

PERIPHERALLY INSERTED CENTRAL CATHETER (PICC LINE) ACCESS

A Peripherally Inserted Central Line (PICC) is a common method of maintaining long-term venous access in select patients. PICC lines are typically inserted into the antecubital fossa, and then threaded into central circulation. PICC lines are frequently flushed with heparin to maintain patency and therefore it is imperative to aspirate 5 ml of blood from the line prior to use.

Note: PICC line access shall *NOT* be performed simply for prophylactic access.

A. INDICATIONS:

1. Immediate vascular access in life-threatening emergencies.
2. Intravenous fluids or medications are urgently needed and peripheral intravenous access cannot be established in a timely manner **AND** the patient exhibits **one (1) or more** of the following:
 - a. Altered mental status (GCS \leq 8).
 - b. Respiratory compromise (pulse oximeter \leq 90% after appropriate O₂ therapy, or respiratory rate <10 or >40).
 - c. Hemodynamic instability (systolic BP <90).
3. PICC line access may be considered **prior** to peripheral IV attempts where successful rapid peripheral IV placement is doubtful, as in the following situations:
 - a. Cardiac arrest (medical or trauma).
 - b. Profound hypovolemia with altered mental status.
 - c. Patient in extremis with immediate need for medication or intravenous fluids (i.e. patient in status epilepticus, impending arrest, etc.).
4. Patient or patient's caregiver requests use of PICC line and accepted risks of complications including infection, catheter damage and embolus.

B. CONTRAINDICATIONS:

1. Inability to aspirate or infuse through the catheter.
2. Catheter located in any place other than the patient's upper arm.

PERIPHERALLY INSERTED CENTRAL CATHETER (PICC LINE) ACCESS

3. Need for rapid fluid resuscitation.

C. PROCEDURE:

1. Use clean gloves and maintain sterility as much as possible.
2. If there is a needleless type port on the distal end of the catheter, perform the following:
 - a. Scrub the port with an alcohol pad for at least 15 seconds and allow drying for at least 5 seconds.
 - b. Attach a 10 ml syringe (without saline) to the port.
 - c. Unclamp if necessary (needleless ports may not have a clamp)
 - d. Attempt to aspirate at least 5 ml of blood. Blood should draw freely. If it does not, remove the syringe and **DO NOT use the catheter** for access.
 - e. If blood aspirates freely, remove the 10 ml syringe with blood and discard.
 - f. Attach a 10 ml syringe with NS and gently flush the line. **Never** use a smaller syringe. If line does not flush, remove the syringe and **DO NOT** use the catheter for access.
 - g. If line flushes, remove the syringe and attach the catheter to the end of the IV tubing and begin infusion of NS. Adjust the rate appropriate to the needs of the patient within the limits of the catheter.
 - h. Administer medications through IV tubing port if indicated.
 - i. IV maintenance fluids must be administered to keep line open during transport
3. If there is a capped needle-type port on the distal end of the catheter, perform the following:
 - a. Scrub the cap with an alcohol pad for at least 15 seconds and allow drying for at least 5 seconds.
 - b. Clamp the catheter tubing using **ONLY** the existing clamp on the catheter and then remove the cap. **Never allow a central line to be open to air.**

PERIPHERALLY INSERTED CENTRAL CATHETER (PICC LINE) ACCESS

- c. Attach a 10 ml syringe on the catheter end.
- d. Unclamp the catheter.
- e. Attempt to aspirate at least 5 ml of blood. Blood should draw freely. If it does not, re-clamp the line and remove the syringe. **DO NOT** use the catheter for access.
- f. If blood aspirates freely, clamp the catheter again.
- g. Remove the 10 ml syringe with blood and discard.
- h. Attach a 10 ml syringe with NS.
- i. Unclamp and gently flush the line. Never use a smaller syringe. If line does not flush, re-clamp the line and remove the syringe. **DO NOT** use the catheter for access.
- j. If line flushes, re-clamp and remove the syringe.
- k. Attach the catheter to the end of the IV tubing.
- l. Unclamp the catheter and begin infusion of NS. Adjust the rate according to the needs of the patient within the limits of the catheter.
- m. Administer medications through IV tubing port if indicated.
- n. IV maintenance fluids must be administered to keep line open during transport.

D. NOTES & PRECAUTIONS:

- 1. **Do not** administer medications, flush or aspirate with less than a 10 ml syringe. Smaller size syringes generate too much pressure and can damage the catheter.
- 2. **Do not** attempt to re-inject aspirated blood as it may contain clots.
- 3. The maximum flow rate for a PICC line is 125 ml/hr for less than a size 2.0 French and 250 ml/hr for catheters over a size 2.0 French.

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4. Keep patient's arm straight to avoiding kinking the PICC line and obstructing flow.
5. Ensure all line connections are secure.
6. PICC lines access the patient's central circulation and the risk of infection is high. Avoid contamination to ports and connections while accessing.
7. **Cautions administering the following medications through a PICC line:**
 - a. **Adenosine** - The line may rupture during rapid infusion due to over pressurization.
 - b. **Dextrose 50%** – The catheter can be damaged by due to the viscosity of the fluid and pressurization.

Potential Complications of Peripherally Inserted Central Catheters	
Complication	Signs and Symptoms
Air embolus	Hypotension, lightheadedness, confusion, tachycardia, anxiety, chest pain, shortness of breath
Catheter embolus	Shortness of breath, confusion, pallor, lightheadedness, tachypnea, hypotension, anxiety, unresponsiveness, shorter catheter measurement on removal than inserted length
Arterial puncture (during insertion)	Bright red blood, pulsatile bleeding at insertion site, retrograde flow in IV tubing, can be verified by arterial blood gas test on sample aspirated from PICC
Cardiac arrhythmia	Irregular pulse, palpitations, atrial or ventricular arrhythmia on cardiac monitor
Nerve injury or irritation	Shooting "electric shock sensation" of pain down arm during insertion, numbness, tingling, weakness of extremity, paralysis
Inability to advance catheter to desired tip termination	Catheter will not advance
Catheter malposition (can occur during insertion, or after insertion)	Patient hears gurgling sound during flushing of catheter (internal jugular tip malposition), arm or shoulder pain, headache, swelling in neck, dyspnea, discomfort during infusion, absence of blood return, leaking at insertion site, arm swelling, back discomfort, chest pain or tenderness, arrhythmia symptoms
Infection	Fever, chills, tachycardia, fatigue, muscle aches, weakness, hypotension, erythema, swelling at site, induration, purulent drainage at site, elevated white blood cell count
Phlebitis	Erythema, pain at access site, streak formation, palpable venous cord, purulent drainage
Difficult removal of PICC	Resistance met at any point during removal of catheter