# Adult Vascular Access Policy

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## Approved by:
GGC Clinical Governance Group

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Date: Updated November 2014

## Date for Review:
Date: November 2016

## Replaces previous version:
New Policy
Introduction

1. Scope

This policy is relevant to all staff who care for adult patients with a vascular access device (VAD), Peripheral venous catheter (PVC), Mid-line catheter, Non-Tunnelled Central venous catheter (CVC), Tunnelled Central venous catheter (tcCVC), Dialysis central venous catheter, Peripherally Inserted Central catheter (PICC) and implantable port.

Specialist clinical areas and areas caring for particularly vulnerable patient groups may have local standard operating procedures in use which should be adhered to.

2. Roles & Responsibilities

Any NHS GGC staff member caring for an adult patient with a vascular access device (VAD) must be trained and competent within this area of practice.

3. Review of the Policy

The policy will be due for renewal November 2016 (2 years).

4. Articulation with other Policies NHS GGC

This policy can be read in conjunction with the GG&C Intravenous Medicines Administration Policy (2014) and the Beatson West of Scotland Cancer Centre CVC Guidelines as appropriate.

5. Infection Control: Standard Infection Control Precautions (SICPs)

Current local and national guidance advise that SICPs should be embedded into all aspects of care delivery including the care of patients with vascular access devices. The principles of SICPs should be used by all staff in all care settings at all times for all patients whether infection is known to be present or not. The application of SICPs ensures the safety of the patients, staff and visitors which is determined by the degree of risk encountered including the task/level of interaction and/or the level of exposure to blood or other body fluids.

Of the ten elements of SICPs, those key to the care and maintenance of vascular access devices are; hand hygiene, appropriate choice & use of personal protective equipment (PPE), management of care equipment, management of blood and body fluid spillage, disposal of waste and management of occupational risk. All staff should be trained on how to apply these precautions to minimise the risk of transmission of micro-organisms from recognised and un-recognised sources of infection (NHS GGC 2013, HPS 2013) Available at: http://library.nhsgg.org.uk/mediaAssets/Infection%20Control/08.03.13%20-%20V2.1%2028%20Jan%20NIPCManual%20-%2088-99-1010-1212.pdf

6. Personal Protective Equipment: PPE

Personal protective equipment (PPE) refers to the following equipment gloves, apron, eye protection, face shield and mask. The term PPE is extensively utilised throughout this policy and specifically relates to non-sterile gloves and apron. However it is acknowledged that in individually risk assessed situations all elements of PPE maybe required.

Disposable Aprons are used to prevent the transmission of micro organisms from patient to patient and should be worn for all direct patient contact. Non-sterile gloves are worn to protect the clinician from the patient’s body fluid, in particular where there is a risk of entry via mucous membranes or exposed tissues. Therefore the use of non-sterile gloves should be based on a risk assessment of the procedure being undertaken by the clinician.
7. **Aseptic Non Touch Technique**

This policy has been written bearing in mind the principles of aseptic non touch technique (ANTT) (Rowley 2010). ANTT states that the key principle to preventing infection is to maintain the asepsis of key parts, a key part being any part of a device that will come into direct contact with the patient’s blood stream (hubs, tips of syringes etc). These key parts can be protected by the use of micro sterile fields such as the inside of a syringe wrapper, or a sterile cap. Should a procedure be relatively simple (peripheral venous cannulation or dressing changes), the key parts are easily identified and protected and there may be no need for the use of a sterile dressing pack or sterile gloves. If a procedure is more complex, requiring many items of equipment to protect (e.g. initiation of dialysis), a sterile field may need to be created to contain the equipment and sterile gloves may need to be worn. Should a procedure be complex (e.g. Central venous catheter insertion), the key parts too numerous to identify, and will be lengthy, then a surgical sterile field may need to be created. The clinician should risk assess each procedure, bearing in mind the condition and location of the patient, to decide the level and size of sterile field needed.

8. **Locking of Catheters**

Catheters that are not in use daily and dialysis CVCs may required to be locked. Solutions used to lock catheters include 0.9% sodium chloride, heparin, heparised saline and taurolidine citrate. Any lock must always be aspirated before the catheter is accessed to avoid the administration of the lock to the general circulation of the patient. For this reason, always aspirate from a CVC before administering medication through them.

9. **Needle Free Connectors**

All needle free connectors, whether single or multiple, with or without extension sets, must be primed before use with IV 0.9% sodium chloride. However, there maybe occasions when it is required to flush with IV 5% glucose due to medicines incompatibility.

10. **Allergy**

Patient’s allergies must be checked prior to the procedure from a dressings, topical solutions and medicines perspective. If the patient has a chlorhexidine allergy, alcoholic povidone - iodine solution can be used instead of 2% chlorhexidine in 70% alcohol.

11. **Medicines Prescription**

All medicines mentioned throughout this policy must be prescribed as appropriate.
Peripheral Venous Cannula (PVC)

**Insertion**

| **Aim** | To ensure that patients undergoing the insertion of a PVC receive optimal evidence based care, by a competent practitioner, whilst maintaining an aseptic non touch technique to reduce complications. |
| **Statement** | Insertion of a PVC to facilitate the administration of medicines, fluids, blood/blood products or nutrition. A PVC can remain in place for 72-96 hours (RCN 2010). |
| **Requirements** | 1) Confirm requirement for PVC  
2) PPE  
3) Clean tray for equipment  
4) Near patient sharps disposal bin  
5) Single patient use tourniquet  
6) 2% chlorhexidine and 70% isopropyl alcohol  
7) Appropriate size PVC dependent on patient assessment  
8) Sterile, semi-permeable, transparent PVC dressing  
9) Needle free connector  
10) 10ml syringe and IV 0.9% sodium chloride flush solution  
11) Clinical waste bag |
| **Location** | In an appropriate clinical environment. |
| Procedure | 1. Discuss previous experiences of IV cannulation, obtain verbal consent where applicable and check if local anaesthetic is required (rare in adult population).  
2. Decontaminate hands and apply PPE.  
3. If necessary wash and dry surrounding area of PVC site if visibly dirty.  
4. Avoid sites if possible where there is visual inflammation or infection present.  
5. Position the patient with arm supported  
6. Apply tourniquet at least 7-8cm above selected insertion site and palpate the vein.  
7. Shaving of hair should be avoided. If necessary to remove hair, clipping or cutting is recommended prior to the area being disinfected.  
8. Clean the skin with 2% Chlorhexidine in 70% isopropyl alcohol for at least 15 seconds and allow to dry. **Do not repalpate** the vein or touch the skin.  
9. Apply gloves.  
10. Fold down wings of PVC, inspect for any defects and handle ensuring that key parts are not touched.  
11. Anchor vein by applying tension to skin below the site and insert the PVC bevel up at an angle of 10-45 degrees dependent on device.  
12. Level the cannula and advance a few millimetres into the vein, withdraw needle slightly, observing flashback of blood in shaft. Maintaining tension with one hand and holding the flashback chamber or thumb plate with the other, advance the PVC forward over the needle.  
13. Release tourniquet and apply digital pressure above tip of PVC and remove needle. Discard into sharps bin.  
14. Unless otherwise indicated attach a needle free connector which has been primed with IV 0.9% sodium chloride.  
15. Apply sterile, semi permeable, transparent dressing  
16. Flush PVC with IV 0.9% sodium chloride using a push pause technique whilst observing patient to ensure catheter patency.  
17. Discard waste appropriately, remove PPE and decontaminate hands.  
18. Record procedure in patients nursing documentation. A PVC care plan must be commenced as soon as a patient is established in an inpatient area (See page 12).  
19. **After two unsuccessful attempts** the clinician should seek assistance from a more experienced colleague.  
20. A patient information leaflet (page 10) containing written guidance on why the catheter has been inserted and what possible complications to be aware of should be given to the patient as soon as possible after insertion unless clinically indicated. |
<table>
<thead>
<tr>
<th>Complications</th>
<th>Most complications / adverse events can be minimised or prevented through:</th>
</tr>
</thead>
</table>
|              | • Careful insertion technique  
               | • “Scrub the Hub” Cleaning the needle free connector for at least 15 seconds before use.  
               | • Optimum care and maintenance  
               | • Securing the device well with an appropriate dressing  
               | • Early detection of complications with appropriate actions taken.  
               | • Removal of the PVC when there is no longer a clinical indication for it or when early signs of complications are indentified. |
|              | The most common complications are:  
               | • Infection  
               | • Phlebitis/Thrombophlebitis  
               | • Infiltration  
               | • Extravasation  
               | • Haematoma Formation  
               | • Nerve damage (not common)  
               | • Arterial damage  
               | • PVC embolism |
### Aim
To ensure that patients with PVC receive optimal evidence based care in relation to the maintenance of both the PVC and PVC insertion site by a competent practitioner whilst maintaining a non touch technique to reduce the risk of complications.

### Statement
It is essential, when caring for a patient with a PVC that a closed system is maintained. When the closed system is interrupted it is essential to observe a strict aseptic non touch technique.

### Location
In a clinical environment. The patient must be placed in the best position to facilitate this procedure.

### Procedure

<table>
<thead>
<tr>
<th>PVC INSERTION SITE &amp; PATENCY ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuing need for the PVC should be reviewed and documented daily.</td>
</tr>
<tr>
<td>2. Medical staff should review the need for intravenous therapy (IV) therapy including antibiotics on a daily basis and switch to oral if appropriate. (refer to NHSGGC IVOST policy on Staffnet)</td>
</tr>
<tr>
<td>3. The PVC site must be checked at least once per shift for signs of patency and phlebitis. The PVC must also be observed during:</td>
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<tr>
<td>• Administration of IV medicines &amp; fluids</td>
</tr>
<tr>
<td>• Alteration of flow rates of IV fluids</td>
</tr>
<tr>
<td>• Changing IV fluids</td>
</tr>
<tr>
<td>4. PVC Observation should include</td>
</tr>
<tr>
<td>• Insertion site and surrounding tissue</td>
</tr>
<tr>
<td>• Dressing</td>
</tr>
<tr>
<td>• Integrity of the PVC</td>
</tr>
<tr>
<td>• Security of the connections</td>
</tr>
<tr>
<td>5. Increased frequency of checks are dependent on clinical environment &amp; types of IV medicines being administered</td>
</tr>
<tr>
<td>6. The PVC site should be palpated through the intact dressing to assess for any tenderness and visually inspected for signs of phlebitis.</td>
</tr>
<tr>
<td>7. The condition of the PVC site should be scored using the Visual Infusion Phlebitis (VIP) score and this should be documented in the PVC care plan.</td>
</tr>
<tr>
<td>8. If PVC dressing is loose, damp or soiled it should be replaced immediately. The insertion site should be cleaned for at least 15 seconds with 2% chlorhexidine and 70% alcohol and allowed to dry.</td>
</tr>
<tr>
<td>9. If the PVC is not being used for continuous infusions then patency must be assessed prior to the administration of any medications.</td>
</tr>
</tbody>
</table>

**Equipment required to carry out patency check of a PVC as follows:**

- PPE
- Tray with 10ml syringe & 5ml vial IV 0.9% sodium chloride
- 2% chlorhexidine in 70% alcohol wipes

10. Scrub the hub for at least 15 secs then flush using a push pause technique to assess catheter patency.
|   | 11. Record procedure in nursing documentation and PVC care plan (page 10)  
|   | 12. If appropriate the patient should be educated and trained to observe their PVC for any abnormalities and should be given the PVC information leaflet (page 11 & 12) |
How should I look after the cannula?

- Keep the area clean and dry and do not touch it. Try not to bump the cannula.
- Don’t wear jewellery such as watches on the same side as the cannula.
- Take care when removing clothing to stop the cannula being moved. Try to wear loose clothing.
- Tell a member of staff if:
  - the dressing becomes wet, dirty, loose or falls off.
  - the area becomes red, painful or swollen around the cannula.
  - you feel hot, cold or shivery.
- If the cannula is no longer being used for medications or fluids, ask if it can be taken out.
What is a Peripheral Venous Catheter (PVC)?

An intravenous (IV) PVC is commonly called a cannula. It is a small plastic tube that is inserted through the skin into a vein in the arm, hand or leg (for young children it may be through a vein in the scalp). This allows healthcare staff to give you IV fluids and medicines. You may need more than 1 PVC at the same time and staff will explain this to you.

Why do I need a PVC?

- Your doctor may have prescribed IV fluids and medicines, which may be the best or the only way for you to get the treatment. The treatment may be given through a drip (infusion) or using a syringe.
- You may need the PVC for anaesthetic medicines or for a diagnostic test where contrast media (dye) or other substances need to be injected.

How will the PVC be put in?

Healthcare staff will explain the treatment, ask for your verbal consent and tell you about what to expect so that you can report any side effects or problems.

The member of staff inserting the PVC will take precautions to help prevent infection. They will do this by:

- Performing hand hygiene and putting on clean gloves and a plastic apron
- Carefully cleaning the skin where the PVC is going to be inserted
- Using a sterile PVC cannula
- Using a technique which reduces the risk of infection

Staff insert the PVC into the vein using a fine needle which they then remove to leave the cannula in the vein. There may be a sharp pain as the needle goes in, but this should stop once the cannula is in place. If the pain continues, tell the member of staff who is inserting the cannula. Once inserted, staff will apply a sterile dressing and flush the cannula with saline to check that it is in the vein. The fluid may feel cool as it goes in.

How will the staff look after the cannula?

They will:

- Check that your dressing covering the cannula is clean, dry and secure and replace it as necessary.
- Check that the cannula is working properly and the skin around it is not red or painful before giving any treatment.
- Inspect the cannula at least once a day while still in use and record this in the PVC care plan.
- Clean the bung with an alcohol impregnated wipe before using it.
- Remove the cannula if it becomes red, painful or swollen or when it is no longer needed and before you go home.
### Peripheral Vascular Cannula (PVC) Insertion & Maintenance

#### Modified V.I.P (Visual Infusion Phlebitis) Score

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No phlebitis: Observe cannula</td>
</tr>
<tr>
<td>1</td>
<td>Possible first sign: Observe cannula</td>
</tr>
<tr>
<td>2</td>
<td>Early stage of phlebitis: Remove &amp; rester cannula</td>
</tr>
<tr>
<td>3</td>
<td>Phlebitis/Thrombophlebitis: Remove &amp; rester cannula</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

#### Insertion – Complete all sections

<table>
<thead>
<tr>
<th>PVC Inserted</th>
<th>Date Inserted</th>
<th>Insertion site</th>
<th>Colour of PVC</th>
<th>Inserted by (Name &amp; Designation / If known)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED</td>
<td>Theatre, Ward</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clinical Indication**
- IV Fluids/IV Medication
- Urgent access
- Interventional procedures
- Other Please state:

**Insertion Criteria**
- Clean field used: Yes □ No □ Unknown □
- Hand hygiene: Yes □ No □ Unknown □
- Skin asepsis: Yes □ No □ Unknown □
- Dressing affixed: Yes □ No □ Unknown □
- Non touch technique (do not re-contaminate cleaned skin): Yes □ No □ Unknown □

#### Maintenance – To be completed daily

<table>
<thead>
<tr>
<th>PVC 1</th>
<th>Has the PVC been used in the past 24 hours?</th>
<th>Absence of inflammation and or extravasation</th>
<th>VIP score</th>
<th>The PVC dressing is intact</th>
<th>The PVC has been inserted less than 72 hours</th>
<th>Hand hygiene before &amp; after all procedures</th>
<th>If answer is no to any of the criteria or if VIP 2 or more and PVC left in situ: Document rationale for decision in comments</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes □ No □ Unknown □</td>
<td>Yes □ No □</td>
<td>V.I.P.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Left in situ □ Removed □</td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td>Yes □ No □ Unknown □</td>
<td>Yes □ No □</td>
<td>V.I.P.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Left in situ □ Removed □</td>
<td></td>
</tr>
<tr>
<td>Day 3</td>
<td>Yes □ No □ Unknown □</td>
<td>Yes □ No □</td>
<td>V.I.P.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Left in situ □ Removed □</td>
<td></td>
</tr>
<tr>
<td>Day 4</td>
<td>Yes □ No □ Unknown □</td>
<td>Yes □ No □</td>
<td>V.I.P.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Left in situ □ Removed □</td>
<td></td>
</tr>
<tr>
<td>Day 5</td>
<td>Yes □ No □ Unknown □</td>
<td>Yes □ No □</td>
<td>V.I.P.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td>Left in situ □ Removed □</td>
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</tbody>
</table>

After day 3 consider removal, if there is still a clinical reason justify rationale for PVC to remain in situ.

**Date removed**

**Reason for PVC removal**

**Reason PVC in greater than 72 hours**

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**NHS GG P Insertion & maintenance care plan**

IPCTv1.3
### PVC Removal

| **Aim** | To ensure that patients receive evidence based care in relation to the removal of a PVC, by a competent practitioner, whilst maintaining a non touch technique to reduce the risk of complications. |
| **Statement** | The need for a PVC is assessed on a daily basis and should be removed as soon as it is no longer required. After 72 hours consider removal, any clinical rationale to leave in situ should be recorded in the care plan. |
| **Requirements** | 1. PPE  
2. Sterile gauze swabs  
3. Sterile adhesive dressing (check allergies)  
4. Sharps disposal bin  
5. Clinical waste bag. |
| **Location** | In clinical environment that is suitable to this procedure |
| **Timing** | Once a decision has been taken to remove PVC, the patient is prepared for the procedure and a competent practitioner is available to carry out the procedure |
| **Procedure** | 1. Explain the procedure to the patient and obtain verbal consent  
2. Ensure that alternative vascular access has been established if necessary  
3. Assess patients bleeding risk and if they are either therapeutically anti-coagulated or have an abnormal clotting screen seek advise from patients consultant prior to removal.  
4. Stop all fluids being infused via the PVC.  
5. Collect equipment.  
6. Decontaminate hands & apply PPE  
7. Carefully remove the PVC dressing noting that scissors must not be used to loosen or remove dressing.  
8. Hold a piece of dry cotton gauze over the insertion site and remove the PVC.  
9. Apply firm pressure immediately to insertion site for approximately 2-3mins or long enough to ensure that there is no subcutaneous leakage of blood  
10. After removal the PVC should be inspected for integrity and damage.  
11. Apply sterile adhesive dressing to the insertion site, checking for any allergies.  
12. Ensure patient is comfortable  
Recorded procedure in nursing documentation and the PVC care-plan (page 12) |
Preventing infections when inserting and maintaining a PVC

When inserting a PVC

Ensure that:
- a PVC is clinically indicated for this patient
- hand hygiene is performed immediately before all PVC insertion procedures (WHO Moment 2)
- a skin antiseptic containing 70% isopropyl alcohol is used to cleanse skin and left to dry before insertion
- aseptic technique is maintained throughout insertion procedure (i.e. ‘critical parts are not touched’)
- a sterile transparent, semi-permeable dressing is used to cover the catheter site

When maintaining an inserted PVC and accessing the insertion site and line

Ensure that:
- the clinical need for the PVC is reviewed and recorded every day (on a daily basis)
- medical staff review the need for intravenous (IV) therapy including antibiotics on a daily basis - switch to oral if possible
- hand hygiene is performed immediately before accessing the line/site (WHO Moment 2)
- removal of PVCs is considered if in longer than 72 hours
- the PVC site is assessed; removing the PVC where there is phlebitis or inflammation at the site
- PVC dressings are intact
- an antiseptic containing 70% isopropyl alcohol is used to clean the access hub before accessing – rub the access hub for at least 15 seconds (“scrub the hub”)

Good Practice Points

Documenting date and time of peripheral vascular catheter insertion is an important step to achieve timely line removal.

The use of personal protective equipment (PPE) including gloves is important in all procedures where blood and body fluid risk exists. Refer to National Infection Prevention and Control Manual.

The featured recommendation on hand hygiene does not detract from other times when hand hygiene is recommended and will be monitored against (namely the 5 Moments for Hand Hygiene).
## Non Tunnelled CVC Insertion

### Aim
To ensure that patients undergoing the insertion of a central venous catheter (CVC) receive evidence based care, by a competent practitioner, maintaining maximal sterile barrier precautions to reduce complications.

### Statement
Insertion of a multi-lumen CVC to facilitate measurement of central venous pressure and provide vascular access for intravenous (IV) medicines, IV fluid, or parenteral nutrition.

### Requirements
1. If appropriate assess patients pain requirements and administer appropriate analgesia
2. The bed must have the facility to place the patient in the head down tilt position (Trendelenberg)
3. Patient monitoring equipment
4. Near bedside resuscitation equipment
5. Access to oxygen and suction point
6. Disinfected trolley
7. Sterile drapes (for trolley)
8. Single/ Multi-lumen CVC
9. Needle free connector 1 for each lumen
10. 3 vials of IV 0.9% Sodium chloride
11. 2% chlorhexidine in 70% alcohol solution
12. Medium drapes
13. Fenestrated Drape
14. Size 11 scalpel blade with handle
15. 10 ml syringes X 2
16. 20 ml syringes X 2
17. 21 g Needle (green) X 5
18. Suture 2/0 Monosof or Dermalon
19. Sterile swabs
20. Sterile, semi permeable, transparent dressing
21. Sterile surgical gown, gloves, hat, mask and goggles/visor (operator and assistant)
22. Lidocaine 1% injection
23. Portable ultrasound, sterile probe cover, sterile gel
24. PVC access if possible
25. Record of baseline observations
26. Adult CVC careplan

### If CVP monitoring is to be established :-
27. Flush flow system
28. Pressure infusor bag
29. Transducer/monitoring system

### Timing
As clinical condition dictates.

### Procedure
1. Explain procedure to patient and obtain verbal consent.
2. The subclavian site should be used if possible or the internal jugular vein. **The femoral site should be avoided whenever possible** due to the risk of infection.
3. All the requirements stated above are taken to the procedure area, opened and establish a sterile field.
4. The patient is positioned appropriately i.e. head down tilt (Trendelenberg position) for the insertion of jugular/subclavian line
5. The practitioner will carry out the following:~
   - Selection of catheter insertion site
   - Application of hat, mask & goggles/visor
   - Full surgical scrub
   - Application of sterile gown and gloves
- Prepare site of insertion by applying 2% chlorhexidine in 70% alcohol using swabs/applicator and a friction rub for at least 15 seconds. The skin is then allowed to air dry completely before the skin is punctured.
- Apply fenestrated drape over the site of insertion and drape over the patient’s body to ensure the maximum sterile field.
- Infiltrate the subcutaneous tissue around the insertion site 1% lidocaine injection and allow to take effect.
- Prepare CVC and apply needle free connector to each lumen with the exception of the CVP monitoring lumen. Prime all lumens and needle free connectors with IV 0.9% sodium chloride.
- Visualise insertion site with ultrasound probe
- Insert CVC using a Seldinger technique
- Ensure guidewire is removed and disposed of into a sharps bin.
- Anchor CVC by applying suture to the flange.
- At this stage the bed can be levelled out.
- Remove any blood/debris from insertion site
- Apply sterile dressing along with completed date & time strip
- Remove all drapes from the patient’s bedside.
- Dispose of waste appropriately, remove PPE & decontaminate hands
- Return the patient to the sitting upright position

**If CVP monitoring is to be established Critical care areas:**
- Apply flush flow system to lumen designated for monitoring purposes.
- Zero the CVP line
- Monitor and record CVP.

6. Throughout the procedure the patient should be continuously monitored.

7. CVC care plan (page 21) and insertion documentation sticker (if used) must be completed and retained in the patient’s case notes.

### Aftercare

Monitor the patient continuously
- Monitor and record NEWS
- Chest X-ray must be carried out following the insertion of a CVC to clarify its position prior to use and exclude pneumothorax. Document the findings in the patient’s medical and nursing notes.
- Observe insertion site for signs of infection, leakage cracking of the CVC and evidence of surgical emphysema

**In a critical care area**
- Listen for air entry to all lung fields post insertion and hourly thereafter.
- If the patient is mechanically ventilated pay particular attention to peak airway pressure levels and record hourly
- If the patient is breathing spontaneously record respiratory rate

### Complications associated with CVC

<table>
<thead>
<tr>
<th><strong>Immediate</strong></th>
<th><strong>Long term</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pneumothorax</td>
<td>1. Local insertion site infection</td>
</tr>
<tr>
<td>2. Haemothorax</td>
<td>2. Bacteraemia</td>
</tr>
<tr>
<td>3. Chylothorax</td>
<td>3. Sepsis</td>
</tr>
<tr>
<td>4. Misplacement of the catheter leading to arrhythmia</td>
<td>4. Cracking/leaking/kinking of the catheter</td>
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<tr>
<td>5. Atrial/ventricular perforation</td>
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<td>6. Arterial puncture</td>
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<td>7. Arterial cannulation</td>
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<tr>
<td>5.</td>
<td>Lumen occlusion</td>
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<tr>
<td>6.</td>
<td>Venous erosion</td>
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<tr>
<td>7.</td>
<td>Catheter related thrombus</td>
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<tr>
<td>8.</td>
<td>Venous thromboembolism</td>
</tr>
<tr>
<td>Aim</td>
<td>To ensure that patients with a CVC receive evidence based care in relation to the maintenance of the CVC, insertion site and flush flow system (if in use), by a competent practitioner maintaining an aseptic non touch technique to reduce the risk of complications.</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Statement</td>
<td>A CVC is used to facilitate the measurement of central venous pressure (CVP) and to provide vascular access for intra-venous (IV) medicines, IV fluid or parenteral nutrition. A CVC can remain in place for up to 14 days. It is essential, when caring for a patient with a CVC that a closed system is maintained. When the closed system is interrupted it is essential to observe a strict aseptic non touch technique.</td>
</tr>
</tbody>
</table>
| Requirements | 1. CVC site care should consist of assessment of the site, decontamination of the catheter insertion site and surrounding area with chlorhexidine 2% in 70% alcohol and the application of a sterile dressing.  
2. Changing the dressing should be carried out as often as the condition of the dressing indicates or at least every 7 days, depending on the dressing.  
3. Clean surface  
4. PPE  
5. Chlorhexidine 2% in 70% alcohol solution  
6. Sterile, semi-permeable, transparent dressing with date and time strip.  
7. Clinical waste bag |
| Location | In a clinical environment that is suitable for this procedure and the patient should be positioned to provide access to the CVC. |
| Timing | As the condition of the dressing and CVC indicate or at least every 7 days |
| Procedure Continued | 1. Explain the procedure to the patient.  
2. Position patient appropriately  
3. Decontaminate hands and apply PPE  
4. Remove transparent dressing from the CVC insertion site.  
5. Decontaminate hands  
6. The nurse will carry out the following:  
   - Observation and evaluation of the CVC insertion site, surrounding tissue, the integrity of the CVC, sutures and security of the connections.  
   - Apply chlorhexidine 2% in 70% alcohol to the CVC insertion site and surrounding tissues for at least 15 seconds and allow to air dry completely before applying the dressing.  
   - Apply dressing and date/time label.  
   - Position patient comfortably  
   - Dispose of waste appropriately, remove PPE & decontaminate hands  
7. Record procedure in nursing documentation and CVC care plan (see page 21-22). |
| Blood stream infection | Monitor the CVC:  
   - Insertion site and surrounding tissue  
   - Dressing  
   - Integrity |
• Security of the connections
As the patient’s condition indicates and at least once per shift.

Monitor the patient’s condition as dependency indicates by observing and documenting NEWS (National Early Warning Score)
The patient should be assessed daily regarding the need to have a CVC. Prompt removal of a CVC is advised to limit the risk of catheter related blood stream infection.

Aftercare

Maintaining patency: When accessing a CVC, it should be flushed before and after each administration of medication or fluids

Manual Flushing of CVC
Before flushing a CVC lumen it is essential to examine the lumen for evidence of cracking or leakage from the lumen

Requirements for Manual Flushing
1. PPE
2. Clean tray
3. 10ml syringe per lumen (e.g. 3 for triple lumen etc)
4. 10ml ampoule of IV 0.9% sodium chloride
5. 2% Chlorhexidine in 70% alcohol
6. Clinical waste bag

Procedure
1. Decontaminate hands & apply PPE
2. Open all requirements
3. Aspirate contents of IV 0.9% sodium chloride ampoule into 10ml syringe.
4. Identify lumen to be flushed.
5. Clean needle free connector of lumen using 2% chlorhexidine in 70% alcohol for at least 15 secs allow to dry
6. Using 10ml syringe aspirate lumen to ensure any residual fluid/medicines are removed.
7. With 10ml syringe with IV 0.9% sodium chloride solution flush the lumen utilising a push pause technique finishing on positive pressure.
8. Dispose of waste appropriately, remove PPE & decontaminate hands.

If a multi lumen CVC is in use then repeat the above as necessary to maintain the patency of all lumens not in constant use. This procedure must be carried out at least once per shift

Using a Flush Flow System (Critical care areas)
If the distal lumen of a multi-lumen CVC has been dedicated for the purpose of CVP monitoring a flush flow system must be used. This is a closed pressurised system that will automatically deliver a 3ml/hour flush of IV 0.9% sodium chloride solution to maintain the patency of this lumen, or a bolus flush on demand when required. These systems must be changed every 72 hours. Strict non touch technique must be observed when applying, changing or using these systems.

Complications

Immediate
1. Pneumothorax
2. Haemothorax
3. Chylothorax
4. Misplacement of the catheter leading to arrhythmia
5. Atrial/ventricular perforation
6. Arterial puncture
7. Arterial cannulation
8. Leakage of lymph due to thoracic duct injury
<table>
<thead>
<tr>
<th>Complications Continued</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Local insertion site infection</td>
<td></td>
</tr>
<tr>
<td>2. Bacteraemia</td>
<td></td>
</tr>
<tr>
<td>3. Sepsis</td>
<td></td>
</tr>
<tr>
<td>4. Cracking/leaking/kinking of the catheter</td>
<td></td>
</tr>
<tr>
<td>5. Lumen occlusion</td>
<td></td>
</tr>
<tr>
<td>6. Venous erosion</td>
<td></td>
</tr>
<tr>
<td>7. Catheter related thrombus</td>
<td></td>
</tr>
<tr>
<td>8. Venous thromboembolism</td>
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</tr>
</tbody>
</table>
**Adult Central Venous Cannula (CVC)**  
**Insertion & Maintenance – General wards**

Please complete insertion details for each CVC inserted. 
Care & maintenance to be undertaken & documentation completed each day. 
(If CVC in longer than 7 days please use a further CVC Insertion & maintenance document as continuation to evidence maintenance) 
*Critical care areas will have existing Insertion & maintenance bundles in use*

### Insertion – When Inserting a CVC ensure that:

1. Surgical scrub is performed before application of maximal sterile barrier precautions.
2. Sterile barrier precautions are used: hat, mask, sterile gown & sterile gloves (Operator & Assistant).
3. Sterile drape used to cover whole patient.
4. Aseptic technique maintained throughout insertion procedure.
5. Skin prepared by decontamination of the insertion site using 2% Chlorhexidine gluconate in 70% isopropyl alcohol and allowed to dry completely.
6. The Subclavian site is used if possible or internal jugular* vein. (The femoral site should be avoided whenever possible. If used record in variance section). [*I] vein is the preferred site for CVC insertion by NHSGGC clinicians. This is in alignment with NHSGGC policy.
7. A sterile, transparent semi-permeable dressing is used to cover the catheter site.

Good practice includes the documenting of the date & time of CVC insertion. This provides a baseline for ongoing catheter maintenance and to enable timely line removal when clinically no longer required.

### CVC Insertion details – please record any variances in section below

<table>
<thead>
<tr>
<th>Where Inserted</th>
<th>ED ☐ Theatre ☐ ITU/HDU ☐ Interventional Radiology ☐</th>
<th>Date/time Inserted</th>
<th>Insertion site</th>
<th>☐ Emergency</th>
<th>☐ Elective</th>
<th>Inserted by (Name &amp; Designation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward/other</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Clinical indication**

<table>
<thead>
<tr>
<th>IV Fluids/IV Medication ☐</th>
<th>Chemotherapy ☐</th>
<th>Urgent access ☐</th>
<th>Total Parenteral Nutrition ☐</th>
<th>Haemodialysis ☐</th>
<th>Other Please state:</th>
</tr>
</thead>
</table>

**Insertion Criteria**

(If no: please explain in variance section below)

1. Surgical scrub Yes ☐ No ☐
2. & 3. Maximal sterile barrier precautions Yes ☐ No ☐
4. Aseptic technique Yes ☐ No ☐
5. Skin prep Yes ☐ No ☐
6. Subclavian or IJ vein used Yes ☐ No ☐
7. Sterile transparent semi-permeable dressing applied Yes ☐ No ☐

**Type of CVC (Tunneled/Non-tunneled) please record**

- Real Time Ultrasound Guidance Yes ☐ No ☐
- If used: Guidewire removed & Intact Yes ☐ No ☐
- Position tip confirmed by Chest X-ray (if applicable) Yes ☐ No ☐

**Needle free device placed on end port(s)**

- Yes ☐ No ☐ N/A ☐

(As per GCC protocol)

- Has there been more than one puncture attempt? Yes ☐ No ☐

If yes

**Variance recording:**

---

MH 265-123-1
Adult Central Venous Catheter (CVC) Maintenance Bundle continuation sheet - General wards

This document should be used in conjunction with an insertion & maintenance bundle for days 1 to 7. If the patient has a Haemodialysis catheter and/or with Renal service, do not use unless an emergency and contact the Renal on call team as soon as possible for advice.

When maintaining an inserted CVC and accessing the insertion site and line ensure that:

1. The requirement for the CVC in situ is reviewed and recorded on a daily basis.
2. The CVC dressing is intact. (If not intact, the dressing must be changed)
3. The CVC dressing has been changed in the last 7 days.
4. Chlorhexidine gluconate 2% in 70% isopropyl alcohol is used for cleaning the insertion site during dressing changes.
5. Hand hygiene is performed immediately before accessing the site or line
6. An antiseptic containing Chlorhexidine gluconate 2% in 70% isopropyl alcohol is used to clean the access hub (needle free device) for at least 15 seconds [Scrub the Hub]. Allow to dry completely before accessing line.

CHT:

Maintenance - To be completed daily (Observe for signs and symptoms of local or systemic infection)
please record any variances in section below

<table>
<thead>
<tr>
<th>Day</th>
<th>Has the need for CVC been reviewed today?</th>
<th>Any sign of CVC infection?</th>
<th>The CVC dressing is intact?</th>
<th>Hand hygiene performed?</th>
<th>Exit site, line and hubs cleaned with 2% Chlorhexidine in 70% IPA?</th>
<th>Aseptic non touch technique used?</th>
<th>CVC is laved/flushed as per local guidelines?</th>
<th>What has been done?</th>
<th>Date dressing due changed</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>/__/</em>___</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
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</tbody>
</table>

Signs and symptoms of CVC infection

<table>
<thead>
<tr>
<th>Local infection</th>
<th>Systemic infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema / inflammation / exudate</td>
<td>Hypotension</td>
</tr>
<tr>
<td>Hot to touch</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Pain tenderness</td>
<td>Pyrexia</td>
</tr>
<tr>
<td></td>
<td>Rigors when using the line</td>
</tr>
</tbody>
</table>

If lumen blocked: seek medical advice as soon as possible as this could potentiate complications.
# Non Tunnelled CVC Removal

<table>
<thead>
<tr>
<th><strong>Aim</strong></th>
<th>To ensure that patients with a Central Venous Catheter (CVC) receive evidence based care in relating to the removal of this CVC, by a competent practitioner, maintaining a safe environment to reduce the risks of complications.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statement</strong></td>
<td>The need for a CVC is assessed by the Doctor on a daily basis. The CVC will be removed when there is no longer a clinical indication to use the CVC as the primary source for vascular access or in the event of any CVC related complications.</td>
</tr>
</tbody>
</table>
| **Requirements**            | The bed/trolley must be head down tilt to allow the patient to be in the Trendelenberg position to prevent air embolus occurring during this procedure. Under no circumstances should the patient be in the upright position in bed or a chair during this procedure.  
   1. Access to resuscitation equipment  
   2. Access to an oxygen point and suction  
   3. Cleaned trolley  
   4. PPE  
   5. Dressing pack  
   6. 2% Chlorhexidine in 70% alcohol solution  
   7. Sterile stitch cutter  
   8. Sterile stitch scissors and universal container (if tip is being sent for culture)  
   9. Sterile dressing  
   10. Clinical waste bag |
| **Location**                | In clinical area suitable for this with the ability to monitor and observe the patient throughout the procedure. |
| **Timing**                  | When it has been assessed that the CVC is to be removed, the patient is prepared for the procedure and a competent practitioner is available to carry out the procedure. |
| **Procedure**               | 1. Confirm that the CVC has to be removed with medical staff.  
   2. Explain procedure to patient and obtain verbal consent.  
   3. Assess the patient's pain requirements and if appropriate administer analgesia.  
   4. Ensure that alternative vascular access has been established if required.  
   5. Assess patients bleeding risk and if they are either therapeutically anti-coagulated or have an abnormal clotting screen seek advise from patients consultant prior to removal.  
   6. Stop all fluids being infused via the CVC and clamp all of the lumens.  
   7. The patient will be placed in the Trendelenberg position if it is a jugular or subclavian CVC, in the recumbent position if the patient has a femoral CVC.  
   8. Take equipment required for this procedure to the patients bed side  
   9. Decontaminate hands & apply PPE  
   10. Open dressing pack and open equipment onto sterile field  
   11. If the tip of the CVC being removed is required to be sent for culture and sensitivity screening then open sterile stitch scissors and place onto the open dressing pack  
   12. Decontaminate hands and allow to dry  
   13. Remove CVC dressing and discard.  
   14. Clean the area around the insertion site and the flange housing the sutures with for at least 15 secs 2% Chlorhexidine in 70% alcohol solution and allow to air dry.  
   15. Place sterile drape over the CVC insertion site and place sterile gauze swabs and sterile dressing on top of the drape. |
**Procedure Continued**

16. With sterile stitch cutter, gently cut the sutures on either side of the CVC, remove and discard. **Care must be taken to ensure that the CVC does not migrate out of the insertion site during this part of the procedure.**

17. Ask the patient to take a deep breath and hold whilst performing Valsalva manoeuvre (to increase intra-thoracic pressure). If the patient is receiving mechanical ventilation the CVC should be removed during the expiratory phase of ventilation.

18. Apply sterile gauze swabs over the insertion site and gently but steadily remove the CVC. **If there is any resistance experienced during this procedure, stop, and summon medical assistance.**

19. With gauze swabs in hand apply pressure to the puncture site for 2-3 minutes and if bleeding has stopped apply sterile dressing. If blood/serous fluid continue to ooze from the site apply pressure for a further 2-3 mins or long enough to ensure that there is no subcutaneous leakage of blood.

20. Once removed observe the CVC to ensure that it is intact, and that there is no evidence of clot formation or cracking.

21. If the CVC tip is required for screening following removal, place the CVC onto the dressing pack, when the procedure is complete, using the sterile stitch scissors cut the tip of the CVC off and place it into the universal container using a non-touch technique.

22. Cover the insertion site with an occlusive dressing which should be left in place for 24 hours.

23. Ensure that the patient is in a comfortable position.

24. Dispose of clinical waste, remove PPE & decontaminate hands.

25. Minimize activity for at least one hour post removal.

26. Record the removal on the CVC care plan and nursing documentation (page 21-22)

Throughout the procedure to remove the CVC irrespective of the site of insertion, it is essential to observe the patient.

**SUSPECTED AIR EMBOLISM**

Turn patient left side down, Trendelenberg position (head down). Administer 100% oxygen and call emergency team on 2222.

| Aftercare | 1. Observe the patients National Early Warning Score (NEWS).  
2. Observe insertion site for signs of leakage, haemorrhage, or haematoma.  
3. Observe limb closest to insertion site for signs of swelling and or pain.  
4. Dressing must remain in situ for a minimum of 24 hours following CVC removal.  
5. Document the condition of the insertion site and surrounding area in the nursing notes. |
| --- | --- |
| Complications of the removal of a central venous catheter | 1. Air embolus  
2. Haemorrhage  
3. Haematoma  
4. Leakage of lymph due to thoracic duct injury  
5. Catheter fracture.  
6. Pain  
7. Swelling.  
8. Infection. |
Preventing infections when inserting and maintaining a CVC

Patient who needs a central vascular catheter (CVC)

When inserting a CVC

Ensure that:
- surgical scrub is performed immediately before donning maximal sterile barrier precautions (i.e., gloves and gown)
- maximal sterile barrier precautions are used; including headwear, mask, sterile gown, and sterile gloves for healthcare workers
- maximal sterile barrier precautions are used by applying a sterile body drape
- aseptic technique is maintained throughout insertion of CVCs
- 2% chlorhexidine gluconate in 70% isopropyl alcohol is used for skin preparation of the insertion site and allowed to dry before CVC insertion
- the subclavian site is used if possible or internal jugular vein (femoral site should be avoided whenever possible)
- a sterile, transparent, semi-permeable dressing is used to cover the catheter site

When maintaining an inserted CVC and accessing the insertion site and line

Ensure that:
- the need for the CVC in situ is reviewed and recorded today (on a daily basis)
- the CVC dressing is intact
- the CVC dressing has been changed in the last seven days
- 2% chlorhexidine gluconate in 70% isopropyl alcohol is used for cleaning the insertion site during dressing changes
- hand hygiene is performed immediately before accessing the line/site (WHO Moment 2)
- an antiseptic containing 70% isopropyl alcohol is used to clean the access hub prior to accessing -- rub the access hub for at least 15 secs ("scrub the hub")

Good Practice Points

Documenting date and time of catheter insertion is an important step to achieve timely line removal.
The use of personal protective equipment (PPE) including gloves is important in all procedures where blood and body fluid risk exists. Refer to National Infection Prevention and Control Manual.

The featured recommendation on hand hygiene does not detract from other times when hand hygiene is recommended and will be monitored against (namely the 5 Moments for Hand Hygiene).

The featured recommendations do not aim to cover emergency situations, which require clinical judgement for patient care actions.
### CVC (Dialysis Double Lumen-non tunnelled) Insertion

<table>
<thead>
<tr>
<th>Aim</th>
<th>To ensure that patients undergoing the insertion of a double lumen dialysis CVC receive evidence based care, by a competent practitioner, whilst maintaining maximal sterile barrier precautions to reduce complications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>Insertion of a double lumen CVC to facilitate haemodialysis treatment</td>
</tr>
</tbody>
</table>
| Requirements | 1. If appropriate assess patients pain requirements and administer analgesia  
2. Patient monitoring equipment and near bedside resuscitation equipment  
3. Disinfected trolley  
4. Access to oxygen and suction point  
5. Minor Operation pack:  
6. Dressings pack containing disposable forceps and swabs  
7. 2% chlorhexidine in 70% alcohol solution  
8. Lidocaine 1% injection 15ml  
9. 10ml syringe  
10. 5ml syringe (for introducer needle)  
11. 2ml syringe (Heparin 5,000units/ml)  
   • Use of 3 different sizes of syringe aid identification  
12. 1 Blue needle for drawing up Lignocaine  
13. 1 Orange needle for infiltrating skin  
14. 2 Green needles  
15. Foil bowl for saline  
16. IV 0.9% Sodium Chloride 500ml bag and sterile scissors  
17. Foil bowl for discharging blood from syringes  
18. Surgical blade: 11 blade disposable scalpel with handle.  
19. Introducer needle – long enough to hit the vessel, wide enough to accept the guidewire  
20. Vessel dilators: 8 and 9f, Occasionally a series of graded dilators is necessary  
21. Guidewire. A 0.35 inch 80cm straight and “J” tipped is normally femoral cannulation to prevent inadvertent dilatation of a paravertebral vein.  
22. Catheter – suitable for the application –Luer lock caps for each lumen  
23. Suture size 0 Monosoft  
24. Sterile pack containing tissue forceps and needle holder  
25. Sterile dressing  
26. 2 extra packs of swabs – available if required  
27. Large clinical waste bag  
28. Heparin 5000units/ml or taurolidine citrate – after the catheter is inserted it is completely flushed with saline and then a Heparin/taurolidine citrate lock is inserted.  
29. Sterile surgical gown, gloves, Hat, mask & goggles/visor (operator and assistant)  
30. Portable ultrasound, sterile probe cover, sterile gel  
31. PVC access  
32. Record of baseline observations  
33. Adult CVC careplan (page 21-22) |
<p>| Location | In a clinical environment that is suitable for this procedure. The bed must have the facility to place the patient in the head down position, with resuscitation equipment available. |</p>
<table>
<thead>
<tr>
<th>Timing</th>
<th>As soon as the patient has been assessed by a skilled practitioner who deems it clinically appropriate.</th>
</tr>
</thead>
</table>
| **Procedure**                  | **Site:** right internal jugular (RIJ)  
|                                | **Line type:** double lumen curved end 15cm  
|                                | **Before gowning:**  
|                                | Ensure all equipment available, portable ultrasound working and any clotting problems are anticipated.  
|                                | 1. Explain procedure and gain verbal consent.  
|                                | 2. Ensure patient adequately oxygenated when lying flat.  
|                                | 3. Position patient. no pillows, head tilted down, head turned to left.  
|                                | 4. Check RIJ vein present and patent using ultrasound.  
|                                | 5. Apply hat, mask & visor/goggles.  
|                                | 6. Surgical scrub to hand decontamination.  
|                                | 7. Don sterile gown & gloves, prepare sterile trolley.  
|                                | 8. Cleanse skin with 2% chlorhexidine in 70% alcohol Solution for at least 15 seconds, allow to air dry.  
|                                | 9. Apply drapes.  
|                                | 10. Place sterile probe cover over ultrasound probe.  
|                                | 11. Lidocaine 1% injection to skin using orange needle attached to 10ml syringe* and check skin is anaesthetised.  
|                                | 12. 2-3mm incision skin with size 11 blade.  
|                                | 13. Prepare catheter:  
|                                | • Prime both lumens of catheter with IV 0.9% sodium chloride.  
|                                | • Advance guidewire through venous (blue) lumen, close arterial lumen  
|                                | 14. Insert introducer needle (attached to 5ml* Luer slip syringe) in skin incision advancing 1-2mm, position ultrasound, locate needle in guide and advance introducer needle into vein.  
|                                | **When venous blood aspirated keeping needle still:**  
|                                | 15. Advance J tip of guidewire leaving >25cm ‘free’  
|                                | 16. Remove introducer needle from guidewire applying pressure over incision with gauze.  
|                                | 17. Advance dilator over guidewire 5cm after warning patient of sensation of pressure.  
|                                | 18. Remove dilator applying pressure over incision with gauze.  
|                                | 19. Advance catheter over guidewire to hilt.  
|                                | 20. Remove guidewire disposing of it in the sharps bin and immediately close venous lumen.  
|                                | 21. Aspirate venous lumen and if venous blood confirmed flush with 20ml IV 0.9%sodium chloride.  
|                                | 22. Repeat for arterial lumen.  
|                                | 23. Lidocaine 1% injection to skin suture sites.  
|                                | 24. Check suture sites anaesthetised and secure with suture.  
|                                | 25. Instil heparin 5000 units/ml or taurolidine citrate as indicated on each lumen of CVC (use 2mL syringe*).  
|                                | 26. Apply sterile dressing with completed date/time strip reflecting when dressing was applied.  
|                                | 27. Sit patient up.  
|                                | 29. Clean ultrasound machine including ultrasound probe.  
|                                | 30. Record procedure in patient’s case notes and commence CVC care plan (page 21-22).  

**Procedure Continued**  
We recommend using different volume syringes for the Lidocaine, introducer needle and heparin to avoid confusion.

**Aftercare**  
Monitor the patient continuously  
- Monitor and document NEWS  
- Arrange chest x-ray (CXR) to confirm the position of the CVC and exclude pneumothorax.  
- Monitor insertion site for signs of infection, leakage, cracking of the CVC and surgical emphysema.

<table>
<thead>
<tr>
<th>Complications associated with central venous catheters</th>
<th>Immediate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Pneumothorax</td>
</tr>
<tr>
<td></td>
<td>2. Haemothorax</td>
</tr>
<tr>
<td></td>
<td>3. Chylothorax</td>
</tr>
<tr>
<td></td>
<td>4. Misplacement of the catheter leading to arrhythmia</td>
</tr>
<tr>
<td></td>
<td>5. Atrial/ventricular perforation</td>
</tr>
<tr>
<td></td>
<td>6. Arterial puncture</td>
</tr>
<tr>
<td></td>
<td>7. Arterial cannulation</td>
</tr>
<tr>
<td></td>
<td>8. Leakage of lymph due to thoracic duct injury</td>
</tr>
</tbody>
</table>

**Long term**  
9. Local insertion site infection  
10. Bacteraemia  
11. Sepsis  
12. Cracking/leaking/kinking of the catheter  
13. Lumen occlusion  
14. Venous erosion  
15. Catheter related thrombus  
16. Venous thromboembolism  
17. Fibrin sheath.
### Maintenance of Double Lumen Non Tunnelled Dialysis CVC (Dressing Change)

| Aim | To ensure that patients with a non-tunnelled double lumen dialysis CVC receive evidence based care in relation to the maintenance of the CVC by a competent or supervised practitioner to reduce the risk of complications. |
| Statement | It is essential, when caring for a patient with a double lumen dialysis non-tunnelled CVC that a closed system is maintained when the patient is not connected to the dialysis machine. |
| Requirements | **CVC INSERTION SITE**
1. Assessment of the site. CVC site care should consist of decontamination of the catheter insertion site and surrounding area with 2% chlorhexidine in 70% alcohol and, the application of a sterile dressing.
2. Changing the dressing should be carried out as often as the condition of the dressing indicates or at least every 7 days.
3. Requirements:
   - Clean surface
   - PPE
   - 2% chlorhexidine in 70% alcohol solution
   - Sterile, semi permeable, transparent dressing
   - Sterile luer lock caps
   - Clinical waste bag |
| Location | In clinical environment that is suitable for this procedure. The patient must be placed in the best position to provide access to the CVC line insertion site. |
| Timing | As clinically indicated |
| Procedure | **Procedure**
1. Explain procedure to patient
2. Collect equipment
3. Decontaminate hands & apply PPE
4. Remove old dressing
5. Inspect site for signs of infection
6. Decontaminate hands
7. Clean the catheter exit site with 2% Chlorhexidine in 70% alcohol for 15 seconds and allow to dry
8. Apply the sterile dressing and completed date/time strip
9. Dispose of clinical waste, remove PPE & decontaminate hands
| Aftercare | **MONITOR THE CVC:**
- Integrity of the CVC
- Insertion site and surrounding tissue
- Dressing
- Security of the connections |
## Removal of Double Lumen Non Tunnelled Dialysis CVC

<table>
<thead>
<tr>
<th>Aim</th>
<th>To ensure that patients undergoing the removal of a non tunnelled double lumen dialysis CVC receive evidence based care, by a competent practitioner.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>Removal of a double lumen non tunnelled dialysis CVC</td>
</tr>
</tbody>
</table>
| Requirements | 1. Resuscitation Trolley  
2. Access to oxygen & suction points  
3. Dressing pack  
4. 2% chlorhexidine and 70% alcohol  
5. Suture cutter  
6. Sterile scissors & universal container (for culture if indicated)  
7. Sterile dressing  
8. PPE |
| Location | In clinical environment that is suitable to this procedure. The bed must have the facility to place the patient in the head down tilt (Trendellenberg) position, with resuscitation equipment available. |
| Timing | As soon as the patient has been assessed by a skilled practitioner who deems it clinically appropriate. |

### Procedure

- The patient should be in a head down tilt (Trendellenberg) position during CVC removal

  1. Explain procedure to patient and gain verbal consent
  2. Assess the patient’s pain requirements and if appropriate administer analgesia
  3. Assess patients bleeding risk and if they are either therapeutically anti-coagulated or have an abnormal clotting screen seek advise from patients consultant prior to removal.
  4. Decontaminate hands & apply PPE.
  5. Open sterile dressing pack and arrange sterile field
  6. Decontaminate hands
  7. Remove old dressing
  8. Decontaminate hands.
  9. Cleanse site for at least 15 secs with 2% chlorhexidine in 70% alcohol and remove any sutures
  10. For Jugular or Subclavian Venous Catheters: Ask patient to take a deep breath and hold it whilst performing the valsalva manoeuvre (to increase intrathoracic pressure).
  11. Gently and steadily withdraw catheter while applying direct pressure with the sterile gauze.
  12. Apply direct, manual pressure for a minimum of 5 minutes. Apply pressure slightly above puncture site to occlude blood flow. Carefully check the site. If oozing continues, compress for 5 more minutes before checking again. Hold direct pressure for a minimum of 5 minutes after evidence of bleeding has stopped.
  13. When bleeding has stopped, apply a sterile dressing over the site.
  14. Ensure patient is comfortable
  15. Dispose of clinical waste, remove PPE & decontaminate hands.
  16. Minimize activity for at least one hour post removal.
17. If CVC infection is suspected the tip of the CVC should be sent for culture. On removal the CVC tip should be immediately placed into universal container.

<table>
<thead>
<tr>
<th>Aftercare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Observe the patient’s NEWS.</td>
</tr>
<tr>
<td>2. Observe insertion site for signs of leakage, haemorrhage, or haematoma.</td>
</tr>
<tr>
<td>3. Observe limb closest to insertion site for signs of swelling and or pain.</td>
</tr>
<tr>
<td>4. Dressing must remain in situ for a minimum of 24 hours following CVC removal</td>
</tr>
<tr>
<td>5. Record in the nursing documentation and the CVC care plan as appropriate (page 21-22).</td>
</tr>
<tr>
<td>6. SUSPECTED AIR EMBOLISM</td>
</tr>
<tr>
<td>Turn patient left side down, trendelenberg position (head down). Administer 100% oxygen and call emergency team on 2222</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complications of the removal of a CVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Air embolus</td>
</tr>
<tr>
<td>2. Haemorrhage</td>
</tr>
<tr>
<td>3. Haematoma</td>
</tr>
<tr>
<td>4. Leakage of lymph due to thoracic duct injury</td>
</tr>
<tr>
<td>5. Catheter fracture.</td>
</tr>
<tr>
<td>6. Pain</td>
</tr>
<tr>
<td>7. Swelling.</td>
</tr>
<tr>
<td>8. Infection.</td>
</tr>
</tbody>
</table>
Insertion of a Tunneled Central Catheter (Hickman Line), PICC, Implantable port and Midline will be by a trained competent practitioner in a dedicated area or in the general ward area. Therefore detailed procedures for insertion of these catheter is outside the scope of this document.
### Tunnelled CVC (Hickman Line) Maintenance (Flush and dressing change)

<table>
<thead>
<tr>
<th><strong>Aim</strong></th>
<th>To ensure that patients with a tunnelled CVC receive evidence based care in relation to the maintenance of the CVC by a competent or supervised practitioner maintaining an aseptic non touch technique to reduce complications.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statement</strong></td>
<td>These catheters are commonly known by their trade name, Hickman or Broviac catheters, and are available as single or dual lumen catheters. They are routinely inserted into the internal jugular or the subclavian vein and advanced until the tip lies in the central venous system (Superior vena cava (SVC)/right atrium). They are inserted when venous access is required for more than 6 weeks on an inpatient or outpatient basis as they can remain in place for up to 2 years. These catheters are available with or without a valve which can be on either end of the catheter. In the absence of this valve there will be external clamps present on the catheter. These catheters require weekly care and maintenance when not in use.</td>
</tr>
</tbody>
</table>
| **Requirements** | 1. Clean surface  
2. Dressing pack  
3. PPE  
4. 2% Chlorhexidine in 70% Alcohol  
5. Sterile, transparent, semi permeable dressing  
6. Needle free connector x 1 per lumen  
7. 10ml luer lock syringe x 2 (no Heplock required) or x 3 (Heplock required) IV 0.9% Sodium Chloride 10ml per lumen  
8. Heparinised saline (10 units/ml) 2ml per lumen (if required)  
9. Drawing up needle, 22g (blue) x 3  
10. Sharps Disposal Container  
11. Clinical Waste Bag |
<p>| <strong>Location</strong> | In clinical area suitable for this with the ability to monitor and observe the patient throughout the procedure. |
| <strong>Timing</strong> | As clinically indicated |</p>
<table>
<thead>
<tr>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explain the procedure to the patient and gain verbal consent.</td>
</tr>
<tr>
<td>2. Collect all necessary equipment.</td>
</tr>
<tr>
<td>3. Decontaminate hands and apply PPE.</td>
</tr>
<tr>
<td>4. Open sterile dressing pack, then equipment onto the field.</td>
</tr>
<tr>
<td>5. Remove catheter dressing if present</td>
</tr>
<tr>
<td>6. Decontaminate hands.</td>
</tr>
<tr>
<td>7. Draw up flush solutions into appropriate syringes.</td>
</tr>
<tr>
<td>8. Apply clamp and remove needle free connector.</td>
</tr>
<tr>
<td>9. Clean the hub with 2% chlorhexidine in 70% alcohol for at least 15</td>
</tr>
<tr>
<td>seconds (‘scrub the hub’) and allow to air dry before applying the new,</td>
</tr>
<tr>
<td>primed, needle free connector.</td>
</tr>
<tr>
<td>10. Place the sterile drape under the catheter.</td>
</tr>
<tr>
<td>11. Using a 10ml syringe, gently aspirate 5mls of blood and discard.</td>
</tr>
<tr>
<td>N.B. For valved catheter - pull pack on the plunger, gently, to 2-3ml</td>
</tr>
<tr>
<td>and hold this position for up to 1 minute to allow the valve to open.</td>
</tr>
<tr>
<td>12. Attach 10ml syringe with IV 0.9% sodium chloride for injection, flush</td>
</tr>
<tr>
<td>the catheter using a brisk push/pause technique, finishing with</td>
</tr>
<tr>
<td>positive pressure.</td>
</tr>
<tr>
<td>13. If required (externally clamped catheter) lock the line. Attach</td>
</tr>
<tr>
<td>10ml syringe with heparinised saline flush and inject 2ml into the</td>
</tr>
<tr>
<td>catheter, finishing with a positive end pressure.</td>
</tr>
<tr>
<td>14. Clean the exit site and surrounding skin with 2% chlorhexidine in</td>
</tr>
<tr>
<td>70% alcohol for at least 15 seconds (an area slightly larger than the</td>
</tr>
<tr>
<td>new dressing should be cleaned). Allow to air dry.</td>
</tr>
<tr>
<td>15. Apply adhesive semi permeable dressing over the CVC site along with</td>
</tr>
<tr>
<td>a completed date and time strip to reflect dressing change.</td>
</tr>
<tr>
<td>16. Ensure patient is comfortable</td>
</tr>
<tr>
<td>17. Dispose of waste appropriately, remove PPE and decontaminate hands.</td>
</tr>
<tr>
<td>18. Record the procedure in the patient’s diary and nursing</td>
</tr>
<tr>
<td>documentation/CVC care plan.</td>
</tr>
</tbody>
</table>
# Taking blood samples from a Tunnelled CVC

<table>
<thead>
<tr>
<th><strong>Aim</strong></th>
<th>To ensure that blood samples are taken using evidence based care by a competent practitioner or a supervised practitioner to reduce the risk of complications.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>In clinical area suitable for this with the ability to monitor and observe the patient throughout the procedure.</td>
</tr>
<tr>
<td><strong>Timing</strong></td>
<td>As clinically indicated</td>
</tr>
</tbody>
</table>
| **Requirements** | 1. Clean Surface  
2. PPE  
3. Vacuette Standard Tube Holder with connector  
4. Blood sample bottles  
5. Laboratory request forms & specimen bags  
6. 2% Chlorhexidine in 70% Alcohol  
7. Drawing up needle 22G (blue) x 2  
8. 10ml leur lock syringe x 2 (no Heplock required) or 3 (Heplock required)  
9. IV 0.9% Sodium Chloride 10ml  
10. Heparinised saline (10 units/ml) 2ml, if required  
11. Sharps disposal bin  
12. Clinical waste bag |
| **Procedure** | 1. Decontaminate hands and apply PPE  
2. Open sterile dressing pack, unwrap all equipment using a non-touch technique.  
3. Decontaminate hands  
4. Clean the needle free connector with 2% chlorhexidine in 70% alcohol ‘scrub the hub’ for 15 secs and allow to dry.  
5. Place the sterile drape to create a sterile field.  
6. Attaching the empty 10ml syringe, open the clamp (if present) and gently withdraw 5 - 10ml of blood, close the clamp (if present), detach the syringe and discard. (N.B. For valved catheters – pull back on the plunger gently to 2-3ml and hold this position for up to 1 minute to allow the valve to open.)  
7. Attach the vacuette holder to the hub, open the clamp and attach blood collection bottles in sequence, when complete re-attach the clamp and remove the vacuette holder.  
8. Without delay, attach the 10ml syringe with IV 0.9% sodium chloride for to the needle free connector, open the clamp (if present) and using the ‘push-pause’ technique flush the catheter, finishing with a positive end pressure, close the clamp (if present) and detach the syringe.  
9. For locking externally clamped catheters, attach 10ml syringe with heparinised saline and inject 2ml into the catheter, finishing with a positive end pressure, closing the clamp before detaching the syringe.  
10. Following correct identification of the patient both verbal and from wristband, label the blood collection bottles at the bedside and place in the transport bag with the appropriate request form.  
11. Dispose of waste appropriately, remove PPE and decontaminate hands.  
13. **For Blood Cultures : Prior to taking any other samples** |
| Procedure Continued | attach the Blood Culture bottle holder and adaptor to the needle free connector, open the clamp and insert blood culture bottles. The anaerobic blood culture bottle should be inoculated first. Once samples are obtained, close clamp (if present) and detach the holder from the needle free connector. |
**Urokinase Administration Protocol for Persistent Withdrawal Occlusion (PWO) – Hickman Line (tCVC) and PICC Catheters.**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Persistent Withdrawal Occlusion (PWO) is the inability to withdraw blood via the catheter while retaining the capacity to infuse solutions without difficulty. The main significance of PWO is that the practitioner cannot be certain that the catheter is in the correct position when there is no free flowing blood return. A satisfactory blood return is the verification that the catheter is in a vein and that the catheter is functioning correctly prior to any intravenous therapy. The most serious, though rare consequence of PWO is the leakage of vesicant or irritant medicines into the surrounding tissues which can potentially cause extravasation injuries. This event is extremely rare.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim</td>
<td>To safely return the line to a functional state where blood can be withdrawn and fluids infused</td>
</tr>
<tr>
<td>Location</td>
<td>In clinical area suitable for this with the ability to monitor and observe the patient throughout the procedure.</td>
</tr>
<tr>
<td>Timing</td>
<td>When clinically necessary but only within normal working hours (09.00 – 17.00)</td>
</tr>
</tbody>
</table>
| Equipment | 1. Cleaned procedure trolley  
2. PPE  
3. Sterile dressing pack  
4. Sterile hand towel  
5. 10ml syringe x 4  
6. Needle free connector x 1 per lumen  
7. Drawing up needle 23G (blue) x 2  
8. 2% Chlorhexidine in 70% Alcohol wipes (at least one per lumen of catheter)  
9. Urokinase 5,000 units/ml reconstituted with IV 0.9% Sodium Chloride (refer to BNF)  
10. IV 0.9% Sodium chloride 10mls per lumen  
11. Heparinised saline (10 units/ml) 2ml per lumen (if required)  
12. Clinical waste bag  
13. Sharps disposal bin |
| Procedure | **Before proceeding check the following:**  
1. That there are no kinks in the catheter.  
2. Ask the patient to take a deep breath in and hold whilst attempting to aspirate the catheter.  
3. If a PICC, then try altering the position of the arm and/or 30° head down tilt.  
4. If clamps are present, move clamp further down the catheter then roll the previously clamped section in your fingers gently to ensure that the catheter walls are not ‘stuck’ together  
5. Prior to undertaking this procedure an x-ray should be obtained to verify the correct position of the catheter in a blood vessel.  
**Then**  
6. Decontaminate hands and apply PPE  
7. Open sterile dressing pack onto the trolley, then open and drop the other necessary equipment onto the sterile field using a non-touch technique. |

Vascular access policy 11/11/2014
| Procedure Continued | 8. Clean the needle free connector with 2% Chlorhexidine in 70% alcohol'scrub the hub’ for at least 15 secs and allow to dry. |
|                     | 9. Place the sterile drape to create a sterile field. |
|                     | **An attempt should be made to withdraw blood prior to instilling the Urokinase:** |
|                     | 10. Attaching the empty 10ml syringe, open the clamp (if present) and gently withdraw 5 - 10ml of blood, close the clamp (if present), detach the syringe and discard. (N.B. *For valved catheters – pull back on the plunger gently to 2-3ml and hold this position for up to 1 minute to allow the valve to open.*) |
|                     | **If blood withdrawal is possible:** - |
|                     | 11. Without delay, attach the 10ml syringe with IV 0.9% sodium chloride to the needle free connector, open the clamp (if present) and using the ‘push-pause’ technique flush the catheter, finishing with a positive end pressure, close the clamp (if present) and detach the syringe and discard. |
|                     | 12. If required (externally clamped catheters), attach 10ml syringe with the heparinised saline and inject 2ml into the catheter, finishing with a positive end pressure, closing the clamp before detaching the syringe. |
|                     | **If blood withdrawal has not been successful:** |
|                     | 13. Attach the 10ml syringe containing the Urokinase solution (5,000 units in 2mls) and instil into the catheter lumen (refer to BNF specific guidance). |
|                     | 14. If the line has an external clamp this should be left unclamped while the Urokinase lock is insitu. |
|                     | 15. Leave the Urokinase insitu for 20-60 minutes, and then withdraw the Urokinase lock. With a fresh 10ml syringe attempt to withdraw blood. |
|                     | **If blood withdrawal is still NOT possible:** - |
|                     | 16. If procedure unsuccessful on first attempt, steps 17-19 may be repeated once more after leaving a one hour gap between each attempt. |
|                     | 17. If the procedure is unsuccessful after two attempts, try again in 24 hours and leave the urokinase lock insitu for 12 – 24 hours as an in-patient. |
|                     | 18. If the procedure is still not successful, the line should be removed. |
|                     | 19. Dispose of waste appropriately, remove PPE and decontaminate hands. |
|                     | 20. Record the procedure in the nursing documentation. |
Urokinase Administration Protocol for Complete Catheter Occlusion Where Thrombus is suspected - Hickman (tCVC) and PICC Catheters.

Statement
Complete catheter occlusion is when there is an inability to infuse any solution into the catheter together with the inability to aspirate any blood from it. Complete occlusion can result from a thrombotic or a non-thrombotic cause. In order to be able to diagnose and manage the occlusion effectively, it is important to verify the source of the problem.

A thrombotic complete occlusion develops as a result of a build-up of blood within the catheter.

The most common non-thrombotic causes of catheter occlusions are:

- Mechanical obstruction
- Medicine or mineral precipitates
- Lipid residue

If a thrombus is suspected proceed:-

Aim
To safely return the line to a functional state where blood can be withdrawn and fluids infused

Location
In clinical area suitable for this with the ability to monitor and observe the patient throughout the procedure.

Timing
When clinically necessary but only within normal working hours (09.00 – 17.00)

Equipment
1. Cleaned procedure trolley
2. PPE
3. Sterile dressing pack
4. 10ml syringe x 4
5. Needle free connector x 1 per lumen
6. Drawing up needle 23G (blue) x 2
7. 2% Chlorhexidine in 70% Alcohol wipes
8. Urokinase 5,000 units per lumen reconstituted with IV 0.9% Sodium Chloride
9. IV 0.9% Sodium chloride 10mls per lumen
10. Heparinised saline (10 units/ml) 2ml per lumen (if required)
11. Clinical waste bag
12. Sharps disposal bin

Procedure
Before proceeding check the following:
1. That there are no kinks in the catheter.
2. Ask the patient to take a deep breath in and hold whilst attempting to aspirate the catheter.
3. Try altering the position of the arm and/or 30° head down tilt.
4. If clamps are present, move clamp further down the catheter then roll the previously clamped section in your fingers gently to ensure that the catheter walls are not ‘stuck’ together.
5. Prior to undertaking this procedure an x-ray should be obtained to verify the correct position of the catheter in a blood vessel.

Then:-
6. Decontaminate hands & apply PPE
<table>
<thead>
<tr>
<th>Procedure Continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Open sterile dressing pack onto the trolley, unwrap the other necessary equipment onto the sterile field using a non-touch technique.</td>
</tr>
<tr>
<td>8. Clean the needle free connector with 2% chlorhexidine in 70% alcohol ‘scrub the hub’ for at least 15 secs and allow to air dry.</td>
</tr>
<tr>
<td>9. Place the sterile drape to create a sterile field.</td>
</tr>
</tbody>
</table>

**An attempt should be made to withdraw blood prior to instilling the Urokinase:**

10. Attaching the empty 10ml syringe, open the clamp (if present) and gently withdraw 5 - 10ml of blood, close the clamp (if present), detach the syringe and discard. (N.B. For valved catheters – pull back on the plunger gently to 2-3ml and hold this position for up to 1 minute to allow the valve to open.)

**If blood withdrawal is possible:**

11. Without delay, attach the 10ml syringe with IV 0.9% sodium chloride to the needle free connector, open the clamp (if present) and using the ‘push-pause’ technique flush the catheter, finishing with a positive end pressure, close the clamp (if present) and detach the syringe and discard.

12. For externally clamped catheters, attach 10ml syringe with heparinised saline and inject 2ml into the catheter, finishing with a positive end pressure, closing the clamp before detaching the syringe.

**If blood withdrawal has not been successful:**

13. Using a 10ml syringe reconstitute the Urokinase vial to achieve 5,000 units in 2mls. per lumen.

14. Prime the 3-way tap with the Urokinase solution at 3 o’clock access point on the tap. Do not disconnect the syringe.

15. Turn tap off to the syringe containing the Urokinase.

16. Pull gently back on the empty syringe plunger to create a vacuum in the catheter to approximately 8mls and hold the plunger at 8mls whilst turning the closed position onto the empty syringe. A small amount of Urokinase will then be drawn into vacuum. Remove the empty syringe and expel air from the empty syringe. When complete clamp the catheter if required and remove the 3 – way tap. Use a 2% chlorhexidine in 70% alcohol wipe to clean the access hub for at least 15 seconds (‘scrub the hub’) and allow to air dry.

17. If the catheter has an external clamp this should be left unclamped while the Urokinase lock is in situ.

18. Leave the Urokinase in situ for 20-60 minutes, and then withdraw the Urokinase lock.

19. With a fresh 10ml syringe attempt to withdraw blood.

**If blood withdrawal is still NOT possible:**

20. If procedure unsuccessful on first attempt, steps 17-23
may be repeated once more after leaving a one hour gap between each attempt.

21. If the procedure is unsuccessful after two attempts, try again in 24 hours and leave the urokinase lock insitu for 12 – 24 hours as an in-patient.

22. If the procedure is still not successful, the catheter should be removed.

23. Dispose of waste appropriately, remove PPE and decontaminate hands

24. Record the procedure in the nursing documentation.
| **Aim** | Patients with a peripherally inserted central catheter (PICC) will receive evidence based care by a competent practitioner when having their PICC maintained. The practitioner will use a non touch technique to minimise complications. |
| **Statement** | A PICC is used to provide reliable, long term venous access, facilitating blood sampling and prescribed intravenous therapy. It is essential that the necessary care and maintenance is performed as in the PICC SOP (at least weekly) in order to minimise the potential complications associated with long term central venous catheterisation and to optimise the life of the catheter. |
| **Requirements** | 1. Clean procedure trolley  
2. PPE  
3. Disposable measuring tape  
4. Sterile dressing pack  
5. 2% Chlorhexidine in 70% Alcohol solution  
6. Adhesive semi permeable transparent dressing 10cm x 12cm  
7. Catheter securing connector e.g. Statlock, griplock or steristrips  
8. Needle free connector x 1 per lumen  
9. 10ml syringe, luer lock x 3 per lumen (if Heplock required)  
10. IV 0.9% Sodium Chloride 10ml  
11. Heparinised saline 10units/ml, 2ml (if required)  
12. Drawing up needle, 22g (blue) x 2  
13. Sterile swab for culture (only if signs of infection)  
14. Clinical waste bag |
| **Location** | The procedure should be performed in a comfortable, well lit environment where privacy can be provided for the patient. |
| **Timing** | Dressing change should be carried out every 7 days or sooner if the integrity of the dressing is compromised. Inspection should be documented on the PICC care plan on a daily basis. The PICC should be observed any time the catheter is being accessed. |
| **Procedure** | 1. Decontaminate hands and apply PPE.  
2. Arrange sterile field and open all equipment required  
3. Loosen and remove the old dressing in an upward direction towards the exit site, taking care not to pull the catheter.  
4. Measure the external length of the PICC, from the exit site to the start of the hub. Compare this measurement to the previous recording in the nursing documentation.  
5. Holding the catheter, clean the exit site and surrounding skin with the 2% Chlorhexidine in 70% Alcohol solution starting at the exit site, apply using repeated up and down, back and forth strokes for at least 15 seconds before working outward to the periphery (an area slightly larger than the new dressing). |
<table>
<thead>
<tr>
<th>Procedure Continued</th>
<th>Apply fixation device onto the PICC. N.B. DO NOT PLACE OVER THE EXIT SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Remove needle free connector and dispose, clean hub threads with the 2% Chlorhexidine in 70% Alcohol wipe before applying new</td>
<td></td>
</tr>
<tr>
<td>7. Using an empty 10ml syringe, gently aspirate 5mls of blood from the PICC and discard (unless obtaining blood cultures, refer to blood culture policy). N.B. For Groshong valved PICCs - pull pack on the plunger, gently, to 2-3ml and hold this position for up to 1 minute to allow the valve to open.</td>
<td></td>
</tr>
<tr>
<td>8. Flush the catheter using a brisk push/pause technique, always finishing under a positive pressure.</td>
<td></td>
</tr>
<tr>
<td>9. If required (PICCs with external clamps) attach 10ml syringe with heparinised saline and inject 2ml into the catheter, finishing under a positive pressure, closing the clamp before detaching the syringe.</td>
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<tr>
<td>10. Apply securing connector and cover exit site with adhesive semi permeable dressing, ensuring that the catheter is covered with the dressing.</td>
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</tr>
<tr>
<td>11. Complete the date strip and apply to dressing reflecting when dressing was last changed.</td>
<td></td>
</tr>
<tr>
<td>12. Dispose of waste appropriately, remove PPE and decontaminate hands.</td>
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</tr>
<tr>
<td>13. Record the procedure in the patients PICC care plan and nursing documentation ensuring that external catheter length is documented.</td>
<td></td>
</tr>
<tr>
<td>Aftercare</td>
<td>• Never flush against resistance.</td>
</tr>
<tr>
<td></td>
<td>• Always use a push/pause flushing technique when flushing the catheter and always finish under a positive pressure</td>
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<tr>
<td></td>
<td>• A strict ANTT should be used when carrying out routine care and also when accessing the catheter</td>
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<tr>
<td></td>
<td>• The dressing, including the catheter securing connector if used, should be changed every 7 days or sooner if the dressing becomes compromised.</td>
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<tr>
<td></td>
<td>• The non valved PICC’s should be flushed with saline before and after each administration of medicine</td>
</tr>
<tr>
<td></td>
<td>• Only PICCs with external clamps require to be locked with heparinised saline If not being accessed on a daily basis.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Never flush the catheter using a syringe smaller than 10ml</strong></td>
</tr>
</tbody>
</table>
# REMOVAL OF PICC

<table>
<thead>
<tr>
<th><strong>Aim</strong></th>
<th>To ensure that patient with a PICC receives evidence based care in relation to its removal by a competent practitioner, whilst maintaining a non touch technique to reduce the risks of complications.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statement</strong></td>
<td>The need for a PICC is assessed on a daily basis and should be removed when no longer required. A PICC should not remain insitu after the manufacturer’s recommended length of time unless there are severe vascular access issues.</td>
</tr>
</tbody>
</table>
| **Requirements** | 1. PPE  
2. Sterile gauze swabs  
3. Sterile dressing  
4. Near patient sharps disposal bin  
5. Clinical waste bag. |
| **Location** | In clinical environment that is suitable to this procedure |
| **Timing** | As clinically indicated |
| **Procedure** | 1. Explain procedure to patient and gain verbal consent  
2. Confirm that the PICC has to be removed  
3. Ensure that alternative vascular access if necessary has been established  
4. Assess patients bleeding risk and if they are either therapeutically anti-coagulated or have an abnormal clotting screen seek advise from patients consultant prior to removal.  
5. Stop all fluids being infused via the PICC.  
6. Patient should be in a position that ensures the limb is below level of the heart  
7. Decontaminate hands and apply PPE.  
8. Carefully remove the line dressing noting that scissors must not be used to loosen or remove dressing.  
9. Ask patient to take a deep breath and hold it whilst performing the valsalva manoeuvre (to increase intrathoracic pressure)  
10. Hold a piece of dry sterile cotton gauze over the insertion site and remove the PICC gently and slowly in small increments  
11. Once the catheter has been removed cross check with size inserted and ensure catheter is intact. Ensure all of the line is removed  
12. Apply firm pressure to insertion site for approximately 2-3mins or long enough to ensure that there is no subcutaneous leakage of blood  
13. Apply sterile dressing to the insertion site.  
14. The catheter should be disposed of into a sharps bin  
15. Dispose of waste appropriately, remove PPE and decontaminate hands.  
16. Record the procedure in nursing documentation and CVC care plan |
### Implantable Port (Port-a-Cath)
#### Port flush and obtaining blood samples

| **Statement** | This connector is completely implanted beneath the patient’s skin and advanced until the tip of the catheter lies in the central venous system (SVC/right atrium). They are available as single or dual lumen connectors and are inserted when intravenous access is required for more than 6 weeks. The connector is available with or without an internal valve system, which will be indicated in the documentation provided to the patient. In order to access the connector a Gripper / Huber needle must be inserted through the septum of the port into the port reservoir. If required for continuous intravenous therapy, the needle can be left in place for up to one week in order to minimise repeated puncture of the connector. When not in use, ports require to be accessed and flushed on a 4 weekly basis with Heparinised Saline (10units/ml). |
| **Aim** | To safely maintain the line in a functional state where blood can be withdrawn and fluids infused |
| **Location** | In clinical area suitable for this with the ability to monitor and observe the patient throughout the procedure. |
| **Timing** | When clinically necessary but only within normal working hours |
| **Equipment** | 1. Cleaned procedure trolley  
2. PPE  
3. Sterile dressing pack  
4. 10ml syringe x 4  
5. Drawing up needle 23G (blue) x 2  
6. 2% Chlorhexidine in 70% Alcohol wipes  
7. IV 0.9% Sodium chloride 10mls per lumen  
8. Gripper / Huber needle:  
9. Length (3/4 inch, 1 inch or 1 ¼ inch): dependant on the amount of subcutaneous tissue between the skin  
Gauge (19 or 22) dependant on the viscosity of the fluid to be infused.  
10. Needle free connector.  
11. Heparinised saline (10units/ml) if required  
12. Laboratory request forms  
13. Vacuette holder blood sample bottles & Specimen bags  
14. Sharps disposal bin  
15. Clinical waste bag |
| **Procedure** | Prior to accessing the port, topical anaesthetic may be applied over the site, covered with an adhesive semi-permeable dressing according to the manufacturer’s instructions. However, it should be noted that creams can leave a lipid residue that can create a medium for microbial growth; therefore residue from the topical anaesthesia must be removed using soap and water, prior to preparation (disinfection) as soap and water has been found to be superior in removing lipid residue from the skin. Ensure that the topical anaesthetic has been removed immediately prior to preparing the site for access. |
1. Decontaminate hands & apply PPE
2. Open sterile dressing pack and all equipment using a non-touch technique.
3. Clean over the port site with 2% chlorhexidine in 70% alcohol. Starting at the port site, apply using repeated up and down, back and forth strokes for at least 15 seconds before working outward to the periphery. Allow to completely dry before proceeding.
4. Stabilise the port by triangulating it between the thumb and first two fingers of the non-dominant hand and, aiming for the centre point between the three fingers, insert the Gripper / Huber needle (primed with IV 0.9% sodium chloride) penetrating the septum at a 90° angle until the needle rests on the base of the reservoir.
5. Attach the empty 10ml syringe and aspirate 5 - 10mls of blood from the connector. Discard this blood unless obtaining blood culture samples (see below).
6. Attach the vacuette holder to the hub, and attach blood collection bottles in sequence, when complete remove the vacuette holder.
7. Attach the 10ml syringe with IV 0.9% sodium chloride to the needle free connector and using the ‘push-pause’ technique flush the port, detach the syringe and discard.
8. If the Gripper / Huber needle is to remain in situ; apply an adhesive semi-permeable dressing to secure the needle in place.
9. If the Gripper / Huber needle is to be removed; stabilise the port with the non-dominant hand and, taking the Gripper / Huber needle in the other remove the needle.
10. Following correct identification of the patient both verbal and from wristband, label the blood collection bottles at the bedside and place in the transport bag with the appropriate request form.
11. Dispose of waste appropriately, remove PPE and decontaminate hands.
12. Record procedure in nursing documentation.
13. **For Blood Cultures**: Prior to taking any other samples attach the Blood Culture bottle holder and adaptor to the needle free connector, open the clamp and insert blood culture bottles. The anaerobic blood culture bottle should be inoculated first. Once samples are obtained, close clamp (if present) and detach the holder from the needle free connector.
MID-LINES
Maintenance of Mid-line Catheter

| Aim | To ensure that patients with a peripheral venous mid-line catheter receive evidence based care in relation to the maintenance of the mid-line catheter by a competent practitioner maintaining non touch technique and therefore reducing the risk of complications. |
| Statement | The continuing need for the mid-line should be reviewed daily. It is essential, when caring for a patient with a mid-line catheter that a closed system is maintained. When the closed system is interrupted it is essential to observe non touch technique precautions. The mid-line site must be checked at least once per shift for patency and signs of inflammation. The catheter must also be observed during:  
  - Administration of IV medicines & fluids  
  - Alteration of flow rates of IV fluids  
  - Changing IV fluids |
| Requirements | Assessment of the site. Mid-line care should consist of cleaning the insertion site and surrounding area with Chlorhexidine 2% in 70% alcohol and the application of a sterile dressing. Changing the dressing should be carried out as often as the condition of the dressing indicates or at least every 7 days. The practitioner needs to collect:  
  1. PPE  
  2. 2% chlorhexidine in 70% alcohol  
  3. Sterile semi permeable transparent dressing  
  4. IV 0.9% sodium chloride  
  5. 10ml syringe  
  6. Sterile needle free connectors  
  7. Clinical waste bag  
  8. The condition of the insertion site should be scored using the Visual Infusion Phlebitis (VIP) score and this should be documented in the care plan.  
  2. If the dressing is loose, damp or soiled it should be replaced immediately. Every 7 days the insertion site should be cleaned with 2% chlorhexidine and 70% alcohol and allowed to dry and the should be changed.  
  3. If the mid-line is not being used for continuous infusions then patency must be assessed a minimum of once per shift.  
  4. Scrub the hub for at least 15 secs with 2% chlorhexidine in 70% alcohol and allow to dry, then flush with IV 0.9% sodium chloride using a push. pause technique to assess catheter patency, finish on positive pressure  
  5. Needle free connectors should be changed every 7 days, the existing connector removed and the catheter hub should be scrubbed with chlorhexidine 2% and 70% alcohol for at least 15 secs and allowed to dry and a new primed connector applied.  
  6. Dispose of waste, remove PPE and decontaminate hands.  
  7. Documentation of the findings should be recorded in the nursing notes and PVC care plan  
  8. If appropriate the patient should be educated and trained to observe their mid-line for any abnormalities. |

LOCATION | In clinical environment that is suitable for this procedure.  
TIMING | As clinically indicated
<table>
<thead>
<tr>
<th>Monitor the mid-line</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Insertion site and surrounding tissue</td>
</tr>
<tr>
<td>• Dressing</td>
</tr>
<tr>
<td>• Integrity of the mid-line</td>
</tr>
<tr>
<td>• Security of the connections</td>
</tr>
</tbody>
</table>
## REMOVAL OF A MID-LINE CATHETER

| **Aim** | To ensure that patient with a mid-line receives evidence based care in relation to its removal by a competent practitioner, whilst maintaining a non touch technique to reduce the risks of complications. |
| **Statement** | The need for a mid-line is assessed on a daily basis and should be removed when no longer required. A mid-line should not remain insitu after the manufacturer’s recommended length of time unless there are severe vascular access issues. |
| **Requirements** | 1. PPE  
2. Sterile gauze swabs  
3. Sterile adhesive dressing  
| **Location** | In clinical environment that is suitable for this procedure |
| **Timing** | As clinically indicated |
| **Procedure** | 1. Explain procedure to patient and gain verbal consent  
2. Confirm that the mid-line has to be removed.  
3. Ensure that alternative vascular access if necessary has been established  
4. Assess patients bleeding risk and if they are either therapeutically anti-coagulated or have an abnormal clotting screen seek advise from patients consultant prior to removal.  
5. Stop all fluids being infused via the mid-line.  
6. Collect equipment as detailed in requirements.  
7. Decontaminated hands and apply PPE  
8. Carefully remove the line dressing noting that scissors must not be used to loosen or remove dressing.  
9. Hold a piece of dry sterile cotton gauze over the insertion site and remove the mid-line gently and steadily in small increments  
10. Once the Midline has been removed cross check with size inserted and ensure all of the line is removed  
11. Apply firm pressure immediately to insertion site for approximately 2-3mins or long enough to ensure that there is no subcutaneous leakage of blood  
12. Apply sterile dressing to the insertion site.  
14. Record procedure in nursing documentation |
## Troubleshooting for Tunnelled Lines and implantable ports

| Systemic Infection | Bacteraemia | 1. Refer to medical team – may be treatable without connector removal depending on the patient’s clinical status and colonising organism.  
2. Only take blood cultures from the catheter if it is thought to be the source of the infection.  
3. Obtain blood cultures from each lumen of the catheter and peripherally.  
4. Monitor early warning score (NEWS) – frequency will depend on patient’s clinical status.  
5. For catheter salvage – consider antibiotic or Taurolidine citrate (discuss with Microbiologist).  
6. If line is to be removed, send catheter tip for culture and sensitivity. **N.B. Taurolidine citrate is a pharmaceutical product which needs to be prescribed with the correct formulation** [http://www.taurolock.com/en/download-en](http://www.taurolock.com/en/download-en) |
| Exit Site Infection | Exit site infection | 1. Obtain wound swab for culture and sensitivity. Redress exit site, aseptically.  
2. If exudate present increase frequency of dressing change  
3. Refer to medical team, consider antibiotic therapy. |
| Connector is sluggish or there is only intermittent free flow of fluids (blood return confirmed) | Thrombus within the catheter  
Migration of the catheter tip  
Lipid aggregation (TPN only)  
Drug precipitation | 1. Check that there are no kinks in the catheter.  
2. Ensure that the clamps are open rule out pinch off syndrome – move the clamp further down the catheter then roll the previously clamped section in your fingers gently to ensure that the catheter walls are not ‘stuck’ together.  
3. Flush catheter with IV 0.9% sodium chloride 20mls using a brisk push/pause flushing technique.  
4. Replace needle free connector. |
| Leakage of infusate from the external portion of the catheter | □ External catheter fracture | 1. Stop infusate.  
2. If there is a clamp, clamp the catheter **ABOVE** the damaged area without delay to prevent possible air embolism.  
3. Cover the whole catheter with an occlusive dressing.  
4. A single catheter may be able to be repaired. This should be discussed without delay with the team who inserted it i.e. Chemotherapy team or Vascular Access Team.  
5. If unable to repair, the catheter should be removed as soon as possible to minimise ... |
<table>
<thead>
<tr>
<th><strong>Catheter Migration</strong>&lt;br&gt; Increase or decrease in external length of catheter</th>
<th><strong>Line Migration</strong></th>
<th><strong>DO NOT PUSH THE CATHETER BACK IN. Contact insertion team for advice.</strong>&lt;br&gt;1. A chest x-ray should be carried out to review the position of the tip of the PICC.&lt;br&gt;2. If the tip of the line is in the right atrium withdraw the PICC the desired length.&lt;br&gt;3. If the tip of the line is in the mid or lower SVC –use the PICC as normal.&lt;br&gt;4. Observe for any signs of thrombosis.&lt;br&gt;5. The tip of the PICC is in the upper SVC or out of the SVC it will require removal.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DVT</strong>&lt;br&gt;Swelling of shoulder, neck, arm or face with or without pain, inflammation, distension of the neck veins/peripheral vessels</td>
<td><strong>Thrombus</strong>&lt;br&gt;Subcutaneous / Surgical emphysema</td>
<td><strong>1. Refer to medical staff for further investigation.</strong>&lt;br&gt;2. If thrombosis suspected – consider diagnostic ultrasound to confirm diagnosis&lt;br&gt;3. It may or may not be possible to treat thrombosis without catheter removal.</td>
</tr>
<tr>
<td><strong>Pain or visible swelling</strong> when catheter is used or fluid leaking from the exit site when the catheter is flushed</td>
<td><strong>1. Internal catheter fracture</strong>&lt;br&gt;2. Fibrin sheath</td>
<td><strong>Consult with senior medical staff. DO NOT USE the catheter under any circumstance.</strong>&lt;br&gt;1. Obtain chest x-ray to verify tip position.&lt;br&gt;2. Internal catheter fracture cannot be repaired and will require removal of connector.&lt;br&gt;3. A fibrin sheath severe enough to cause extravasation at the exit site will normally indicate catheter removal.</td>
</tr>
</tbody>
</table>
References


Rowley, S., Clare, S., Macqueen, S., Molyneux, R. (2010) ANTT v2: An updated practice framework for aseptic technique *British Journal of Nursing* 19(5) s5-s11
# Working Group Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Margaret Connolly</td>
<td>Lead Nurse Practice development GGC</td>
</tr>
<tr>
<td>Kate Hamilton</td>
<td>Lead Nurse Infection control GRI</td>
</tr>
<tr>
<td>Emma Henderson</td>
<td>Practice Development Beatson West of Scotland Cancer centre</td>
</tr>
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<td>Pamela Joannidis</td>
<td>Consultant Nurse Infection control GGC</td>
</tr>
<tr>
<td>Ann Kerr</td>
<td>Lead Nurse Infection control</td>
</tr>
<tr>
<td>Ann MacCrimmon</td>
<td>Clinical Educator Diagnostics</td>
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<tr>
<td>Karen McGugan</td>
<td>Lead Nurse Diagnostics</td>
</tr>
<tr>
<td>Catherine McLaughlin</td>
<td>Lead pharmacist Risk Management of Medicines GGC</td>
</tr>
<tr>
<td>Pat McQuillan</td>
<td>Practice Development Critical Care GGC</td>
</tr>
<tr>
<td>Christina Ronayne</td>
<td>Practice development Nurse GGC</td>
</tr>
<tr>
<td>Pinky Virhia</td>
<td>Practice Development Nurse GGC</td>
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