Peripherally Inserted Central Catheters (PICCs)

LEARNING PACKAGE

- General Nursing Procedures: CVC - Care of PICCs (Accessing, Dressing Changes, Tubing & Adapter Changes, Flushing)

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1.0 INTRODUCTION/GENERAL INFORMATION

1.1 This package provides information for nursing staff to review Peripherally Inserted Central Catheter (PICC) theory and nursing care.

1.2 The nurse will:

1.2.1 Review the learning package and complete the review quiz.

1.2.2 Practice PICC care skills: tubing changes, adapter changes, flushing, dressing and site care, of PICCs in a simulated lab and/or clinical setting as required.

2.0 OBJECTIVES

2.1 Upon completion of this learning package the nurse should be able to:

- describe catheter characteristics and indications for use
- identify the standards for PICC care and use
- identify the potential complications of PICCs, and recognize the need for consultation & collaboration
- understand and complete procedures required for PICC line care

3.0 THEORY

3.1 What is a Peripherally Inserted Central Catheter (PICC)?

A PICC is a central venous catheter that is inserted in a peripheral vein and threaded into a large central vein with the tip placed outside the right atrium, usually in the superior vena cava.

A client may have a PICC inserted for the following reasons:
- administration of IV fluid, parenteral nutrition, blood products, medications (i.e. extended antibiotics and other therapies)
- when client has limited peripheral venous access
- administration of irritant medications
- blood sampling
- venous access over several weeks to as long as required
PICC characteristics:
- biocompatible and radiopaque, made of polyurethane or silicone.
- some catheters have an antimicrobial and/anti-biofilm coating.
- available in single, double or triple lumen and in different lengths.
- lumens exit side by side
- inserted above (or below) the antecubital fossa - usually in the basilic or cephalic vein and threaded through the subclavian vein into the superior vena cava
- percutaneous insertion by the physician under local anaesthetic in Medical Imaging
- tip is situated centrally unless it can’t be advanced past the clavicle - in this case, the tip position will be indicated in the practitioners’ notes. Not all therapies are appropriate for a catheter placed in this way. Consultation with an RN is required.
- sutured in place
- Some PICCs do not have clamps due to the presence of a pressure activated safety valve (PASV) inside their hubs. The PASV keeps the line “closed” so no external clamp is necessary. It reduces the risk of bleeding from the PICC, air embolism and occlusion.
- lumens that are not directly connected to an IV line must be flushed to maintain patency (See PICC Adult or Pediatric Standards - Appendix A & B)
- if not connected directly to IV tubing, must have an appropriate adapter attached
Special Issues

- mechanical phlebitis may be observed in the first week after insertion - the catheter may still be used and usually does not need to be removed
- PICCs are more susceptible to kinks and damage from mechanical trauma than other external lines
- small lumen size may limit PICC use. It can’t be used for acute fluid resuscitation and may make blood withdrawal difficult.
- lower risk of infection and air embolism
- do not draw blood or take B/P on arm with a PICC
- removed by certified Registered Nurses or physicians

Needleless Connector (Microclave clear)

- a needleless connector is used on all PICC lumens that are not directly connected to IV tubing.
- the connectors are scrubbed for at least 15 seconds with an alcohol swab before accessing
- the connectors are changed every 7 days or with tubing changes, if removed for any reason, if there is residual blood or residue within the needleless connector and prior to drawing a blood sample for blood cultures
### Complications & Causes

<table>
<thead>
<tr>
<th>COMPLICATIONS &amp; CAUSES</th>
<th>SIGNS &amp; SYMPTOMS</th>
<th>TREATMENT/NURSING ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Air Embolism</strong></td>
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<tr>
<td>- Lower risk with PICCs</td>
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<tr>
<td>- Air may enter central circulation</td>
<td>anxiety, hypotension, confusion, unresponsiveness, cyanosis, tachycardia, chest pain, dyspnea, apnea, precordial murmur</td>
<td>If air enters central circulation:</td>
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<tr>
<td>- During insertion</td>
<td></td>
<td>- Clamp the PICC as close to the insertion site as possible to prevent more air from entering</td>
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<tr>
<td>- From breaks in catheter or administration system</td>
<td></td>
<td>- Position client on left side in Trendelenburg - the pulmonary artery will now be below the right ventricle; the air will rise to the wall of the right ventricle and blood flow from the ventricle will improve</td>
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<tr>
<td>- During tubing/cap changes</td>
<td></td>
<td>- Consult an RN and notify physician</td>
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<td>- Air in the vascular system has the potential to impede and/or obstruct circulation</td>
<td></td>
<td>- Administer 100% oxygen by mask</td>
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<td>- Monitor vital signs including oxygen saturation</td>
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<td><strong>2. Catheter Occlusion</strong></td>
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<tr>
<td>- The PICC may become occluded by:</td>
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<tr>
<td>- The formation of thrombus or fibrin sheath</td>
<td>the PICC may exhibit:</td>
<td>- Prevent occlusion by flushing with a stop and start motion following blood withdrawal or administration and before &amp; after medication administration</td>
</tr>
<tr>
<td>- The catheter tip may be against the wall of the vein</td>
<td>- Inability to infuse fluids and/or inability to aspirate blood</td>
<td>- Change client’s position, lower head, rotate shoulders, move arm</td>
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<tr>
<td>- Failure to flush according to Standards</td>
<td>- Back tracking of fluid along catheter under fibrin sheath</td>
<td>- Have client cough</td>
</tr>
<tr>
<td>- Running infusions too slowly</td>
<td></td>
<td>- If able to infuse, flush rapidly with saline then re-attempt aspiration</td>
</tr>
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<td>- Failure to use infusion pump correctly</td>
<td></td>
<td>- DO NOT ATTEMPT TO IRRIGATE BLOCKED PICC</td>
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<tr>
<td>- Kinked tubing or catheter</td>
<td></td>
<td>- If the above are unsuccessful, notify the physician/ consult Medical Imaging</td>
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<td>- Precipitation of medications</td>
<td></td>
<td>- Physician may use a thrombolytic or other agent to restore patency</td>
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<tr>
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<tr>
<td><strong>3. Infection/Sepsis</strong></td>
<td>• systemic: - fever, chills, tachycardia - increased WBC</td>
<td>• HANDWASHING is the single most important preventative measure against nosocomial infection</td>
</tr>
<tr>
<td>• may be local and/or systemic</td>
<td>• local: (exit site, port pocket or tunnel) - redness - drainage from site - tenderness</td>
<td>• maximum sterile barrier precautions on insertion</td>
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<tr>
<td>• related to aseptic technique at insertion</td>
<td></td>
<td>• follow standard dressing and accessing protocols</td>
</tr>
<tr>
<td>• related to aseptic technique during use/care of the PICC as well as dressing technique, site, duration and IV fluid</td>
<td></td>
<td>• assess site daily</td>
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<td>• highest risk with Parenteral Nutrition (PN) administration</td>
<td></td>
<td>• consult RN if problems with site</td>
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<td>• immunocompromised clients at higher risk</td>
<td></td>
<td>• if drainage, replace transparent dressing with gauze dressing (then, must be changed once a day)</td>
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<td>• risk increases with number of lumens</td>
<td></td>
<td>• dedicate one lumen to PN - access this lumen only for PN</td>
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<td>• associated with thrombus formation/fibrin sheath</td>
<td></td>
<td>• blood cultures - peripheral and catheter sources</td>
</tr>
<tr>
<td><strong>4. Venous Thrombosis (especially axillary or subclavian)</strong></td>
<td>• may be asymptomatic</td>
<td>• removal of PICC after screen for other sources of infection</td>
</tr>
<tr>
<td>• resulting from injury to endothelium, decreased blood flow or changes in coagulation</td>
<td>• edema of the limb closest to the catheter</td>
<td>• send catheter tip for culture</td>
</tr>
<tr>
<td>• large diameter catheter in a small vessel</td>
<td>• difficulty maintaining infusion rates</td>
<td>• antibiotic therapy</td>
</tr>
<tr>
<td><strong>5. Nerve Injuries</strong></td>
<td>• pain or discomfort during or after insertion of any type of CVC</td>
<td>• Consult RN and notify the physician immediately</td>
</tr>
<tr>
<td>Can occur during insertion or while indwelling CVC due to injury of nerves from direct trauma, compression from the catheter or from inflammation from infiltration/extravasation</td>
<td>• Respiratory difficulties or dyspnea and changes in the eye such as pupil constriction or upper eyelid drooping</td>
<td>• dependent upon location and size of the thrombus</td>
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<td></td>
<td>• Right shoulder and neck pain, distended neck veins and hiccups can also signal inflammation and potential nerve injury</td>
<td>• consult Medical Imaging</td>
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<td></td>
<td></td>
<td>• assess hematology values</td>
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<tr>
<td></td>
<td></td>
<td>• anticoagulation therapy</td>
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<td></td>
<td></td>
<td>• Report any symptoms of pain, tingling or numbness to physician immediately</td>
</tr>
<tr>
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<tr>
<td>6. Malposition/Displacement of the Tip Outside the Superior Vena Cava (e.g. into another vein or extravascular)</td>
<td>may be asymptomatic&lt;br&gt;sluggish gravity drip rate&lt;br&gt;increasing external catheter length&lt;br&gt;difficulty with aspiration and/or infusion&lt;br&gt;leaking at the site&lt;br&gt;arm, shoulder or chest pain&lt;br&gt;vague back discomfort&lt;br&gt;client reports “ear gurgling” on infusion (if tip in internal jugular vein)&lt;br&gt;arrhythmias if tip is in right atrium</td>
<td>stop infusion&lt;br&gt;consult RN&lt;br&gt;notify physician&lt;br&gt;consult Medical Imaging&lt;br&gt;physician may flush rapidly with saline to restore position if there is no resistance to infusion&lt;br&gt;prevent slippage/removal by carefully securing catheter with dressing and/or tape&lt;br&gt;may spontaneously resolve</td>
</tr>
<tr>
<td>7. Catheter Damage - External</td>
<td>fluid leaking from catheter&lt;br&gt;moist dressing&lt;br&gt;symptoms of air embolism</td>
<td>clamp catheter&lt;br&gt;consult RN&lt;br&gt;replacement of PICC&lt;br&gt;as for air embolism</td>
</tr>
<tr>
<td>8. Phlebitis</td>
<td>symptoms include pain/tenderness, erythema, warmth, swelling induration, purulence or palpable venous cord</td>
<td>consult RN&lt;br&gt;notify physician</td>
</tr>
<tr>
<td>9. Infiltration and Extravasation (infusing into tissues)</td>
<td>pain, burning or stinging during infusion&lt;br&gt;may be local swelling</td>
<td>flush with saline before giving any medications through the PICC&lt;br&gt;stop the infusion if client complains of pain, burning, stinging, at or around the insertion site or along the venous pathway&lt;br&gt;consult RN&lt;br&gt;notify physician&lt;br&gt;consult Medical Imaging</td>
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</tbody>
</table>
3.3 Care of the Client with a PICC

Accessing a PICC
- Lumens must have an end cap attached at all times (exception – continuous infusion with tubing attached. Upon disconnection of the tubing, an end cap must be applied to the lumen.)
  - End caps include: needleless adapters (MicroClave Clear connector), dead enders. (Dead enders are only used on Home Care clients in the community).
  - Needleless adapters are accessed with tubing or a syringe. You can’t use a needle to access these adapters.
  - MicroClave Clear connector is neutral pressure; doesn’t allow blood back into the catheter when the syringe or tubing is disconnected.
- Administer Intermittent medications/fluid through a needleless adapter or tubing port
- Clean needleless adapters for 15 seconds using an alcohol swab and friction in a twisting motion prior to accessing (Scrub the hub)
- Check patency by attaching a 10mL prefilled saline flush, flush with 1-2 mLs then gently withdraw blood. Once blood can be seen in the lumen, flush with the remainder of the saline flush using a stop and start technique. If you are unable to flush or withdraw blood, contact the physician.
- For continuous infusions, directly connect tubing to the lumen. An adapter isn’t required.

Dressing Change
- PICCs must have a dressing over the insertion site at all times.
- Assessment at the time of dressing change includes:
  - Drainage at site – purulent drainage can indicate an infection, clear drainage can indicate a catheter leak or back-up due to fibrin formation, bleeding should stop after a day or two – prolonged or increased bleeding is not normal.
  - Sutures or securement device are intact.
  - Signs of catheter slippage – the length of catheter you see at the exit site should not change.
  - Signs of inflammation or mechanical phlebitis.
• Immediately after insertion, a gauze dressing may be required for the first few hours or days if there is increased bleeding from the site
  o Gauze dressings must have a border of tape around the edges for securement and asepsis.
  o Gauze dressings even when under a transparent dressing, must be changed every 2 days.
• When the site is no longer bleeding a Tegaderm semi-permeable dressing can be applied
  o Change every 5-7 days or sooner if the dressing is becoming loose and non-occlusive
• If the site needs to be cleaned to remove dried drainage, use sterile 0.9% Sodium Chloride
• To disinfect the site use Chlorhexidine 2%/alcohol 70% swabsticks
  o Clean back and forth over the insertion site and area that will be under the dressing
  o Turn the swab over and do the same in the opposite direction
  o More than one swab can be used if necessary
  o Sterile gloves should be worn when applying the new sterile dressing

Changing the Adapter or Tubing
• Tubing must be changed as per SHR Nursing Policy & Procedure #1118 Intravenous and/or Peripheral Saline Lock Insertion & Maintenance
• Needless adapters must be changed with every tubing change and at least every 7 days

Flushing
• Flush PICCs with 0.9% Sodium Chloride:
  o after blood withdrawal,
  o after blood administration
  o before and after medication administration,
  o for maintenance of an unused lumen
• Flush lumens using stop & start flush technique

Documentation
• Document on appropriate record:
  o Dressing changes
  o Condition of insertion site
  o Medications given (MAR)
  o Record fluid volumes as appropriate. (Pediatrics: on Fluid Balance Record)
4.0 POLICY

Policies and Procedures

Title: CENTRAL VENOUS CATHETERS – CARE OF PERIPHERALLY INSERTED CENTRAL CATHETERS (PICCS)
- accessing
- dressing changes
- tubing and adapter changes
- flushing

I.D. Number: 1001

Authorization: [x] SHR Nursing Practice Committee

Source: Nursing
Date Effective: January 25, 2017
Scope: SHR & Affiliates

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DEFINITIONS

Client- a term used to describe a client, client or resident.

Peripherally Inserted Central Catheter (PICC): A central venous access device inserted into a peripheral vein whose tip dwells in the superior vena cava and is used in acute care, long term care or home care.

ROLES

Graduate Nurses (GNs) - as assigned, GNs provide PICC care with direct supervision until determined by an RN supervisor to be competent to practice autonomously.

Graduate Licensed Practical Nurses (GLPNs) – as assigned, GLPNs provide PICC care with direct supervision until determined by an RN or LPN supervisor to be competent to practice autonomously.

Licensed Practical Nurses (LPNs) – as assigned, LPNs provide PICC care. Prerequisite: LPN must have completed SaskPolytechnic IV Therapy/Blood & Blood Products Completer Course or equivalent.

Registered Nurses (RNs) – as assigned, RNs provide PICC care.

Registered Psychiatric Nurses (RPNs) - role with PICC care is currently under review.

Medical Radiology Technologists (MRT) - as assigned, MRTs provide PICC care.
1. PURPOSE

1.1 To maintain the patency of PICCs.

1.2 To minimize the risk of infection, damage, displacement and other complications associated with the care and use of PICCs.

2. POLICY

2.1 Special Considerations

- Prior to accessing PICCs for any reason, nurses must perform appropriate Hand Hygiene procedures (Infection Prevention & Control policy #20-20)
- To decrease the risk of contamination, accessing PICCs should be kept to a minimum
- The continued need for a PICC will be assessed daily or per home visit
- To prevent peripheral PICC occlusion and/or damage, avoid using same arm with PICC for BPs or venipuncture

2.2 Accessing a PICC

- Assess CVC function by aspirating for blood return and then flushing prior to each intermittent CVC use (administration of medication or infusion) and as clinically indicated with continuous infusions (e.g. occlusion alarms) Exception: Acute Care Pediatrics/PICU small lumen (3 Fr. And under) no blood withdrawal or blood infusion is recommended. Physician will be notified and Medical Imaging may be consulted for intervention if unable to flush a lumen or if unable to aspirate for blood return.
- Direct luer lock connections will be used for continuous infusions
- Intermittent medications/fluid will be administered through a needleless adapter or needleless injection port on IV tubing
Acute Care Pediatrics: applies a needleless adapter for all IV infusions
- Needleless adapters will be cleaned for 15 seconds using an alcohol swab and friction in a twisting motion prior to each access (scrub the hub)

2.3 Flushing PICCs

- Flushing is performed on PICCs that are used intermittently (not connected to a continuous infusion) and following each access.
- If the PICC is not routinely accessed each lumen is flushed on a schedule specific to type of PICC (See CVC Adult, Pediatric or PICU Standards - Appendix A, B & C).
- **PICCs will be flushed with 0.9% Sodium Chloride** using stop & start flush technique:
  - after blood withdrawal,
  - after blood administration
  - before and after each medication administration,
  - for maintenance of an unused lumen
- PICCs will be flushed using at least a 10mL syringe to avoid excessive pressure, to avoid possible rupture of the catheter or dislodgement of a clot
- Physician will be notified and Medical Imaging may be consulted for intervention if unable to flush a lumen or if unable to aspirate for blood return

  **Note:** Clients receiving treatment from the Saskatchewan Cancer Agency should be advised to contact the Cancer Clinic prior to their next appointment if there are any flushing concerns (e.g. sluggish or blocked lumen)

- **Acute Care Pediatrics, PICU and NICU** follow unit protocols for flushing PICCs
2.4 Changing Tubing and Adapters

- Prior to changing needleless adapters or tubing, clean connection for 15 seconds using an alcohol swab and friction in a twisting motion
- Prime tubing and adapters prior to attaching to PICC line

2.4.1 Needleless Adapters:

- PICC lumens will be capped with a sterile needleless adapter at all times when not directly connected to tubing
- **Acute Care Pediatrics** needleless adapter applied to all IV infusions
- **Home Care Clients only**: for clients only getting a weekly maintenance flush, Luer lock plugs (or dead enders) may be used (replaced after each access)
- **Change needleless adapters**: every 7 days and if removed for any reason, if there is residual blood or debris within the needleless connector and prior to drawing a sample for blood culture. Document change on care plan/flowsheet.

2.4.2 Tubing and extension sets: will be changed q96hrs except:

- lipid emulsions: parenteral nutrition tubing q 24hr
- propofol q 12hr (RN only)
- blood transfusion tubing q 8 hours, after 4 units infused or if more than an hour has elapsed between infusions
  - When tubing is changed, any needleless adapters, stopcocks or other tubing connected to the same lumen must be changed at the same time
  - New IV tubing will be used when a new PICC is inserted

2.5 Dressing Changes

- Use aseptic technique using sterile gloves when applying new dressings
- Skin will be disinfected with Chlorhexidine 2%/Alcohol 70% during dressing changes

**Note**: for infants less than 2 months or client is sensitive to chlorhexidine, use providine –iodine swab or 70% alcohol swab or disinfect with chlorhexidine then wipe off with sterile saline

2.5.1 Dressings will be changed:

- Follow orders for initial dressing change following insertion
- Transparent semipermeable dressing every 5-7 days and prn when dressing soiled, wet or non-occlusive.
- Gauze (or combination of gauze & transparent dressing) – every 2 days
- If the client has a securement device such as Stat Lock it is changed every 7 days with the dressing change.
- Site will be assessed at least every 8 hours for:
  - signs of inflammation
  - infection
  - bleeding
  - leakage at insertion site
  - length of PICC
  - secure sutures/securement device

Report any concerns to the physician. **Home Care**: Educate the client /family to recognize and report any of the above symptoms to their nurse

2.6 Catheter Securement

PICC must be stabilized with sutures or stabilization device.
If PICC migrates externally it should not be advanced back into the vein. The PICC should be stabilized at the point of external migration and assessed by physician/ Medical imaging prior to further use.

2.7 Catheter Damage
If the PICC line becomes damaged, immediately clamp the line between the break and the chest wall to prevent air embolism or bleeding from the device. Notify the physician immediately.

3. PROCEDURES

3.1 Assessing PICC patency – Assess PICC function by aspirating for blood return and flushing prior to each intermittent medication or intermittent infusion or when clinically indicated with continuous infusions. Exception: Acute Care Pediatrics/PICU small lumen (3 Fr. and under) where no blood withdrawal or blood infusion is recommended.

3.1.1 Supplies
- 10mL syringe prefilled with 0.9% Sodium Chloride
- alcohol swabs
- CVC Adult, Pediatric or PICU Standards (Appendix A, B & C) for flush volumes

3.1.2 Perform hand hygiene.

3.1.3 Clean needleless adapter for 15 seconds using an alcohol swab and friction in a twisting motion. Allow to dry.

3.1.4 Attach 10mL syringe prefilled with 0.9% sodium chloride

3.1.5 Gently flush lumen with 1-2 mLs of 0.9% sodium chloride.

3.1.6 Gently aspirate the PICC for blood return.

3.1.7 Flush the lumen with saline using stop and start flush technique.

3.1.8 Administer medication/infusion.

3.1.9 Following medication administration, flush lumen as per Standards (Appendix A,B & C)

3.1.10 Perform hand hygiene following the procedure.

3.2 Flushing

3.2.1 Flushing is performed on PICCs that are used intermittently (not connected to a running infusion), following each access. If the PICC is not routinely accessed then these lumens are flushed on a schedule specific to each type of PICC (Adult/Pediatric/PICU Standards - Appendix A, B & C).

3.2.2 Supplies
- 10mL syringe prefilled with 0.9% Sodium Chloride (1 for each lumen to be flushed)
- alcohol swabs
- CVC Adult, Pediatric or PICU Standards (Appendix A, B & C) for flush volumes
3.2.3 Perform hand hygiene

3.2.4 Clean needleless adapter for 15 seconds using an alcohol swab and friction in a twisting motion. Allow to dry.

3.2.5 Flush: Attach 0.9% Sodium Chloride flush syringe, inject the required volume and remove the syringe:
- after blood withdrawal, before and after medication administration, for maintenance of an unused lumen
- using a stop and start flush technique

*Note:* A pulsatile flushing technique of 10 short boluses of 1 mL interrupted by brief pauses may be effective at removing solid deposits.

- Do not use force to flush or lock a PICC.

3.2.6 Repeat the procedure for other lumens as necessary.

*Note:* Use a separate flush syringe for each lumen.

3.2.7 Perform hand hygiene following the procedure.

3.2.8 Documentation:
- Record fluid volumes as appropriate on Fluid Balance Record.

3.3 Tubing and Adapter Change

3.3.1 Supplies:
- alcohol swabs
- primed needleless adapter
- primed tubing
- 10mL syringe prefilled with 0.9% Sodium Chloride (1 for each lumen)
- Luer lock plug (Home Care)
- Tubing change sticker
- Clean gloves

3.3.2 Perform hand hygiene and apply clean gloves

3.3.3 For tubing change, stop IV infusion.

3.3.4 For clamped (or non-valved) PICC, clamp lumen to prevent air embolism or blood loss.

3.3.5 Clean needleless adapter or tubing connection where the hub meets the lumen for 15 seconds using an alcohol swab and friction in a twisting motion. Allow to dry.

3.3.6 Loosen connection to facilitate rapid change over. If difficult to loosen, use a tourniquet or glove for improved grip. Do not use metal forceps as this could damage the catheter hub.

3.3.7 Disconnect tubing or adapter.
3.3.8 Clean PICC line end with new alcohol swab. Allow to dry.

3.3.9 While maintaining aseptic technique to avoid catheter contamination, connect new primed tubing or adapter.

3.3.10 Unclamp catheter and re-establish IV infusion if applicable.

3.3.11 Flush unused lumens according to CVC Standards (Appendix A, B & C).

3.3.12 Remove gloves and perform hand hygiene following procedure.

3.3.13 Document date of tubing or adapter change on care plan or other appropriate document. Write date changed on tubing change sticker and attach to tubing.

3.4 Dressing Change

3.4.1 Supplies:
- dressing tray/set (if needed)
- clean gloves
- sterile gloves
- 0.9% Sodium Chloride (for skin cleansing if required)
- sterile cotton tipped applicators (if required)
- 2 - Chlorhexidine 2%/Alcohol 70% - swab sticks for skin disinfection
- Sterile transparent semi permeable or sterile gauze dressing
- Catheter stabilization device if used
- tape if needed
- stabilization device if used (Sku:217135)
- Alcohol based hand sanitizer

3.4.2 Perform hand hygiene and don clean gloves.

3.4.3 Remove dressing.

3.4.4 If stabilization device is present, use alcohol swabs to ease removal.

3.4.5 Discard gloves and dressing.

3.4.6 Perform hand hygiene.

3.4.7 Inspect insertion site for:
- signs of infection or inflammation
- secure sutures or stabilization device in place
- catheter slippage/movement
- leaking IV fluid
- pain or swelling in arm

Notify physician promptly if any of the above are noted.

3.4.8 If drainage is present, cleanse skin and catheter with 0.9% Sodium Chloride using aseptic technique.

3.4.9 Disinfect skin with 2% Chlorhexidine/Alcohol 70% swab stick applicator. With the first swab stick, using friction, clean around the exit site of catheter and area where dressing is to be placed using a back and forth motion for 15 seconds. Flip the swab stick and moving in opposite direction clean site for another 15 seconds.
With the second swab stick, cleanse length of exposed catheter. For clients less than 2 months old wipe off chlorhexidine after 30 seconds with sterile 0.9% Sodium Chloride.

3.4.10 If there is a contraindication to chlorhexidine, providine-iodine or 70% alcohol can be used as alternatives

**Note:** PICC material can be damaged with adhesive removers and acetone

3.4.11 Allow skin to air dry completely.

3.4.12 Apply skin protectant to area for irritated or fragile skin and if catheter stabilization device will be used (using aseptic technique and avoiding the insertion site).

3.4.13 Perform hand hygiene.

3.4.14 Don sterile gloves.

3.4.15 Apply new catheter stabilization device if catheter is not sutured in place (follow manufacturer’s directions for use.)

3.4.16 Apply transparent semipermeable dressing to cover both the insertion site and sutures/securement device. Lay dressing in place and mold it over the catheter with fingertips starting at the insertion site. Do not stretch dressing over skin surface. Slightly overlap the border tabs under hub of lumens. Press transparent portion of dressing into place. Add adhesive strips to stabilize PICC and to label dressing change date. Apply gentle pressure to entire dressing to ensure optimal adhesion.

3.4.17 If using plain sterile gauze, secure with a full border of tape or cover with transparent dressing.

3.4.18 Secure tubing to the skin with supplied tape strips to prevent traction on the dressing or insertion site.

3.4.19 Remove gloves and perform hand hygiene.

3.4.20 Document dressing change and condition of insertion site on appropriate record.

**Other CVC policies:**
#1086 Central Venous Catheters – Short Term, Tunneled, Implanted - Care of
#1042 Central Venous Catheters – Blood Withdrawal (PICC, Short Term, Tunneled, Implanted)
#1003 Central Venous Catheters – Peripherally Inserted Central Catheters (PICC) Removal
4. REFERENCES


Technical Services - MicroClave® Neutral Displacement Connector Change Recommendations. ICU Medical Inc.
**CENTRAL VENOUS CATHETERS - Adult Standards**  
November 2017

Prior to accessing CVC for any reason perform **Hand Hygiene** for at least 15 seconds with alcohol-based hand rub or antiseptic soap and water.

<table>
<thead>
<tr>
<th></th>
<th>PICC</th>
<th>PICC</th>
<th>Short Term</th>
<th>Tunneled</th>
<th>Implanted Port</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clamp less, valved e.g. BioFlo PICC</td>
<td>with clamps, non-valved</td>
<td>Percutaneous -jugular, subclavian or femoral</td>
<td>Long term e.g. Hickman</td>
<td>chest or arm e.g. Port-a-Cath, P.A.S. port</td>
</tr>
</tbody>
</table>

**Accessing**
- Syringe or IV tubing via needleless adapter

**Check Placement**
- Gently aspirate to visualize blood return then flush with 0.9% Sodium Chloride

**Frequency of Flushing and Locking**
(Flushing and Locking not required for continuous IV infusion)

<table>
<thead>
<tr>
<th></th>
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</tr>
<tr>
<td>Accessing</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td>Check Placement</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Flush Volume**
(0.9% sodium chloride)
- 10mLs before & after medication administration.
- 20mLs after blood administration or withdrawal

<table>
<thead>
<tr>
<th></th>
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<th>Short Term</th>
<th>Tunneled</th>
<th>Implanted Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heparin Lock (100units/mL)</td>
<td>N/A</td>
<td>N/A</td>
<td>3mL (300 units)</td>
<td>5mL (500 units)</td>
<td></td>
</tr>
<tr>
<td>Heparin Lock Syringe Size</td>
<td>N/A</td>
<td>N/A</td>
<td>12mL</td>
<td>12mL</td>
<td></td>
</tr>
</tbody>
</table>

**Dressing changes**
- Transparent semipermeable q 5-7 days and PRN when dressing soiled, wet or non-occlusive
- Transparent semipermeable with gauze or gauze alone q2 days
- Clean skin with saline prn, then for skin antisepsis use Chlorhexidine 2%/alcohol 70% swab stick.

**Needleless Adapter Change**
(Use needleless adapter on all unused and intermittent use CVC lumens)
- Once a week for unused lumens. Change every 96 hours if tubing is connected.
- Once a week if port accessed

**Blood Sampling Discard Volume**
- 1 tube or 5 mL
- 2 tubes or 7 mL
- 2 tubes or 7 mL

* Stock # in SPD:  
  *Gripper Micro Safety Needle*: 20G X ½ - 200939  22G X ¼ - 200941  22G X 1 -200942
**CENTRAL VENOUS CATHETERS - Pediatric Standards**

**Prior to accessing CVC for any reason perform Hand Hygiene for at least 15 seconds with alcohol-based hand rub or antiseptic soap and water.**

<table>
<thead>
<tr>
<th>Accessing</th>
<th>Syringe or IV tubing via needleless adapter</th>
<th>Non coring safety needle needle primed with 0.9% Sodium Chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Placement</td>
<td>Flush with 5 -10mLs 0.9% Sodium Chloride</td>
<td>Gently aspirate to visualize blood return then flush with 0.9% Sodium Chloride</td>
</tr>
<tr>
<td>Frequency of Flushing (0.9% sodium chloride)</td>
<td>Before &amp; after medication administration</td>
<td>After each intermittent access</td>
</tr>
<tr>
<td>Flushing NOT required for continuous IV infusion</td>
<td>Before &amp; after medication administration</td>
<td>After each intermittent access</td>
</tr>
<tr>
<td>Flush Volume (0.9% sodium chloride)</td>
<td>5mL</td>
<td>Volume weight based: less than 10 kgs: 5mL greater than 10 kgs: 10 – 20mL</td>
</tr>
<tr>
<td>Frequency of Heparin Locking Locking NOT required for continuous IV infusion</td>
<td>N/A</td>
<td>After each intermittent access</td>
</tr>
<tr>
<td><em>Unless physician specific orders written</em></td>
<td>N/A</td>
<td>Q 24h to unused lumen</td>
</tr>
<tr>
<td>Heparin Lock Volume (100 units/mL)</td>
<td>N/A</td>
<td>After each intermittent access</td>
</tr>
<tr>
<td>wt. greater than 10 kgs or accessed 5 times or less/24 hrs.</td>
<td>1.5mL(150 units)</td>
<td>Q 24 h if accessed but not used Once a month if deaccessed</td>
</tr>
<tr>
<td>wt. less than 10 kgs or accessed 6 times or more/24 hrs.</td>
<td>N/A</td>
<td>2.5mL(250 units)</td>
</tr>
<tr>
<td>Heparin Lock Syringe Size</td>
<td>12mL</td>
<td>0.2mL heparin (100 units/mL) added to 1.8 mLs 0.9% sodium chloride (20 units)</td>
</tr>
</tbody>
</table>

**Dressing Change**

- Transparent semipermeable with gauze or gauze alone **q2days**
- Transparent semipermeable **q 5-7 days** and PRN when dressing soiled, wet or non-occlusive
- Clean skin with saline prn, for skin antisepsis use 2% Chlorhexidine swab stick

**Note**: ages 2 months & under – clean skin with chlorhexidine, let the skin dry then wipe off chlorhexidine with 0.9% Sodium Chloride

**Needleless Adapter Change**

- use adapter on all CVC lumens
- Once a week on unused lumens. Change every 96 hours if tubing connected.
- Once a week if ACCESSED

**Blood Sampling Discard Volume**

- **No blood sampling**
- **No blood transfusions**
- 3mL
## PICU Central Venous Care Guidelines 2016

<table>
<thead>
<tr>
<th></th>
<th>PICC under 3 French</th>
<th>PICC 3 French &amp; over</th>
<th>Percutaneous CVL/CVP</th>
<th>Long Term Tunneled Silicone</th>
<th>Long Term Implanted port</th>
<th>Umbilical Venous (Argyle)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lumen Volume</strong></td>
<td>1.9Fr=0.105mL</td>
<td>3 Fr=0.145mL</td>
<td>Per pkg or lumen instruction</td>
<td>2.7Fr=0.15mL</td>
<td>Port-0.2-0.7mL</td>
<td>Single Lumen 3.5 Fr=0.15mL 5.0 Fr=0.30mL Multilumen-see pkg or lumen instruction</td>
</tr>
<tr>
<td><strong>Flush &amp; Locking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Saline Flush/Lock</strong></td>
<td>-Before and after meds or bloodwork -Unused: q 24 hr. -Amount to clear lumen (at least 0.5 mL)</td>
<td>-Before and after meds or bloodwork -Unused: q 24 hr. -Amount to clear lumen (at least 0.5 mL)</td>
<td>-Before and after meds or bloodwork -Unused: q 24 hr. -Amount to clear lumen (at least 0.5 mL)</td>
<td>-Before and after meds or bloodwork -Volume: &lt; 10 kg-5 mL &gt; 10kg-10mL</td>
<td>-Before and after meds or bloodwork -Volume: 2-5 mL</td>
<td>Before and after meds or bloodwork -Amount to clear lumen</td>
</tr>
<tr>
<td>Heparin Lock (Physician Order required)</td>
<td>25 units/mL 0.5-1mL q 8 hrs. and prn</td>
<td>No-Saline Lock at least q 24 hrs. <strong>Note</strong>-consider Heparin lock if patency problematic. Order required.</td>
<td>0.5-1.5mL of 25 units/mL q 8 hr. &amp; prn</td>
<td>Non Access: 1.5 mL of 10 units/mL q 24 hrs. <strong>Intermittent Access</strong>: 1.5 mL of 10 units/mL q 8hrs &amp; prn</td>
<td>Non accessed: 1.5 -2.5 mL of 100 u/mL monthly <strong>Intermittent Access</strong>: 1.5 -2.5 mL of 25 units/mL q 8hrs &amp; prn</td>
<td>4 units/mL 2x lumen volume Q 6 hours</td>
</tr>
<tr>
<td><strong>Blood work draw</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Blood Discard</strong></td>
<td>n/a</td>
<td>2x lumen volume</td>
<td>2x lumen volume</td>
<td>3-5mL</td>
<td>2-5mL</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>CVP Monitoring</strong></td>
<td>No, unless ordered</td>
<td>No, unless ordered</td>
<td>Yes, Distal lumen</td>
<td>No, unless ordered</td>
<td>No, unless ordered</td>
<td>As ordered</td>
</tr>
<tr>
<td><strong>Acceptable Meds</strong></td>
<td>ALL IV meds</td>
<td>ALL IV meds</td>
<td>ALL IV meds</td>
<td>ALL IV meds</td>
<td>ALL IV meds</td>
<td>ALL IV meds</td>
</tr>
<tr>
<td><strong>Parenteral Nutrition</strong></td>
<td>Dextrose &lt;/= 30%, amino acids, lipids. Consider heparin in PN at low rates</td>
<td>Yes-all</td>
<td>Yes-all</td>
<td>Yes-all</td>
<td>Yes-all</td>
<td>Yes-all</td>
</tr>
<tr>
<td><strong>Blood administration</strong></td>
<td>NO</td>
<td>NO unless no other site</td>
<td>NO-unless no other site</td>
<td>NO-unless no other site</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Routine Care</td>
<td>PICC under 3 French</td>
<td>PICC 3 French &amp; over</td>
<td>Percutaneous CVL/CVP</td>
<td>Long Term Tunneled Silicone</td>
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<td>---------------------</td>
<td>---------------------</td>
<td>---------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>Tubing Change</strong> (including stop cocks and caps not put on with sterile field)</td>
<td>TPN-q 24 hrs. IV -q 96 hr.</td>
<td>TPN-q 24 hrs. IV -q 96 hr.</td>
<td>TPN-q 24 hrs. IV/CVP -q 96 hr.</td>
<td>TPN-q 24 hrs. IV -q 96 hr.</td>
<td>Access Needle-q 7 days</td>
<td>Q 24 hours</td>
</tr>
<tr>
<td><strong>Dressing</strong> -Sterile technique -Skin Asepsis with Chlorhexidine-wash off if &lt; 2 month age</td>
<td>Transparent-q 7 days &amp; prn Gauze-q 24 &amp; prn</td>
<td>Transparent-q 7 days &amp; prn Gauze-q 24 &amp; prn</td>
<td>Transparent-q 7 days &amp; prn Gauze-q 24 &amp; prn</td>
<td>Transparent-q 7 days &amp; prn Gauze-q 24 &amp; prn</td>
<td>Transparent-q 7 days &amp; prn Gauze-q 24 &amp; prn</td>
<td>Transparent-q 7 days &amp; prn Gauze-q 24 &amp; prn</td>
</tr>
</tbody>
</table>
6.0 PICC Review Quiz

1. PICC lines can be used for the following: (choose all the correct answers)
   a. Parenteral Nutrition
   b. Blood products
   c. Arterial blood gases
   d. Blood sampling

2. PICCs without clamps have a pressure activated valve (PASV) in the hub. The PASV: (choose all the correct answers)
   a. Keeps the line closed
   b. Reduces the risk of a client bleeding from the PICC
   c. Decreases the risk of air embolism and occlusion of the PICC line

3. To minimize the pressure generated in the PICC, the smallest syringe size used for flushing is: (choose one answer)
   a. 3 mLS
   b. 5 mLS
   c. 10 mLS
   d. 20 mLS

4. Prior to accessing a PICC for any reason and before and after any procedure perform Hand Hygiene for at least how long? (choose one answer)
   a. 10 seconds
   b. 15 seconds
   c. 30 seconds

5. PICC site will be assessed at least every 8 hours for (check all correct answers):
   - Signs of inflammation
   - Signs of Infection
   - Any bleeding
   - Leakage at site
   - Length of PICC
   - Secure sutures/securement device

6. Assessing PICC function: Before administering an intermittent infusion or medication, check for patency of the PICC by: (choose one answer)
   a. Flushing the PICC
   b. Aspirating for blood and flushing
   c. Checking to see if the sutures are intact

7. All PICCs are flushed with 0.9% Sodium Chloride (True or False)  T   F

8. Use a stop and start technique while flushing to increase turbulence inside the PICC line as this will help prevent clot formation. (True or False)  T   F
9. Refer to the Adult/Pediatric/PICU Standards chart for frequency and volume of flush. (True or False) T  F

10. Tubing and adapter changes match the procedure with the correct timeframe:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Change IV tubing and extension sets</td>
<td>q 8 hours, after 4 units or if 1 hr between units</td>
</tr>
<tr>
<td>b. Change Parenteral Nutrition (PN) tubing</td>
<td>q 96 hours</td>
</tr>
<tr>
<td>c. Change blood tubing</td>
<td>q 24 hrs</td>
</tr>
</tbody>
</table>

11. Appropriate nursing actions for a suspected infection in a client with a PICC include: (choose all that apply)
   a. Checking the client’s temperature
   b. Assessing PICC for signs and symptoms of infection (redness, swelling, warmth, purulent drainage)
   c. Obtaining blood for C&S and insertion site swab for C&S
   d. Sending blood sample for PT and INR

12. Signs and symptoms of a venous thrombosis include (choose all that apply):
   a. Swelling of the neck, face, shoulder and arm
   b. Mild to moderate neck pain
   c. Difficulty with aspiration or infusion

13. PICCs are flushed with a stop and start technique because (choose the correct answer):
   a. The motion helps prevent infection from developing in the line
   b. The motion helps to prevent catheter occlusion
   c. The motion helps decrease the pressure from building up in the line
   d. The motion helps decrease the side effects of certain medications

14. Changing a needleless connector should be done (choose all that apply)
   a. Every 7 days
   b. If removed for any reason
   c. If there is residual blood or debris within the needleless connector
   d. Prior to drawing a blood sample for blood culture

15. PICC dressing changes (choose all correct answers)
   a. Are performed every 5-7 days and prn
   b. Clean with chlorhexidine/alcohol swab sticks
   c. Technique: back and forth for 15 seconds and then in the opposite direction for 15 seconds
   d. Wear sterile gloves while applying the dressing