Nursing Management of Venous Access Devices: Peripherally Inserted Central Catheter (PICC)

Mimi Bartholomay, RN, MSN, AOCN
Denise Dreher, RN, CRNI, VA-BC
Theresa Evans, RN, MSN
Susan Finn, RN, MSN, AOCNS
Debra Guthrie, RN, CRNI
Hannah Lyons, RN, MSN, AOCN
Janet Mulligan, RN, MS, VA-BC
Carol Tykienski, M.S., R.N., N.P
Peripherally Inserted Central Catheter (PICC)

Benefits

- Long-term access - dwell time varies (can be > one year)
- Decreased length of stay in hospital – allows for IV therapy in non-acute settings i.e. home care /hospice/ skilled nursing facility (SNF)
- Cost effective compared to all other central VADs
- Decreased infection rate, as compared with other non-tunneled CVADs
- Patient satisfaction and comfort
- Fewer interruptions in IV therapy
PICCs

Risks:

- Air embolism
- Infection
- Deep vein thrombosis (DVT)
- Nerve damage
- Increased heparin usage in some PICCs

Other considerations:

- Blood withdrawal can be difficult; may be dependent on catheter length.
- Over time, multiple insertions can cause venous scarring and decrease the ability to reuse the site.
PICC Characteristics

- **Catheter types:**
  - single lumen (SL)
  - double lumen (DL)
  - triple lumen (TL)
  - quad lumen (QL)

- **Catheter sizes:**
  - 2F to 6F

- **Catheter styles:**
  - non-Power PICC
  - Power PICC®
  - saline-only or valved PICC (Solo®)

- **Catheter lengths:** cut to specific patient-dependent length
PICC Placement

- **Placement**
  - Successful placement is highly technique-dependent; requires formal training.
  - A sterile procedure performed at bedside by specially trained IV nurse or in Interventional Radiology.
  - Requires x-ray verification of tip location.

- **Contraindicated in extremities affected by**
  - Lymph node dissection
  - Tissue damage such as burns, cellulitis, fracture, rotator cuff tear
  - Vessel occlusion / DVT
  - Dialysis catheter (AVF) in same arm or need to preserve veins for future dialysis access
  - Newly implanted pacemaker or defibrillator
  - Affected arm s/p stroke
Multi-lumen PICCs

Double Lumen PICC

Triple Lumen PICC

Images retrieved from http://www.bardaccess.com/ with permission 10/6/09
Other PICCs

Bard Solo PICC
(valved, saline flush only PICC)

Bard Power PICC

Solo PICC has characteristic “bubble”

Flush PICCs

Adults/Adolescents:
- 10ml saline per lumen
- 5ml heparin (10 units/ml) per lumen = 50 units
- Valved PICCs do not require heparin
- Flush after completion of any infusion or blood sampling, at least every 24 hours when not in use

Pediatrics:
- 2F catheter
  - 1ml heparin (10 units/ml) per lumen = 10 units
  - Flush after completion of any infusion or blood sampling, at least every 6 hours when not in use
- 2.6F catheter or larger:
  - 2-3ml heparin (10 units/ml) per lumen = 20-30 units
  - Flush after completion of any infusion or blood sampling, at least every 12 hours when not in use
PICC Assessment

- Patient comments/complaints (e.g., pain, palpitations, hears something when catheter flushed)
- New cardiac irritability: repeat CXR to verify catheter tip location
- Extremity edema
  - Is extremity cold or mottled in appearance?
  - Do arms appear to be same size? If not...
    - Assess for dependent edema
    - Assess whether patient is ‘favoring’ that arm
    - Check bicep circumferences
    - Rule out DVT
    - Rule out catheter fracture
- Catheter migration (more catheter visible outside insertion site):
  - CXR to verify new catheter tip location
  - Hold central-concentration infusates until confirmation of central placement
- Consult with IV Team for any issues or symptoms
# PICC Line Care: Flushing

Refer to MGH Nursing Policies and Procedures Trove 05-03-06

<table>
<thead>
<tr>
<th>Type of Catheter</th>
<th>Routine Flushing</th>
<th>Frequency of Flush</th>
</tr>
</thead>
</table>
| PICCs and power-injectable PICCs (e.g. Bard Power PICC) | **Adults/Adolescents:**  
Heparin 10 units/ml; flush with 5ml (50 units). | Intermittent use: After completion of any infusion or blood sampling.  
**Maintenance:** Every 24 hours when not in use. |
| **Pedi/Toddlers/Infants:**  
- **2F catheter:**  
Heparin 10 units/ml; flush with 1ml (10 units). |  
After completion of any infusion or blood sampling, every 6 hours when not in use. |
| - **2.6F catheter or larger:**  
Heparin 10 units/ml; flush with 2-3ml (20-30 units). |  
After completion of any infusion or blood sampling, every 12 hours not in use. |
| **Neonates/NICU:**  
Single lumen PICCs are not hepled. Unused lumens of multi-lumen PICCs may be hepled in certain situations, such as fluid restriction. |  
All neonate/NICU infusions, including central line flushes, should be administered using a pump to reduce the risk of catheter fracture. |
PICCs: Miscellaneous

- Maximum infusion rate: as patient condition warrants
- Pumps are mandatory for any infusion!
- NO blood pressure cuff or tourniquet on or above PICC dressing
- A new Stat-lok securement device should be applied with dressing and needleless connector change
- Please notify IV Team if patient admitted to MGH with a PICC
- Designate dedicated lumen for TPN. Please be sure to flush and maintain prior to TPN initiation.
- For multilumen power PICCs, always have a power-injectable lumen available for ordered contrast studies.
Discontinuing a PICC

- Physician/provider order required to discontinue PICC
- IV team will remove all inpatient PICC lines
  - For ambulatory settings, if removal needs to be performed by a staff nurse, must demonstrate & complete PICC removal competency first
- Procedure:
  - Patient should be recumbent in bed
  - Apply slow, steady traction when sliding catheter out
  - Have patient perform Valsalva maneuver
  - Place petroleum-based ointment, a sterile gauze, and occlusive dressing over insertion site. Dressing should remain on for at least 24 hours, or longer until epithelialization occurs
  - Inspect catheter; check tip integrity and length
  - Consider tip culture if infection is suspected
- If difficulty removing catheter, apply warm compresses to arm, shoulder, and chest to decrease venospasm. If catheter remains steadfast, DO NOT FORCE. Secure catheter and notify physician.
- Refer to MGH Nursing Policies and Procedures Trove 05-03-14