaded into the central circulation. The tip is located in the lower third of the superior vena cava.
4. Teach the patient what to expect during and following the procedure
Assemble equipment necessary for the clinician to insert the PICC
5. Measure the length of the catheter from the insertion site with first dressing change
Assess the exit site for bleeding
Assess the arm in which the PICC is inserted for pain and swelling.
Change the initial dressing 24 hours after insertion and as necessary if it becomes wet with blood.
6. Apply warm compresses to the upper arm between the insertion site and the shoulder for 20 minutes four times a day.
Elevate the arm in which the PICC is inserted
Encourage mild exercise of the arm (i.e. ADL)
7. **RN/CT Technologist**: Have the patient change his/her position -- change the position of the arm in which the PICC is inserted. **RN ONLY**: Attach a 10 ml normal saline prefilled syringe to the PICC adaptor. Attempt to aspirate blood, if unsuccessful instill 3-5 mls of saline and reattempt aspiration. Assess patient for

- drug precipitate, signs and symptoms of catheter migration or DVT. Line maybe partially or totally occluded, notify physician.
8. Referred pain in the jaw, ear or teeth on the side of the PICC
Distended neck veins on the side of the PICC
The length of the catheter from the insertion point has increased.
 9. To prevent or delay catheter occlusion related to fibrin formation or drug precipitate.
To prevent clot formation in the catheter and at its tip.
 10. SAS is used when the PICC is used for intermittent administration of medication. This is done to eliminate problems with incompatible drugs:
S - **Saline** flush with one 10mL preservative free normal saline prefilled syringe
A - **Administration** of the medication
S - **Saline** flush with two 10mL preservative free normal saline prefilled syringes
 11. Every 7 days
 12. The 10ml syringe reduces the amount of pressure exerted on the PICC -- reduces the chance of rupture of the catheter.
 13. Turbulent flushing is best described as a stop/start motion as you flush, which helps clear the walls of the Central Venous Access device.
 14. To prevent backward flow of blood into the catheter during times of changing intrathoracic pressure (e.g. vigorous coughing, vomiting).
 15. Aspirating gently on the plunger of the syringe to verify blood return and instilling saline.
 16. Able to infuse fluid but blood return is sluggish or able to infuse fluid but blood return is absent on aspiration.
 17. Once weekly.
 18. a) Blood is withdrawn and discarded prior to collecting a blood sample to avoid contamination of the sample with heparin or IV infusate.

- b) The amount of blood to discard prior to collecting is 6mL to 10mLs. Prior to taking blood cultures no blood is discarded.
 - c) The PICC is flushed with two 10ml prefilled syringe of sterile preservative free normal saline following blood collection. The reason for flushing with normal saline is to maintain patency of the vein.
19. Allows greater control to remove catheter without stretching it and decreases risk of venospasm.
 20. Integrity of tip and catheter length.
 21. Venous spasm – patient reports a sharp pain or numbness over the vein track. You will feel as though you have hit an obstruction. Nursing actions: reposition arm and reattempt removal. If resistance continues try applying warm, moist heat to upper arm for 15–20 minutes and reattempt gentle removal. If still unsuccessful, apply moist heat to hand below insertion site and give patient warm drink. If still unable to remove catheter, stop, redress and cover extremity to keep warm and notify physician.
 22. If break occurs in portion of catheter that has already been pulled out, at least more than 1 inch from insertion site, clamp exposed end and continue removal.
 - If break occurs at insertion site, clamp it and apply tourniquet to upper arm in order to trap internal fragment. Check radial pulse to ensure that arterial flow not occluded. Place patient in high Fowlers and instruct to keep arm still. Notify physician.

If break occurs with no part of the catheter visible then apply tourniquet at the highest part of the upper arm, check radial pulse, position patient in high Fowlers notify physician. Monitor patient for emboli. If signs and symptoms of emboli noted then place patient on left side in Trendelenburg, apply oxygen, notify physician and monitor vitals.

PROFICIENCY STANDARD SKILLS CHECKLIST

TITLE: Flushing the PICC Line - RN

Name:

Unit:

Evaluator:

Date:

Critical Behaviours Performed	Yes	No
1. Cleans hands with antibacterial soap or use alcohol based hand rub and applies non-sterile gloves.		
2. Scrub the top of adaptor of the PICC with alcohol swab for minimum 15 seconds with a juicing action		
3. Attaches 10mL prefilled syringe normal saline to the adaptor of the PICC, open clamp		
4. Determines patency by pulling gently on the plunger of the syringe to verify blood return		
5. Using turbulent flush injects two 10mL prefilled saline syringes, closes clamp during the last mL and removes syringe from adaptor.		
6. Cleans hands		
7. Documents		

PROFICIENCY STANDARD SKILLS CHECKLIST

TITLE: Changing the PICC Adaptor- RN

Name:
Evaluator:

Unit:
Date:

Critical Behaviours Performed	Yes	No
1. Masks and performs hand hygiene with antibacterial soap or use alcohol based hand rinse and applies non-sterile gloves.		
2. Ensures lumen clamp is closed		
3. Prime new Adaptor		
4. Scrubs connection of the PICC with alcohol swab (allows to dry) and does not put line down once cleansed		
5. Removes old adaptor and immediately attaches the new adaptor tightly using sterile technique, aspirates for blood return and flushes using turbulent technique with two 10 mLs prefilled normal saline syringes. Closes clamp during the last mL and disconnects syringe.		
6. Clean hands		
7. Document in the MAR		

PROFICIENCY STANDARD SKILLS CHECKLIST

TITLE: **Changing the PICC Dressing**

Name:
Evaluator:

Unit:
Date:

The RN or LPN will perform the above procedure consistent with the skills checklist.

Critical Behaviours Performed	Yes	No
1. Washes hands with antibacterial soap or uses alcohol based hand rub, applies non-sterile gloves and applies a mask		
2. Set up sterile dressing tray and add supplies. Or prepare equipment maintaining asepsis.		
3. Removes old dressing – stabilizes hub with one hand		
4. Assesses insertion site for signs of inflammation or infection		
5. Removes securement device		
6. Perform hand hygiene and apply clean gloves		
7. Using swab sticks clean the catheter with antiseptic solution. Clean the insertion site by scrubbing over the catheter in a horizontal pattern and then vertical pattern. Cleanse the skin beginning at the insertion site with a circular motion (middle to outward) extended in 5cm in diameter coverage. Repeat in the other direction. Minimum total of 1 minute cleansing.		
8. Next clean the line to include the wings of the PICC. Beginning at the insertion site top of the catheter down the line. Then clean the back of the catheter from insertion site down Keeping catheter elevated off skin, allow for complete drying.		
9. Perform hand hygiene and apply sterile gloves.		
10. Applies skin protectant to securement site, allows to dry. Places catheter wings into posts of securement device, closes retainer doors and peels away paper backing. Then applies securement device to skin		

Critical Behaviours Performed	Yes	No
11. Applies a transparent dressing, ensuring the exit site and securement device is covered.		
12. Cleans hands		
13. Documents in the kardex and MAR		

PROFICIENCY STANDARD SKILLS CHECKLIST

TITLE: **Blood Withdrawal from a PICC line- RN**

Name:

Unit:

Evaluator:

Date:

Critical Behaviours Performed	Yes	No
1. Performs hand hygiene with antibacterial soap or use alcohol based hand rub and applies non-sterile gloves.		
2. Places extended arm with the PICC at a 45 to 90 degree angle.		
3. Stops all infusions and clamps lumens for one minute.		
4. Scrubs adaptor of the PICC with an alcohol swab. Note: If IV attached cleanse connection site with alcohol swab and removes IV tubing placing a sterile safety needle or sterile cap on the end of the tubing to maintain sterility.		
5. Attaches a 10ml syringe to the adaptor and withdraws 6-10mls of blood for discard.		
6. Attaches vacutainer holder and luer adaptor to needleless connector. Inserts blood tubes to obtain samples according to order of draw.		
7. Removes vacutainer setup and scrubs adaptor with alcohol swab. Flushes the PICC with two 10mL prefilled preservative free normal saline syringes.		
8. If obtaining sample using a syringe method, uses a vacutainer with a needleless luer-lok adaptor (blood transfer device), to transfer blood from the syringe to the blood tubes.		
9. Cleans hands		
10. Complete requisition and labelling of tubes at bedside confirming patient identity with armband. Document.		

PROFICIENCY STANDARD SKILLS CHECKLIST

Title: Removal of a Peripherally Inserted Central Catheter (PICC) - RN

Name:
Evaluator:

Unit:
Date:

Critical Behaviours Performed	Yes	No
1. Washes hands with antibacterial soap or use alcohol based hand rub and applies non-sterile gloves and mask.		
2. Assembles dressing tray and applies clean gloves.		
3. Positions patient with arm at 45–90 degree angle to trunk of body and places tourniquet under upper arm ready for use if required		
4. Removes dressing – stabilizing hub with one hand – wearing disposable gloves		
5. Clean insertion site with alcohol swab		
6. Grasps PICC line with gloved hand close to insertion site and slowly pulls out 2.5 cm (1 inch). Releases catheter and grasps again close to insertion site and repeats maneuver until catheter completely removed. Applies appropriate measures if resistance is encountered.		
7. Applies pressure with gauze until bleeding stops		
8. Applies sterile dressing		
9. Assesses catheter tip and report to the physician if it is not intact. Compare measurement of PICC to length documented under the insertion note in the chart. If there are any discrepancies then notifies the physician.		
10. Cleans hands		
11. Document		

PROFICIENCY STANDARD SKILLS CHECKLIST

Contrast Injection via PICC (Peripherally Inserted Central Line) for CT Technologists

Name:

Unit:

Evaluator:

Date:

Critical Behaviors Performed	Yes	No
1. Washes hands with antibacterial soap or uses waterless hand rinse and applies non-sterile gloves		
2. Assess line insertion site. Look for redness, swelling, type of PICC [Is it power injectable line?]		
3. Cleans needless adaptor with an alcohol or CHG/alcohol swab using a scrubbing motion for minimum 15 seconds.		
4. Attaches pre-filled saline syringe [10ml] to the adaptor		
5. Determines patency of line by pulling gently on the plunger of the syringe to obtain blood return		
6. Injects the saline slowly using a turbulent/stop start method and removes the syringe from the needless adaptor		
7. Cleanses the needless adaptor [as above] and then attaches the primed tubing of contrast medium. Initiates injection of contrast via infusion device		
8. Once infusion is complete removes tubing from adaptor and flushes with 20ml of Saline as per steps 4 and 6		
9. Clamps tubing during last ml of flush. Re starts IV infusion if necessary.		
10. Document		