Using PiCC and Midlines for Contrast Administration in Radiology

Training Pack

S. E. Penry

Available online at:

The Research Radiographer.co.uk

2017

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## Recognised pressure-rated (Trust inserted) lines

<table>
<thead>
<tr>
<th>PiCC line</th>
<th>Midline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand</td>
<td>Navilyst</td>
</tr>
<tr>
<td>Model</td>
<td>“Xcela® Navilyst with PASV valve technology”</td>
</tr>
<tr>
<td>No. of recognised variations</td>
<td>=2=</td>
</tr>
</tbody>
</table>

**Appearance (Visual)**

- **PiCC line**
  - Single lumen
  - Double/“Dual” lumen

- **Midline**
  - Single lumen
  - Double/“Dual” lumen
**Appearance (Description)**

- Has a ‘purple **body**’
- “POWER INJECT 3.5ml/Sec MAX” written on the body (If single lumen)
  
  OR
  
  "POWER INJECT 5ml/Sec MAX” written on the body (If double lumen)
  
- Will have brand name ‘Navilyst’

- Has a ‘purple **lock**’
- “5cc/sec MAX” 5ml/sec written on the body (If single lumen)
  
  OR
  
  “7cc/sec MAX” 7ml/sec written on the body (If double lumen)

- Will have the brand name ‘Medcomp’ and will have “POWER INJECT MIDLINE” written on the tubing.

**Maximum flow rate**

- Double lumen = 5ml/sec
- Single lumen = 3.5ml/sec.

(!) **NB: always check the flow rate written on the line**

- Double lumen = 7ml/sec.
- Single lumen = 5ml/sec.

(!) **NB: always check the flow rate written on the line**

**Maximum PSI (Stated by manufacture)**

- **325 PSI**
- **300 PSI**
### Compatible power-injectors

<table>
<thead>
<tr>
<th>Aspirate required?</th>
<th>Compatible power-injectors</th>
<th>Aspirate required?</th>
<th>Compatible power-injectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>Any – providing PSI can be limited (in CT = Covidien Pump) + flow-rate can be controlled</td>
<td>NO</td>
<td>Any – providing PSI can be limited (in CT = Covidien Pump) + flow-rate can be controlled</td>
</tr>
<tr>
<td>IMPORTANT</td>
<td>(!) Not all ‘Navilyst’ PICC lines are pressure rated (so the above checks must be made, prior to use)</td>
<td>IMPORTANT</td>
<td>(!) Not all ‘Medical Access’ midlines are pressure rated (so the above checks must be made, prior to use)</td>
</tr>
</tbody>
</table>

### PiCC line and Midline Contrast Administration Training Pack

<table>
<thead>
<tr>
<th>Average Pressures (PSI)</th>
<th>PiCC line</th>
<th>Midline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set flow rate: 2ml/sec</td>
<td>Set flow rate: 4ml/sec</td>
<td></td>
</tr>
<tr>
<td>Actual pressure 130-160 PSI (approx.)</td>
<td>Actual Pressure: 150-180 PSI (approx.)</td>
<td></td>
</tr>
<tr>
<td>Sensible pressure limit: 150-170</td>
<td>Sensible pressure limit: 170-200</td>
<td></td>
</tr>
</tbody>
</table>
Equipment

- Sterile gloves
- 20ml syringe (luer lock)  
  (!) Do not use a smaller syringe (can ↑ risk of rupture)
- Drawing up needle (blunt)
- x4 10ml saline ampules (40ml total – for x2 20ml saline flushes)
- Alcohol Wipe (Sani-Cloth CHG 2%)
- Sterile bung

- Wound-care pack (Option II medium) for sterile field

Contains:
- Drape (For sterile field)
- x5 small swabs (For holding + dressing PiCC/Midline)
- x2 medium towels (For holding PiCC/Midline)
- Pot
- Small orange bag (For waste)
- Gloves (These only come in one size)
Procedure

- The subsequent “7 step” method allows a sterile / surgical approach (following Trust Guidance), takes into account the NHS National Patient Safety Alert “NHS/PSA/D/2016/008” and has been used by the author of this training pack.

Step

1: Set up trolley
2: Get contrast and NaCl ready
3: Patient prep
4: Gloves on
5: Check line (Aspirate and flush)
6: Inject contrast
7: Aftercare

Two people are often required (1) An injector and (2) A supporting member of staff.
Step 1: Set up trolley

Person ONE (Injector)

- Open wound care pack onto a clean small trolley
- Open additional equipment onto the sterile field/trolley (Syringe/Needle/Bung) [see equipment list].

Step 2: Get contrast and NaCl ready

Person TWO (Supporter)

- Load contrast pump (If applicable - as some contrast injections will be carried out by hand)
- Get x4 NaCl ampules ready (ensure they are of the same batch and check expiry)
- Get alcohol wipe ready
Step 3: Patient preparation

**Person ONE (Injector) OR Person TWO (Supporter)**

- Roll down the patients’ elastic sleeve – that is supporting the PiCC.
- Take off the swab(s) that is covering the PICC/Midline body.
- Get patient to put their arm by their side and supinate arm for stability.

Step 4: Sterile gloves

**Person ONE (Injector)**

- (!) Does the patient have a Latex Allergy? (If so, use NON-Latex Sterile gloves)
- Wash hands and put on gloves
- Put a sterile towel over the patients arm and over the line. Use this to hold the line leaving just the PiCC/Midline-body exposed.
- Bring sterile trolley so it is close to you and patient (reachable)
- Ask **Person TWO (Supporter)** to open an alcohol wipe.
- Carefully take wipe (maintaining your sterility) and put on sterile trolley.
- Use a sterile swab to cover/grip the bung (to maintain sterility) and unscrew to remove.
- Clean “hub” with sterile alcohol wipe.
- Attach luer lock syringe to PICC
Step 5: Checking line (Aspirating and flushing)

Person ONE (Injector)

- (If it is a PiCC line) Aspirate a very small amount of blood (NB: If it is a Midline aspiration is not required)

- Discard this very small volume of blood (carefully and SLOWLY) into sterile pot
  (Do this away from direction of pt and away from Person TWO to prevent SPLASH INJURY)

(Discarding this blood avoids the risk of injecting coagulated blood back into the patient)

Alternatively or at any point where you feel this is necessary, keep the blood in the syringe (Discard) and get a new 20ml syringe.
• Connect a drawing up needle to syringe

• ASK **Person TWO (Supporter)** to open the 1\textsuperscript{st} (*of the 4*) saline ampules
• Draw up this 1\textsuperscript{st} saline ampule

• ASK **Person TWO (Supporter)** to open the 2\textsuperscript{nd} saline ampule
• Draw up this 2\textsuperscript{nd} saline ampule

• Remove needle

• Flush the (20mls of saline into the PiCC)

• Disconnect syringe.
Step 6: Injecting contrast

Person ONE (Injector)

- Connect contrast tubing to PiCC/Midline.

Person TWO (Supporter)

- Set parameters on contrast pump (Max Pressure/PSI, Flow-rate, Volume) and confirm with Person ONE (Injector)

Max Pressure =  
Flow Rate =  
Volume =

ALWAYS set a pressure limit for CT (The limit should never be higher than the MAX pressure limit of PICC/Midline).

The pressure limit should be sensible (A very high pressure could indicate partial/total occlusion).

The maximum flow-rate should NEVER be exceeded.

The flow-rate should be sensible.

(CT = Venous enhancement is more dependent on contrast volume AND Arterial enhancement is more dependent on flow-rate)

As per protocol
Step 7: Aftercare

- Is the patient feeling well? (If CM has been administered – check for signs of reaction)

- Ask Person TWO (Supporter) to open the 3rd (of the 4) saline ampules
- Draw up this 3rd saline ampule

- Ask Person TWO (Supporter) to open the 4th saline ampule
- Draw up this 4th saline ampule

- Flush the line with 20ml of saline (to ensure patency / prevent CM coagulation in the distal portion of the line)

- Attach+ secure sterile bung

Please turn over…
• **Make the pt comfortable** – wrap 2 or 3 swabs around the distal portion of the line (as the bulky PiCC/Midline body is usually kept close and tight against the skin and can otherwise rub and lead to irritation) *NB: PICC dressings are often changed once per week.*

• **CM been given? = Still keep the patient in the department**/Supervise pt for at least 15 minutes.  
  *Even though there is no need for the pt to wait for his/her cannula to be removed, most reactions occur within the first 10-15mins of contrast administration.*
IMPORTANT

*DO NOT USE THE POT (Found in the sterile pack) TO DRAW NaCl INTO THE SYRINGE*

As per MEHT & NHS Patient Safety Alert: Issued in **May 2017**

As this can introduce bacteria contamination.

P.T.O...
Improving Patient Safety; Promoting safer use of injectable medications

Last year NHS Improvement published a Patient Safety Alert in response (NHS/PSA/D/2016/008) to errors that occurred when injectable medication was decanted into an 'open system' before administration.

'Open systems' include gallipots or other types of open container such as moulded plastic procedure trays. This practice risks one medication being confused with another, and medication intended for injection being confused with other substances, such as skin antiseptics, that are routinely contained in gallipots or other open containers. Additionally, an 'open system' can become contaminated by bacteria.

The British Society of Interventional Radiology (BSIR), supported by the Royal College of Radiologists, now state that an ‘open system’ should only be used for embolization procedures in which embolic agents need to be mixed and prepared openly during a procedure. Its statement also advises on the safe management of this exceptional use of an ‘open system’.

“We are not aware of any other clinical reason in any setting for the use of an ‘open system’ during invasive procedures. Due to the risk posed by unidentifiable solutions in ‘open systems’ we consider their use for injectable medicines to be an indefensible practice, with the single exception of the embolization procedures described above.”

In summary:

- An ‘open system’ is not used in the future as a container for injectable medication with the exception only of embolization procedures involving embolic agents that need to be prepared openly.

- If embolization procedures involving embolic agents that need to be prepared openly take place in your organisation, ensure a specific protocol or procedure is developed for undertaking this as safely as possible using the advice from BSIR4 and the NatSSIPs Resource Alert.

- The trust policy for injectable medicines (09060) will be updated to incorporate the guidance from the Patient Safety Alert and BSIR and that local protocols are in place for embolization’s procedures.

Please use the link below to access the alert directly.

IEG.2017.001 Issued by Integrated Effectiveness Group May 2017
Step 1: Trolley prep

- Open wound care pack onto a clean small trolley
- Open additional equipment onto the sterile field/trolley (Syringe/needle/bung)
- Load contrast pump (if applicable)
- Set contrast pump parameters (Max PSI, Flow-rate, Volume)
- Get x4 NaCl ampules ready (ensure they are of the same batch and check expiry)
- Get alcohol wipe ready
- Roll down the pts’ elastic sleeve (which is supporting line)
- Take off swab(s) that is covering the PICC/Midline body.
- Supinate arm + keep by side (for stability)
- (!) Does the patient have a Latex Allergy? (If so, use NON-Latex Sterile gloves)
- Wash hands + put on sterile gloves
- Keep trolley close to you so it is reachable
- Put a sterile towel over the patients arm + over the line (Use this to hold the line leaving just the PiCC/Midline-body exposed)
- Ask person TWO to open an alcohol wipe.
- Carefully take wipe (maintaining your sterility) + put onto sterile trolley.
- Use a sterile swab to cover the bung (to maintain sterility) now remove bung.
- Clean “hub” with sterile alcohol wipe
- If PiCC = Attach luer lock syringe + Aspirate blood (then discard this blood)
- Ask person TWO to open + hold NaCl.
- Attach needle to syringe and draw up NaCl (20mls) then, remove needle
- Remove bung from line (using sterile swab)
- Flush line.
- Connect line to contrast line

Step 2: Contrast and saline ready

Step 3: Patient prep

Step 4: Gloves on

Step 5: Check line (Aspirate and flush)

Step 6: Inject Contrast

Step 7: Aftercare

- Pt feeling well?
- Flush line with 20ml of NaCl (to keep line patent)
- Attach+ secure sterile bung
- Make pt comfortable – wrap 2-3 swabs around the distal portion of the line (as the bulky PiCC/Midline body is usually kept close + tight against the skin – it can otherwise rub)
- Keep pt in department/Supervise pt for >/=15 minutes.

Even though there is no need for the pt to wait for his/her cannula to be removed, most reactions occur within the first 10-15mins of contrast administration.
# What glove size am I?

Typical guide:

<table>
<thead>
<tr>
<th>Gloves</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>6 to 7</td>
</tr>
<tr>
<td>Medium</td>
<td>7 to 8</td>
</tr>
<tr>
<td>Large</td>
<td>8 to 9</td>
</tr>
</tbody>
</table>

S. Penry 2017
**GENERAL INFORMATION**

**PICC Service Personnel**

Dr Dilshan Arawwawala (Consultant Lead)
Sr Julie Godfrey Clinical Nurse Specialist
R/N Norah Millard
R/N Lorna Gipson
HCSW Louise Morland

**LOCATION**

Dedicated area situated in the High Care Dependency Unit (E227)

**SERVICE AVAILABILITY**

Wednesdays; Thursdays, Fridays (not Bank Holidays) 10:00—14.00 Please note this is not an emergency service.

**HOW TO REFER**

The patient’s named Consultant must approve all referrals. Referrals should be made by clicking on the PICC Service logo on the front page of Broomfield Hospital Intranet page and submitting the proforma or if this is not available: email [picc.line@meht.nhs.uk](mailto:picc.line@meht.nhs.uk) providing the patients name, location, indication for PICC line and the referrers name and contact details. Currently, only an in-patient service is available.

**NEED HELP?**

See [PICC & Midline Clinical Guideline and troubleshooting advice on intranet clinical pages](#)

Normal working hours: Please contact PICC Bleep 65551403 or via switchboard.
Out of hours: Please contact GICU Doctor via switchboard or on ITU Extn: 4053

(Source: “PICC & Midline Care & Maintenance Guide”p2  Julie Godfrey, 2014)
What is a PICC line?

P peripheral
I inserted
C central
C catheter

This is a long, slender, flexible tube inserted into a peripheral vein (typically the upper arm is the area of choice) and advanced until the tip is sited in the Superior Vena Cava, near the heart. Total length approximately 45cm-60cm

- May have single or double lumen
- Is inserted under ultrasound visualisation
- Placement is confirmed with CXR or navigational tip position device

What is a Midline?

This is a peripheral venous access device: longer than peripheral “venflon” but shorter than a PICC line. Typically they are 8-20cm in length. They are also sited in an upper arm vein but tip ends below the level of the axillary line.

- Routinely used for 1-10 weeks
- As line does not reach a central vein position does not need to verified by XRay
- Permits the infusion of most/all infusates that are appropriate for peripheral use without the need for renewal of cannula every 72 hrs
- Some medications cannot be administered via a mid-line due to ph, osmolarity or vesicant nature, e.g TPN or Daptomycin & the midline lying in a deeper vessel.

INDICATIONS FOR PICC LINE OR MIDLINE INSERTION

- For intravenous access for the medium term > 2 weeks
- Prolonged antibiotic treatment
- Total Parenteral Nutrition
- Chemotherapy
- Hydration therapy
- IV access for patients with poor venous access

BENEFITS

- Avoids repeated peripheral venous cannulations
- Less invasive compared to Hickman lines/Portocaths
- Low incidence of catheter related blood stream infection
- May facilitate early patient discharge lines can be cared for at home by health care workers, patient’s family

RISKS

- Infection (site and systemic)
- Phlebitis
- Occlusion
- Limb oedema
- Catheter malposition
- Thrombo-embolic phenomenon
- Difficult removal
- Nerve injury or irritation
- Catheter fracture and leakage
- Outward migration of catheter
- Rupture of catheter

Equipment for All Care & Maintenance

- Plastic apron and gloves
- Cleaned Dressing Trolley/IV tray or alcohol cleaned surface
- Sterile Dressing Pack
- Clear occlusive dressing Leukomed/Tegaderm (unimpregnated) or equivalent dressing if skin is fragile.
- Chloroprep 2% 1.5ml applicator or ‘Sanicloth’ 2% or chlorhexidine soaked gauze
- New “Statlock” securement device (PiCC nurses will provide these on request although these should be ordered through NHS supplies)
- ‘BIOPATCH’ chlorhexidine patch supplied by PiCC Service or from central point of storage: Heybridge, Felsted or Billericay Wards
- 20ml syringe
- 2 plastic vials of Sterile 0.9% (NaCl) Normal Saline
- New needle free access obturator (Bionnector) or plain obturator (Bung)

Procedure for PiCC/Midline Flushing and Line Handling

•PiCC and Midlines must be handled with ‘Surgical Approach Aseptic Approach’ as per Trust Policy. See Clinical Guideline.
•Wash/ cleanse hands thoroughly as per Trust Protocol and apply apron
•Clean work surface with Sani-cloth/alcohol and open dressing pack/ all other sterile equipment onto sterile field
•Cleanse hands with alcohol gel, put on sterile gloves and place sterile towel under line
•Wipe bio-connector surface with a new ‘sanicloth’ and allow to air dry on sterile surface
•Ensuring clamp is in place with midlines (NB: PiCC has an integral pressure activated valve at the hub and subsequently no clamp); thoroughly wipe around obturator with ‘Sanicloth’, remove and discard; with ‘Sanicloth clean around hub of lumen(s) and allow to air dry
•Attach a 20ml normal saline 0.9% filled syringe and then the line should then be aspirated if a PiCC to ensure blood flash back and accurate tip position, followed by brisk ‘Push-pause’ flushing technique. 10mLs instilled into each lumen in the same manner to ensure patency. Please note Midlines do not and will not aspirate for they are the same as a cannula and therefore it is not part of the protocol
•Remove the syringe once patency is confirmed and clean hub with sanicloth
•Attach infusion line or withdraw blood sample (although blood sampling is not encouraged to occlusion and infection risks) discarding 5mLs initially to avoid sample contamination.
•Once procedure/treatment is finished perform flushing as per protocol immediately to preventing line blockage
•Please note that evidence has now demonstrated that PiCC and Midlines do not require to be ‘Heparin Locked’ Regular 0.9% Normal Saline 20 ml flushing is adequate to maintain patency. This should be performed every 48 hours if line likely to block or minimum once weekly in the community if there are no clotting issues with the patient which may incur an increased risk of blockage. Please seek advice from the PiCC Service if unsure
•Only use a 20ml syringe when accessing/flushing a PiCC/Midline for a smaller syringe could lead to rupture of the line

AFTER TPN FLUSH LINE WITH 20ML SALINE; TPN GIVING SETS ARE CHANGED EVERY 24HRS/ WHEN TPN FINISHED

PiCC/Midline Dressing Change and Patency Maintenance

MOST COMPLICATIONS OCCUR FROM WET DRESSINGS

- Complications can occur from wet dressings therefore check dressing and insertion site through dressing daily.
- Perform dressing change WEEKLY or earlier if the dressing is peeling/lifting away or excessive amount of moisture is noticed underneath.

Procedure

- Position and support with a pillow the patient’s arm at 90° angle to body for clear access to line site
- Put plastic apron on and wash/cleanse hands thoroughly
- Open dressing pack onto clean surface and open other stock onto sterile field
- Don unsterile gloves to remove old dressing: anchor lumen(s) with one hand to secure the catheter whilst removing dressing and remove old dressing from the bottom of arm towards top minimises inadvertently pulling catheter out of skin
- Remove gloves; cleanse hands with alcohol gel and put on sterile gloves
- Apply long thin securing strip from ‘statlock’ pack over PiCC/Midline close to insertion site to prevent accidental migration of the PiCC/Midline
- Remove Statlock/securement device from skin holding the PiCC at all times. DO NOT PULL ON THE PiCC (alcohol required to remove)
- Use sterile gauze to hold catheter/lumens in place whilst cleansing skin
- Use 2% Chloraprep applicator or equivalent sani-cloth to clean skin-catheter junction using away motion from site
- Check measurement of catheter against recorded measurement to ensure no migration has occurred. DO NOT ADVANCE CATHETER IF MIGRATION NOTED
- Thoroughly clean surrounding skin that will be covered with the dressing using back-forward and side-to-side motions for at least 30 seconds
- Allow chlorhexidine to air dry. DO NOT pat dry with gauze
- Only apply gauze pressure dressing if site is bleeding
- Position new Statlock/securement device in position and apply new ‘BIOPATCH’ blue side up with the slit facing towards the bottom of the dressing. DO NOT PULL ON THE PiCC
- Apply transparent occlusive dressing and label with date and secure with a bandage or ‘Tubifast’ if required. NB: The bandage or ‘Tubifast’ must not be tight as it may lead to poor flow and thrombus formation. ‘Tubigrip’ should NOT be used.

(SOURCE: “PiCC & Midline Care & Maintenance Guide” p7 Julie Godfrey, 2014)
• Attach a 20ml normal saline 0.9% filled syringe and then the line should then be aspirated if a PICC to ensure blood flash back and accurate tip position, followed by brisk ‘Push-pause’ flushing technique as per protocol. 10mls instilled into each lumen in the same manner to ensure patency. Please note Midlines do not and will not aspirate for they are the same as a cannula and therefore it is not part of the protocol. Please see flushing protocol for the lines.
• Discard used equipment/old dressing in clinical waste bag
• Record dressing and findings in patient’s notes and report any untoward findings to PICC team
• The ‘Limbo’ waterproof arm protector supplied by the PICC team at insertion should always be used when bathing or showering. The line/dressing should NEVER GET WET.

Removal of PiCC and Midlines Procedure

• Remove Line only on doctor’s orders & following clarification from PICC team:
• Any Registered Nurse or Doctor can remove a PICC or Midline.
• Clean hands: wash/alcohol gel and apply non-sterile gloves
• Lay patient flat and support arm with a pillow out at 90 degrees
• Remove dressing and catheter securement device
• Clean site with Chlorhexidine 2% (Chloraprep applicator or Sanicloth) and allow to air dry before removing device
• Apply gentle traction on catheter, holding the catheter near the skin
• As catheter comes out, keep moving your hand forward on the catheter so traction is applied from close to the skin (possibility of catheter breaking if traction applied too far from site)
• If resistance is felt stop removal. Apply warm compresses for 20-30 minutes. If still resistance: leave line in-situ and call PiCC Team or ITU for advice
• Place sterile gauze over site and apply digital pressure until any bleeding stops
• Cover site with gauze and transparent dressing to be kept dry for 48hours
• Change dressing daily until site epithelialised

(SOURCE: “PiCC & Midline Care & Maintenance Guide”p8 Julie Godfrey, 2014)
### Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to aspirate blood from catheter</td>
<td>Ask patient to cough and breathe deeply or turn head (to stretch line), lie down, raise their arms or increase their general activity</td>
</tr>
<tr>
<td>Catheter appears to be blocked</td>
<td>Tip of catheter might be covered with fibrin sheath; may be resolved with 20ml Saline 0.9% rapid ‘push-pause’ flush</td>
</tr>
<tr>
<td>Catheter appears to have migrated out of site</td>
<td>If &lt;2cm: no action required If &gt;2cm: report to attending doctor; advise Chest X-Ray to check position of catheter tip</td>
</tr>
<tr>
<td>Leaking of blood/infusates from catheter</td>
<td>Check all connections are secure. Place arm at 90 degrees &amp; flush. If persists line may be fractured. Stop using catheter and seek PICC team advice</td>
</tr>
<tr>
<td>Swelling, soreness +/- redness of upper limb</td>
<td>Consider mechanical phlebitis and cellulitis. Mechanical phlebitis occurs commonly within 72 hours post-insertion. Responds to regular warm compresses. If no improvement, discuss with ICU Doctor</td>
</tr>
<tr>
<td>Pain during injection or infusion of therapy</td>
<td>Chemical phlebitis likely. Review agent being infused. If no improvement, use alternative access and seek PICC team advice.</td>
</tr>
<tr>
<td>Swelling of shoulder, neck, arm, or face</td>
<td>Consider extravasations or vessel thrombosis. Stop infusions and seek medical help – may require anti-coagulation.</td>
</tr>
<tr>
<td>Swelling of forearm +/- hand</td>
<td>Possible impaired venous drainage. Elevate forearm. If no improvement stop using catheter and seek PICC team review.</td>
</tr>
<tr>
<td>Redness +/- pus from insertion site without systemic symptoms of sepsis</td>
<td>Localised insertion site infection. Clean site with sterile gauze and sterile water. Seek PICC team advice.</td>
</tr>
<tr>
<td>Symptoms suggestive of systemic infection (tachycardia, tachypnoea, vasodilatation, pyrexia)</td>
<td>Consider catheter-related blood stream infection. Take blood cultures from catheter and via peripheral stab. Urgently discuss with ICU Doctor.</td>
</tr>
<tr>
<td>Pins and needles/numbness in catheter limb</td>
<td>Possible adjacent nerve irritation. Seek PICC team review</td>
</tr>
<tr>
<td>Cardiopulmonary symptoms (cardiac or respiratory distress, cardiac collapse/cardiac arrest)</td>
<td>CALL FOR HELP IMMEDIATELY Give oxygen therapy Apply basic monitoring Consider myocardial perforation, effusion or tamponade</td>
</tr>
</tbody>
</table>

Disclaimer:

A model was used to create the images in this document – dressings pictured in this document are therefore not accurate.