Title:	**CENTRAL VENOUS CATHETERS (CVCS)**	Ref No: 0209 Version 9 Classification: Guideline
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Responsible for review:	Cancer & Vascular Access Advanced Nurse Practitioner	Document Control
Ratified by:	Care and Clinical Policies Group Clinical Director of Pharmacy Chief Nurse Medical Director	
Applicability:	All healthcare professionals involved in the selection, placement, on-going management and removal of various forms of central venous catheters (CVC) and midlines	

Contents

Preface and Acknowledgements

These guidelines are a resource for all health care professionals caring for Central Venous Catheters (CVCs), maintaining patency, venous sampling and general care of CVCs. They should be used in conjunction with the RCN Standards for Infusion Therapy (2010), and Trust Intravenous Drug Policy.

They are intended to deal primarily with practical matters. No attempt has been made to address the many other issues which may face patients with CVCs - e.g. anxiety or altered body image.

Thanks are due to Central Venous Access CNS at UCLH for her kind contribution to these guidelines.

For further information, education or support please do not hesitate to contact the **Vascular Access Team on 07769 880038.**

Chapter 1: Care of Non-Tunnelled CVCs

Infection Prevention & Management — Non-Tunnelled CVCs

- **Infection i**s the most common complication associated with CVCs and one of the most serious.
- **You must be familiar with** the latest infection control guidance when caring for patients with CVCs.
- **Decontaminate hands** before and after each patient contact using correct hand hygiene procedure.
- **Always use ANTT** when accessing the CVC.
- **Regularly inspect for signs of infection** (at least daily if patient is in hospital)
- **Take action immediately** if there are signs of CVC-related infection. These include:
    - Pyrexia, rigor, malaise (see Chapter 6 Managing Complications)
    - Tenderness, inflammation and or pain at exit site (see Chapter 6 Managing Complications)
- **Central Venous Catheters** should be removed as soon as possible if they are not needed.

Assessing Patency — Non-Tunnelled CVCs

NB Always use ANTT when accessing the CVC

- **Do not administer chemotherapy or other vesicant drugs unless the line is fully patent. By *fully patent* we mean that:**
    - The line can be flushed easily
    - There is flashback of blood
- **If the catheter is not fully patent see Chapter 7 Maintaining Patency.**
- **Testing for patency:**
    - Test for flashback of blood before administering IV medication but note that you should not discard blood unnecessarily. To assess for flashback you can either:
        - attach a syringe containing 10 mL 0.9% sodium chloride to the catheter, flush a couple of mL into the line and then withdraw. As soon as you see a trace of blood in the catheter just flush the rest of the sodium chloride into the line.
        - or use a gravity technique (ie with all clamps open briefly hold an attached infusion below the level of the patient's heart until you see flashback of blood).
    - If there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.
    - **Always waste 5mL of blood prior to blood sampling.**
    - **An infusion pump must be used for all infusions including blood products.**

Flushing — Non-Tunnelled CVCs

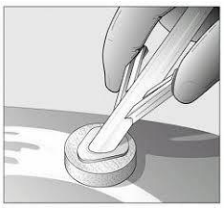
NB Always use ANTT when accessing the CVC

- **Before flushing**
    - If there are infusional vasoactive drugs in lumen, withdraw prior to flushing to avoid bolus dose.
- **Technique:**
    - Brisk push-pause technique with positive pressure finish
- **What to flush with:**
    - 10 mL 0.9% sodium chloride between incompatible drugs / infusions and after blood sampling
    - Lock with a further 10mL 0.9% sodium chloride
- **Frequency of flushing:**
    - Flush **unused** lumens at least once a week with 10mL 0.9% sodium chloride

Exit Site Care — Non-Tunnelled CVCs

NB Always use ANTT for exit site care

- **Securement**:
  - Always fix catheter firmly to patient's skin with *Griplok®* dressing.
- **Cleaning**:
  - Clean exit site at dressing changes with *Chloraprep 3mL®* using a 30-second back and forth friction rub. Allow to dry.
  - NB If there is loose blood or exudate present, this should be removed first using sterile gauze and 0.9% sterile sodium chloride.



- **Dressings**:
  - *Griplok®* dressing plus *Tegaderm™ or IV3000™* dressing (right). Change every 7 days (or sooner if dressing becomes wet, soiled or detached).
  - If patient cannot tolerate *Tegaderm™* try *IV3000™* and vice versa.
  - If patient cannot tolerate a transparent dressing at all, use gauze-type dressing (eg *Mepore®*). Inspect and change daily if patient at high risk of exit site infection. (Change sooner if dressing becomes wet, soiled or detached).

- **Bathing & showering**
  - The exit site must not be allowed to get wet.

Removal — Non-Tunnelled CVCs

- **Central Venous Catheters** should be removed as soon as possible if they are not needed.
- **Who can remove non-tunnelled CVCs?**
  - Any qualified nurse who is IV trained and has been assessed as competent and who follows these guidelines.
- **Procedure**:
  - **You will need assistance** during this procedure: do not attempt it alone.
  - **Check patient's coagulation status**. If there is an increased risk of bleeding discuss with medical team before proceeding. If platelets are < 50, platelets should be administered immediately prior to the procedure. If the patient is anticoagulated, this should be managed as for surgery.
  - **The risk of air embolism increases if patient is dehydrated, is unable to lie flat, or has an uncontrolled cough**. Assess for these risks. Only proceed if satisfied that it is safe to do so.
  - **Use ANTT** throughout.
  - **Unless contraindicated (eg head injury or respiratory difficulties), lie the patient flat and tip the head of the bed downward** to reduce the risk of air embolism (except femoral catheters).
  - **Remove the dressing**. If there is any sign of infection, take a swab of the exit site.
  - **Ask patient to perform Valsalva's manoeuvre** (ie take a deep breath, hold it, and bear down). If patient unable to do this, remove the catheter during expiration and NEVER when the patient is breathing in, as this will increase the risk of air being sucked into the venous system.
  - **Gently and swiftly pull out the catheter** and immediately apply pressure to the site using sterile gauze. The patient they can now breathe normally, return the bed to its original position.
  - **Continue applying pressure to the exit site for three minutes** (or longer in cases of deranged clotting).
  - **If systemic infection is suspected**, use sterile scissors to cut off the tip of the catheter and without contaminating it drop it into a dry sterile specimen pot. Send it to microbiology for culture.
  - **Apply a sterile occlusive dressing** to prevent air from entering the venous system.
  - **Advise the patient to stay in bed for 30 minutes to allow any bleeding to stop**.
  - **During this time observe patient** for signs of haematoma (ie, swelling, pain, altered voice, airway obstruction).

Chapter 2: Care of Tunnelled CVCs (Hickman Lines)

Infection Prevention & Management — Tunnelled CVCs

- **Infection i**s the most common complication associated with CVCs and one of the most serious.
- You must be familiar with the latest infection control guidance when caring for patients with CVCs.
- Decontaminate hands before and after each patient contact using correct hand hygiene procedure.
- Always use ANTT when accessing the CVC.
- **Regularly inspect for signs of infection** (at least daily if patient is in hospital)
- Take action immediately if there are signs of CVC-related infection. These include:
    - Pyrexia, rigor, malaise (see Chapter 6 Managing Complications)
    - Tenderness, inflammation and or pain at exit site (see Chapter 6 Managing Complications)
- **Tunnelled lines** should be removed as soon as possible if they are not needed.

Assessing Patency — Tunnelled CVCs

NB Always use ANTT when accessing the CVC

- **Do not administer chemotherapy or other vesicant drugs unless the line is fully patent. By *fully patent* we mean that:**
    - The line can be flushed easily
    - There is flashback of blood
- **If the catheter is not fully patent see Chapter 7 Maintaining Patency** but note that community nurses administering a weekly flush to an unused lumen are not routinely required to check for flashback.
- **Testing for patency:**
    - Test for flashback of blood before administering IV medication but note that you should not discard blood unnecessarily. To assess for flashback you can either:
        - Attach a syringe containing 10mL 0.9% sodium chloride to the catheter, flush a couple of mL into the line and then withdraw. As soon as you see a trace of blood in the catheter just flush the rest of the sodium chloride into the line.
        - Or use a gravity technique (ie with all clamps open briefly hold an attached infusion below the level of the patient's heart until you see flashback of blood).
    - If there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.
    - **Always waste 5mL of blood prior to blood sampling.**
    - **An infusion pump must be used for all infusions including blood products.**

Flushing — Tunnelled CVCs

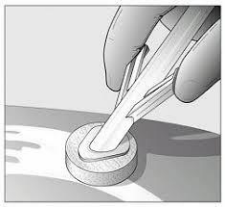
NB Always use ANTT when accessing the CVC

- **Before flushing**
    - If there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.
- **Technique:**
    - Brisk push-pause technique with positive pressure finish
- **What to flush with:**
    - 10mL 0.9% sodium chloride between incompatible drugs / infusions and after blood sampling
- **Frequency of flushing:** Flush unused lumens once a week (10mL 0.9% sodium chloride). Increase to twice weekly if there are patency problems.

Exit Site Care — Tunnelled CVCs

NB Always use ANTT for exit site care.

- **Securement**:
  - In addition to the exit site dressing, always fix catheter firmly to patient's skin (eg using tape or *Griplok®*)
- **Sutures**:
  - **Exit site**: remove at 21 days
  - **Venepuncture site**: Remove stitches / Steri-strips at 7 days (unless dissolvable)
- **Cleaning**:
  - Clean exit site at dressing changes using *Chloraprep® 3mL* using a 30-second back and forth friction rub. Allow to dry
  - NB If there is loose blood or exudate present this should be removed first using sterile gauze and 0.9% sterile sodium chloride.



- **Dressings**:
  - **Exit site**:
    - **Post-insertion**: gauze under transparent dressing for 1 day or until bleeding stops.
    - **After 1 day:**
      - *Griplok®* dressing plus *Tegaderm™ or IV3000™* dressing (right). Change every 7 days (or sooner if dressing becomes wet, soiled or detached).
      - If patient cannot tolerate *Tegaderm™* try *IV3000™* and vice versa.
      - If patient cannot tolerate a transparent dressing at all, use gauze-type dressing (eg *Mepore®*). Inspect and change daily if patient at high risk of exit site infection. (Change sooner if dressing becomes wet, soiled or detached).

    - **After 21 days**: choose between
      - Continuing with same dressing OR no dressing if appropriate for patient
  - **Venepuncture site**:
    - Dry dressing and/or transparent dressing until sutures removed / dissolve.
- **Bathing, showering & swimming**
  - **Bathing**: Patient should not submerge exit site in bathwater.
  - **Showering**: If transparent dressing is intact patient can shower. If patient has dry dressing or no dressing, s/he can shower after 21 days as follows:
  - Remove dry dressing (if any) immediately before or after showering
  - Dry exit site after shower using sterile gauze and non-touch technique.
  - Clean exit site as usual & apply new dressing (if any).
- **Swimming**: Not generally advised because of the infection risk but if patient wishes to swim after 21 days it may be considered depending on other patient risk factors.

Patient Education and Discharge Planning — Tunnelled CVCs

- Patients with tunnelled CVC's may be discharged home with the catheter in situ.
- **Aftercare should be arranged by the team responsible for the patient's care.**
- Patient education regarding the recognition and reporting of complications is of great importance.
- Where possible, care in hospital should be aimed at the promotion of independence in caring for the line, but liaison with the primary healthcare team remains vital.
    - Medical equipment & flushing solutions need to be provided.
    - Some services (e.g. Nutrition) have agreements with private healthcare companies who supply line care equipment as part of a package along with the required drugs/therapies.
- **If the community nursing team are required to provide CVC care**
    - Medical equipment & flushing solutions need to be provided.
    - A PMAR document (appendix IV) needs to be completed and sent with the patient.

Removal — Tunnelled CVCs

- **Tunnelled CVCs** should be removed as soon as possible if they are not needed.
- **Do not remove tunnelled CVCs unless you have been specifically trained to do so**.
- **Contact the Vascular Access Team 07769 880038 for removal**.

Chapter 3: Care of PICCs and Midlines

Infection Prevention & Management — PICCs & Midlines

- **Infection i**s the most common complication associated with CVCs/Midlines and one of the most serious.
- You must be familiar with the latest infection control guidance when caring for patients with CVCs/Midlines.
- Decontaminate hands before and after each patient contact using correct hand hygiene procedure.
- Always use ANTT when accessing the CVC/Midline.
- **Regularly inspect for signs of infection** (at least daily if patient is in hospital)
- Take action immediately if there are signs of CVC/Midline-related infection. These include:
    - Pyrexia, rigor, malaise (see Chapter 6 Managing Complications)
    - Tenderness, inflammation and or pain at exit site (see Chapter 6 Managing Complications)
- **PICCs & Midlines** should be removed as soon as possible if they are not needed.

General Points — PICCs & Midlines

- **Assess external length of PICC/Midline before use**: if it has increased since insertion see Chapter 6 Managing Complications. The external and internal length is documented on the PICC/Midline insertion sticker and insertion pathway in the medical notes.
- **Take care at all times not to pull PICC/Midline out**. Remember there's nothing to keep the catheter in apart from the dressing.
- **Avoid compression to vein containing the PICC/Midline if possible**. Blood pressure cuff should be used on the opposite arm if possible. If this is not possible proceed to use the catheter arm but keep BP to a minimum. Any bandage / tubular dressing must be loose.
- **An infusion pump must be used for <u>all</u> infusions including blood products.**
- **Pressure injectable PICCs can be used for administering contrast medium.**
- **Midlines CAN be used for administering contrast medium <u>BY HAND INJECTION ONLY</u>.**

Assessing Patency — PICCs & Midlines

NB Always use ANTT when accessing the CVC

- **Do not administer chemotherapy or other vesicant drugs unless the line is fully patent. By *fully patent* we mean that:**
    - The line can be flushed easily
    - There is flashback of blood
- **If the PICC is not fully patent see Chapter 7 Maintaining Patency** but note that community nurses administering a weekly flush to an unused lumen are not routinely required to check for flashback.
- **Testing for patency:**
    - Test for flashback of blood before administering IV medication but note that you should not discard blood unnecessarily. To assess for flashback you can either:
        - Attach a syringe containing 10mL 0.9% sodium chloride to the catheter, flush a couple of mL into the line and then withdraw. As soon as you see a trace of blood in the catheter just flush the rest of the sodium chloride into the line.
        - Or use a gravity technique (ie with all clamps open briefly hold an attached infusion below the level of the patient's heart until you see flashback of blood).
    - BUT if there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.
    - **Always waste 5mL of blood prior to blood sampling.**
    - **Midlines will not bleed back,** to assess patency the midline should flush easily with 10mL Sodium chloride

Flushing — PICCs & Midlines

NB Always use ANTT when accessing the PICC/Midline

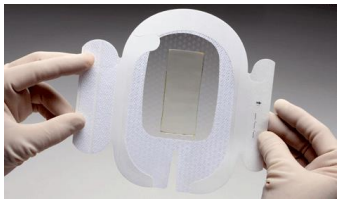
- **Before flushing**
  - If there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.
- **Technique:**
  - Brisk push-pause technique with positive pressure finish
- **What to flush with:**
  - 10 mL 0.9% sodium chloride between incompatible drugs / infusions or after blood sampling
- **Frequency of flushing**:
  - Flush unused lumens at least once a week (10mL 0.9% sodium chloride). Increase to twice weekly if there are patency problems.

Exit Site Care — PICCs & Midlines

NB Always use ANTT for exit site care

- **Securement**:
  - Always fix catheter firmly to patient's skin using steri-strips or Griplo*k*® and a transparent dressing.
- **Cleaning:**
  - Clean exit site dressing changes with *Chloraprep* ® (see right) using a 30-second back and forth friction rub. Allow to dry.
  - There is no need to clean the actual catheter itself. This is unnecessary and risks dislodging the catheter.
  - NB If there is loose blood or exudate present, this should be removed first using sterile gauze and 0.9% sterile sodium chloride.

- **Dressings:**
  - **Post-insertion**: gauze, steristrips or *Griplok*® dressing under a transparent dressing for 1 day (may be longer for outpatients).
  - **After 1 day**:
    - *Griplok*® dressing plus *Tegaderm*™ *or IV3000*™ dressing. Change every 7 days (or sooner if dressing becomes wet, soiled or detached).
    - If patient cannot tolerate *Tegaderm*™ *try IV3000*™ and vice versa.
    - If patient cannot tolerate a transparent dressing at all, use gauze-type dressing (eg *Mepore*®). Inspect and change daily if patient at high risk of exit site infection. (Change sooner if dressing becomes wet, soiled or detached).



- **Bathing, showering & swimming**:
  - **Bathing & Showering**: Patient should not get the dressing wet. If possible provide a waterproof covering for bathing and showering (eg *Limbo*® or *Bathguard*™).
  - **Swimming**: not advised unless using completely waterproof cover (*Drypro or Xerosox*).

Patient Education & Discharge Planning — PICCs & Midlines

- Patients with PICCs/Midlines may be discharged home with the catheter in situ.
- **Aftercare should be arranged by the team responsible for the patient's care.**
- Patient education regarding the recognition and reporting of complications is of great importance.
- Where possible, care in hospital should be aimed at the promotion of independence in caring for the line, but liaison with the primary healthcare team remains vital.
    - Medical equipment & flushing solutions need to be provided.
    - Some services (e.g. Nutrition) have agreements with private healthcare companies who supply line care equipment as part of a package along with the required drugs/therapies.
- **If the community nursing team are required to provide CVC care**
    - Medical equipment & flushing solutions need to be provided.

A PMAR document (appendix IV) needs to be completed and sent with the patient.

Removal — PICCs & Midlines

- **PICCs** should be removed as soon as possible if they are not needed.
- **Who can remove PICCs?**
    - Any registered nurse or assistant practitioner who follows these guidelines.
    - PICCs & Midlines can be removed in the acute or primary care setting.
- **Procedure**:
    - **Always use ANTT when removing a PICC/Midline**
    - **Patient should be sitting/lying** with the PICC/Midline exit site below the level of the heart (this will help prevent air embolism)
    - **Remove the dressing** & any stitches. (Take swab if signs of infection)
    - **Pull catheter out slowly and gently** an inch or two at a time. As each inch goes by, change the position of your hand so that your fingers are close to the exit site. This will reduce the likelihood of the catheter breaking.
    - **If you meet resistance, STOP**. Resistance may be due to venospasm. If this happens, apply warm packs to the patient's arm for about 5 minutes before resuming. If there is still resistance, call the vascular access team for advice.
    - **Once the catheter is out, apply pressure to exit site** with sterile gauze for 3 minutes.
    - **If systemic infection is suspected**, use sterile scissors to cut off the tip of the catheter and without contaminating it drop it into a dry sterile specimen pot. Send it to microbiology for culture.
    - **Apply sterile occlusive dressing** to prevent air from entering the venous system.
    - **Keep wound dry for 1 to 2** days or until healed

Chapter 4: Care of Implantable Ports (Portacaths)

Infection Prevention and Management — Ports

- **Infection i**s the most common complication associated with CVCs and one of the most serious.
- Decontaminate hands before and after each patient contact using correct hand hygiene procedure.
- Always use ANTT when accessing the CVC.
- **Regularly inspect for signs of infection** (at least daily if patient is in hospital)
- Take action immediately if there are signs of CVC-related infection. These include:
    - Pyrexia, rigor, malaise (see Chapter 6 Managing Complications)
        - Tenderness, inflammation and or pain at exit site (see Chapter 6 Managing Complications)

General Points — Ports

- **Only access port using a dedicated non-coring huber needle** with integral extension set with clamp.
- **Following insertion of the port there may be oedema and tenderness around the site**. This may make accessing port painful and more difficult than usual. Ideally port should be accessed while patient is in Interventional Radiology if it is to be used immediately afterwards.
- **Use volumetric pump with a filtered giving set when infusing blood products** to avoid blockage
- **If patient undergoes MRI scan**, inform scanning personnel about the port.
- **If patient requires defibrillation** do not place paddles directly over the port.
- **Pressure injectable ports can be used for administering contrast medium.**

Inserting the Non-coring Needle — Ports

- **Which needle?**
    - **Style**: For infusions, a 90^{o} non-coring needle with extension set should be used. For boluses, blood-taking and flushing, a straight non-coring needle may be used instead if preferred.
    - **Gauge**: A 20 or 22-gauge needle will suffice for most uses including blood administration and withdrawal.
    - **Length**: Where a 90^{o} needle is used, the length will depend on the amount of subcutaneous tissue between the skin surface and the port. The external part of the needle should not exert pressure on the skin but equally it should not stand too proud. **Hint**: a 1" needle is suitable for most adult patients. Deeper or more superficial ports will require longer or shorter needles.
- **Technique:**
    - **Always use ANTT when accessing the port**
    - **Numb skin over the port** if required using topical anaesthetic (before skin prep) or subcutaneous Lignocaine 1% (after skin prep).
    - **Prepare skin over the port using** *Chloraprep 3mL*® and using a 30-second back and forth friction rub. Allow to dry. Do not touch the proposed needle insertion site again except with totally sterile gloves.
    - **Prime needle and/or giving set** with 0.9% sodium chloride.
    - **Put on sterile gloves so you can palpate the port** to ensure you are confident of its position.
    - **Hold port firmly (eg with thumb and two fingers)** and stretch skin taut during insertion of the needle to prevent the port sliding out of the way of the needle, and to reduce the risk of the port becoming dislodged within the subcutaneous pocket.
    - **Insert needle swiftly and firmly** until it is felt to contact the back of the port.
    - **Verify correct position** by flushing with 10 mL 0.9% sodium chloride and checking for aspiration of blood.

- **If there is any local discomfort and/ or oedema** in the tissues around or over the port this may indicate incorrect position of the needle. In this case needle should be removed (see below for technique) and a fresh attempt made. (You can use the same needle for up to 2 further attempts if it has not become contaminated or damaged.)
- **If the port flushes easily without any local discomfort/oedema but there is no flashback of blood**, this suggests that needle position is correct but that the catheter itself is not fully functional. See Chapter 7 Maintaining Patency.

Assessing Patency — Ports

NB Always use ANTT when accessing the port

- **Do not administer chemotherapy, drugs or fluids unless the line is fully patent. By *fully patent* we mean that:**
  - The line can be flushed easily
  - There is flashback of blood
- **If the port is not fully patent see Chapter 7 Maintaining Patency.**
- **Testing for patency:**
  - Test for flashback of blood before administering IV medication but note that you should not discard blood unnecessarily. To assess for flashback you can either:
    - Attach a syringe containing 10mL 0.9% sodium chloride to the giving set, flush a couple of mL into the line and then withdraw. As soon as you see a trace of blood in the catheter just flush the rest of the sodium chloride into the line.
    - Or use a gravity technique (ie with all clamps open briefly hold an attached infusion below the level of the patient's heart until you see flashback of blood).
    - BUT note that if there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.
- **Always waste 5mL of blood prior to blood sampling.**

Flushing — Ports

NB Always use ANTT when accessing the CVC

- **Non-accessed ports:**
  - **Flush at least every four weeks** with 10mL 0.9% sodium chloride and lock with 5 mL Heparinised sodium chloride 10 units/mL.
- **Accessed ports**:
  - **Technique:**
    - Brisk push-pause technique
  - **What to flush with**:
    - **10 mL 0.9% sodium chloride between incompatible drugs** / infusions or after blood sampling
    - **If needle to be removed:** lock with 5 mL Heparinised sodium chloride 10 units/mL
    - **If needle to remain in situ**: lock with a further 10mL 0.9% sodium chloride

Removing the Needle — Ports

NB Always use ANTT when removing the needle

- **Technique**:
  - **Lock port** with 5mL heparinised sodium chloride 10 units/m. Ideally, remove needle while injecting last mL to achieve positive pressure finish but use gauze to prevent spray. NB you will need to ask the patient or a third party to inject because you will need two hands for removing the needle. (NB If this is not possible, you can achieve a positive pressure finish by clamping the infusion set while injecting the final mL of flush and then remove needle as below.)
  - **Stabilise the port** with one hand during needle withdrawal to avoid trauma to tissues. Always activate the sharps safety device and dispose of in a sharps bin immediately.

- **Apply gentle pressure** to needle site with sterile gauze until minor bleeding has ceased. A plaster may be applied if necessary / desired.

Exit Site Care — Ports

NB Always use ANTT for exit site care

- **Sutures**:
  - To side of port: remove at 7-10 days (unless dissolvable)
  - Venepuncture site: Remove at 7 - 10 days (unless dissolvable)
- **Frequency of needle change:**
  - If port in constant use for more than a week, change needle weekly using different puncture site.
- **Dressings**
  - **Non-accessed ports:**
    - No dressing or exit site care required (except immediately following insertion of the port when the wound should be kept covered until stitches removed and wound healed.)
  - **Accessed ports**:
    - Pad needle with sterile gauze if necessary and cover with transparent IV dedicated dressing. Needle site should be visible for inspection.
    - Tape tubing firmly to skin to prevent pulling on the needle.
    - Inspect needle entry site at least daily.
    - Advise patient to report any discomfort or swelling at the puncture site immediately.
- **Bathing, showering & swimming**
  - **Non-accessed ports**:
    - Patient may bath, shower or swim freely once wound has healed.
  - **Accessed ports**:
    - **Bathing**: Patient should not submerge exit site in bathwater.
    - **Showering**: Patient may shower if needle site is completely covered with an occlusive dressing, taking care not to dislodge needle.
    - **Swimming**: not advised while needle is in situ.

Patient Education — Ports

- If patient is discharged with port in situ:
  - **Ensure patient is aware of care** required
  - **Ensure patient is aware of the importance of reporting complications** and has a contact number for this purpose
  - **Make arrangements for the port to be flushed every 4-6 weeks if not in use. This is usually best done in Daycare.**
  - **Note that Community Nursing Staff** are rarely trained to access ports. If community staff need training in use of the port, there are sessions available at the Horizon Centre, or subscribe to the e-learning module.
  - **Patients may wish to learn to flush their own ports.** The vascular access team **may** be able to assist in teaching.

Removal — Ports

- Contact the vascular access team for advice on the removal of implantable ports.

Chapter 5: Care of CVCs used for Dialysis

Infection Prevention and Management — CVCs used for Blood Processing

- **As for tunnelled or non-tunnelled CVCs, PICCs**.

Information About Locking Solutions — CVCs used for Blood Processing

NB Always use ANTT when accessing the CVC

Locking solutions

- **If the catheter is to be used again within 12 hours**, lock with 10 mL 0.9% sodium chloride using vigorous push-pause flush and positive pressure finish.
- **If the catheter is NOT to be used again within 12 hours,** flush with 10 mL 0.9% sodium chloride as above but then lock each lumen with Heparin 1000 units/mL*. The volume of heparin should be exactly the priming volume of the lumen in question (this is marked on each lumen). Each lumen locked in this way must be clearly labelled "***Locked with heparin 1000 units/mL. Withdraw this before use. Do not flush into the patient***".
- **When the catheter comes to be used again, always withdraw and discard the indwelling heparin prior to using the catheter.** If you are unable to withdraw the heparin it may be necessary to flush the catheter without withdrawing but you must never do this without discussion with the patient's medical team. This is because in effect you will be delivering a heparin bolus which might have clinical implications for the patient.

Assessing patency — CVCs used for Blood Processing

- **As for tunnelled or non-tunnelled CVCs**, whichever applies but note you must always remove any indwelling heparin prior to assessing patency. If you are unable to withdraw the heparin it may be necessary to flush the catheter without withdrawing but you must never do this without discussion with the patient's medical team. This is because in effect you will be delivering a heparin bolus which might have clinical implications for the patient.

Flushing — CVCs used for Blood Processing

- **As for tunnelled or non-tunnelled CVCs**, whichever applies but see "Information about locking solutions" above

Exit Site Care — CVCs used for Blood Processing

- **As for tunnelled or non-tunnelled CVCs**, whichever applies.

Patient Education (tunnelled lines) — CVCs used for Blood Processing

- **As for tunnelled CVCs**, **see Chapter 2.**

Removal — CVCs used for Blood Processing

- **As for tunnelled or non-tunnelled CVCs**, whichever applies.

Chapter 6: Managing Complications (call the vascular access team)

Pyrexia plus or minus: rigor after flushing, sore throat, generally feeling unwell, hypotension, tachycardia, shock, exit site / tunnel infection

- **Possible cause:**
  - Catheter Related Blood Stream Infection
- **Management:**
  - **Refer to medical staff**. May be treatable without catheter removal depending on patient's clinical status and colonising organism. Microbiology opinion should usually be sought.
  - **Take blood cultures** from each lumen and peripherally.
  - **TPR & BP.** Frequency will depend on patient's clinical status.
  - **If there are signs of exit site infection** see below.

Inflammation and tenderness at the exit site / insertion site / skin tunnel / port pocket plus or minus exudate

- **Possible cause:**
  - Infection
- **Management:**
  - **Take a swab**
  - **Refer to medical staff.** In non-tunnelled CVCs, exit site infections involving pus should probably be removed to prevent infection spreading to the blood stream. In tunnelled CVCs and PICCs, a superficial exit site infection will often resolve with antibiotics, but infections involving the skin tunnel above the cuff or a port pocket are very difficult to treat. Microbiology opinion should usually be sought.
  - **Stop using** *Tegaderm™ CHG* **or** ***Biopatch®*** **dressing** until symptoms resolve.
  - **Increase frequency of dressing change & cleaning** depending on amount of exudate**.**
  - **4 hourly TPR & BP** if patient in hospital
  - **If patient also shows signs of systemic infection,** see also above**.**

The catheter is sluggish, or there is no flashback of blood, or there is complete blockage.

- **Possible causes:**
  - Clotted blood in catheter
  - Fibrin sheath (which may be diagnosed using fluoroscopy)
  - Malpositioned catheter
  - Build up of lipids (Parenteral Nutrition)
  - Drug Precipitation
  - NB: Implantable Ports needle may be incorrectly positioned: check before taking any other action.
- **Management:**
  - See Chapter 7: Maintaining Patency.

Pain or visible swelling when catheter is used **or** fluid leaks from exit site when catheter is flushed.

- **Possible causes:**

- Malposition of catheter
- Internal catheter fracture
- Fibrin Sheath (which may be diagnosed using fluoroscopy)
- Separation of port and catheter (Implantable ports)
- NB: Implantable Ports needle may be incorrectly positioned: check before taking any other action.

- **Management:**
  - **Stop using the catheter.**
  - **Refer to the vascular access team and / or medical staff**: a malpositioned catheter should usually be removed. Internal fracture cannot be repaired. If there is a fibrin sheath severe enough to cause leakage the catheter should be removed.
  - **Chemotherapy**: follow Cytotoxic Policy if extravasation occurs.
  - **If catheter is fractured or faulty complete Adverse Incident Form**. Do not retain the catheter but if possible record the make and lot number on the incident form.

Leakage from external portion of catheter when flushed.

- **Possible cause:**
  - External catheter fracture
- **Management:**
  - **Clamp or fold catheter** between the exit site and the leak to prevent air entry. If using a clamp (eg artery forceps) pad with gauze to avoid trauma to the catheter.
  - **Catheter must be repaired or removed as soon as possible**. Some catheters can be repaired if equipment & expertise available. The advisability of repair will depend on the patient's clinical status as it carries a risk of infection. Contact the vascular access team for advice.
  - **Complete Adverse Incident Form.** Do not retain the catheter but if possible record the make and lot number on the incident form.

Cuff protrudes from exit site (Tunnelled CVCs)

- **Possible cause:**
  - Tissues within tunnel have failed to adhere to cuff & catheter has migrated out.
- **Management:**
  - **Stop** using the catheter.
  - **Tape catheter** firmly to skin at exit site (use a *griplok* if available)
  - **Refer to the vascular access team** for catheter removal.

Increase in external length of a PICC

- **Possible cause:**
  - PICC has migrated out
- **Management:**
  - **Do NOT push the catheter back in**
  - **Refer to insertion documentation which will indicate how many cm of PICC was left out on insertion.**
  - **If PICC has come out by more than 3cm on insertion documentation,** consult the vascular access team or medical team. Examination of the post-insertion CXR may reveal whether or not a CXR will need to be carried out to check tip position. (i.e. if upper SVC at time of insertion x-ray).

Pain or swelling of arm, neck or shoulder, with or without distension of neck / peripheral veins

- **Possible cause:**
  - Thrombosis.
- **Management:**
  - **Refer to the vascular access team and / or medical staff** for investigation of suspected thrombosis. It may or may not be possible to treat thrombosis without catheter removal.
  - **Commence treatment dose LMWH (if platelets <50 split dose BD and keep platelets >30) and request an urgent USS.**
  - Infective thrombophlebitis can occur. If patient shows signs of infection, see guidance on managing infection above.

Palpitations / Abnormal ECG

- **Possible causes:**
  - Cardiac arrhythmias related to CVC
- **Management:**
  - **If patient is distressed or unwell as a result of abnormal rhythm, call for urgent medical assessment** and monitor vital signs
  - **PICCs:** Pulling PICC out by 1 - 2cm may resolve the problem immediately. If possible, liaise with the vascular access team to check that this will not result in too high a tip position. If there is any reason to suspect that the palpitations may have another cause, check tip position before retracting the line.

Cardiopulmonary symptoms including any of the following: respiratory distress / failure apnoea, reduced o^2 saturation levels, tachycardia, bradycardia, hypotension, pallor, cyanosis, anxiety, chest pain, loss of consciousness

- **Possible causes:**
  - Pneumothorax
  - Air or catheter embolism
  - Pulmonary embolism
  - Cardiac tamponade / pericardial effusion
- **Management:**
  - **Call for medical assistance** / resuscitation team
  - **Administer O^2**
  - **Monitor vital signs**

Chapter 7: Maintaining Patency

Patency Problems

- **Patency problems are common** in Central Venous Catheters and include:
  - no flashback of blood
  - sluggish flow
  - complete blockage
- **Possible causes**
  - clotted blood in the catheter (most likely cause)
  - fibrin sheath
  - malpositioned catheter
  - drug precipitation
  - build up of lipids (parenteral nutrition)
  - incorrectly positioned needle in an implantable port: check before taking any other action.

Preventing Patency Problems: good flushing techniques

- **Use a brisk 'push-pause' flushing technique** routinely when flushing the catheter – i.e. flush briskly, pausing briefly after approximately each mL of fluid.
- **Use a "positive pressure finish" when you lock the catheter –** i.e. clamp the line while you are flushing in the final mL. If there is no clamp remove the syringe from the needle free hub while you are still injecting the final mL.

Managing Patency Problems

- **No flashback of blood**
  - Ask the patient to take deep breaths and try different positions. Flush briskly using 10mL 0.9% sodium chloride. If this fails use a thrombolytic (see below).
  - If lipids/drug precipitation suspected a 4mL solution of 70% ethanol should be inserted gently into the lumen and locked in place for one hour to unblock the catheter. If it is not known whether occlusion is caused by lipid or clots, it is recommended that urokinase be tried first.
- **Catheter flow is sluggish**
  - Ask the patient to take deep breaths and try different positions. Flush briskly with 10mL 0.9% sodium chloride. If this fails use a thrombolytic (see below).
  - If lipids/drug precipitation suspected a 4mL solution of 70% ethanol should be inserted gently into the lumen and locked in place for one hour to unblock the catheter. If it is not known whether occlusion is caused by lipid or clots, it is recommended that urokinase be tried first.
- **Catheter is completely blocked**
  - Use a 3-way tap or inverted syringe technique to instil thrombolytic into catheter (see below).

What is a thrombolytic?

- **A thrombolytic** is a drug capable of breaking up a thrombus.
- **Urokinase 25000 units** reconstituted in 2mL sodium chloride is the thrombolytic used for unblocking CVCs.
- **A thrombolytic should always be prescribed**.
- **Heparin and Hepsal are NOT thrombolytics**.

When should you use a thrombolytic?

Use a thrombolytic to improve patency in the following situations:

- flashback of blood is absent
- free-flow of fluids is sluggish or intermittent
- resistance is felt when flushing
- the catheter/lumen is completely blocked

What if the thrombolytic fails to restore function?

- **If a thrombolytic used correctly (see below) fails to restore function, contact the vascular access team and / or medical team.** A chest x-ray may need to be carried out to check the position of the line. If a chest x-ray shows that the catheter is correctly placed, it may be worth investigating further using fluoroscopy which may reveal a fibrin sheath.
- **If the cause could be a build up of lipids from Parenteral Nutrition or drug precipitation,** a 4mL solution of 70% ethanol should be inserted gently into the lumen and locked in place for one hour to unblock the catheter.

How to use a thrombolytic

Urokinase Bolus Protocol

- **Arrange prescription**. (Caution if patient's clotting is severely deranged or if high doses of an anticoagulant are being given concurrently.)
- **Draw up the thrombolytic** as per manufacturer's instruction eg for Urokinase: reconstitute 25000 unit vial with 2mL of 0.9% sodium chloride.
- **Instil the thrombolytic into the catheter and wait 1 hour.** see Using a Thrombolytic in a Completely Blocked Catheter (below). Some practitioners prefer to use a 3 way tap for this.
- **Assess the catheter again.** There is no need to worry that you are flushing the thrombolytic into the patient: small doses can be flushed into the patient without danger unless the patient has exceptionally deranged clotting.
- **If full function has not returned** repeat procedure.
- **If the procedure fails** to restore function consider whether lipids / drug precipitation could be causing a blockage. If not, refer to the vascular access team and / or medical staff: a chest x-ray may reveal malposition of the line.
- **If the procedure fails** consider push protocol or infusion.

Using a Thrombolytic in a Completely Blocked Catheter.

Urokinase Push Protocol

- In the absence of a PGD, Urokinase should be prescribed.
- Reconstitute 50000 units Urokinase vial with 4mL of 0.9% sodium chloride. Gently shake the vial to dissolve the powder. This solution contains 12500 units/mL of Urokinase.
- Draw up into a **10mL luer lock syringe.**
- Steadily inject 2mL of the urokinase solution into the lumen of the catheter, using sufficient volume to fill the catheter lumen.
- Clamp the catheter and leave the syringe attached but secured to the patient with tape.
- Wait for a period of 10 minutes and then inject a further 1mL of the solution into the occluded lumen of the catheter.
- Wait for another period of 10 minutes and inject a further 1mL of the solution into the lumen of the catheter.
- Wait for another 10 minutes and then attempt to aspirate from the lumen of the catheter.
- If unsuccessful, then repeat the urokinase push protocol
- unless this was the second episode in a 2 month period, in which case discuss with senior medical staff with a view to proceeding to a urokinase infusion. The urokinase 'push' may be repeated at least 30 minutes after the initial unsuccessful 'push'.

Urokinase Infusion Protocol

- Urokinase infusion is contraindicated in patients with:
  - Active GI bleeding or a bleed in the last month
  - Haemorrhagic stroke or any other cerberovascular accident in the last month.
  - Major surgery or trauma in the last two weeks
  - Coagulation defects
  - Known urokinase allergy
- Urokinase infusion should be used with caution in patients receiving antiangiogenic medication e.g: bevacizumab
- Take a blood sample from the patient and check FBC to ensure platelets are >100 and Clotting Screen to ensure that clotting parameters are within the therapeutic range.
- Reconstitute 250,000 units Urokinase and add to 100mL bag of 0.9% Sodium chloride.
- Connect an infusion line to the occluded lumen of the catheter using ANTT. Administer over 90 – 180 minutes.
- Check the patients pulse and blood pressure every 15 minutes for one hour and then hourly afterwards.
- Check for any signs of bleeding from the catheter exit site. If bleeding is present, stop the urokinase infusions and discuss with senior medical staff.
- On completion of the urokinase infusions attempt to aspirate from the lumens of the catheter.

The 'pop' technique

- This is a new method of unblocking catheters presented at the 2016 WOCOVA conference in Barcelona. It unblocks catheters using shock waves rather than a flushing solution.
- Draw up 5-10mL 0.9% sodium chloride in a 50mL luer lock syringe.
- Attach the syringe to the catheter and unclamp the catheter.
- With the syringe inverted (pointing downwards so the fluid is at the luer lock tip) draw back the plunger to the 50mL mark and let it go.
- The plunger with rapidly return to its 5mL position causing a loud 'pop' sound. Patients should be warned about the noise prior to the procedure.
- Repeat this up to 30 times or until patency has been restored.

Appendix I: Background Information: Different Types of CVC

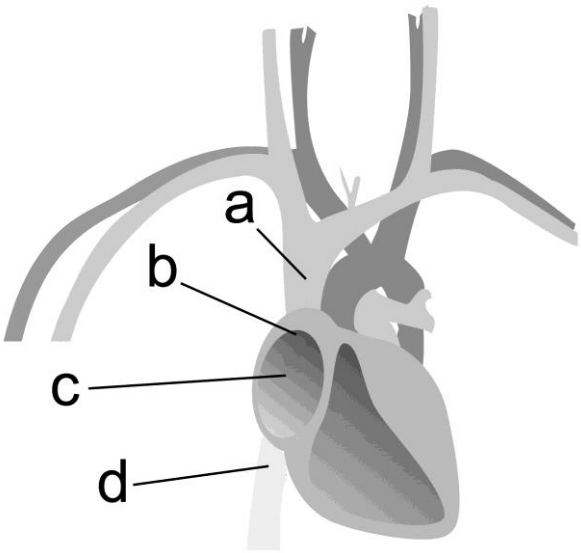
(i) Definition of a Central Venous Catheter (CVC)

The term Central Venous Catheter (CVC) refers to an **intravenous catheter whose internal tip lies in a large central vein**. There are various different types of CVC but common to all is the idea that the **tip of the catheter floats freely within the bloodstream in a large vein** and parallel to the vein wall. Blood flow around the catheter is maximised, and physical and chemical damage to the internal walls of the vein are minimised.

Opinions vary about the ideal place for the tip of a CVC but it is generally accepted that for a catheter to be considered a "central catheter" the internal tip should be in one of the following positions.

a. Superior vena cava
b. Junction of the right atrium and the superior vena cava (also known as the atrio-caval junction)
c. Right atrium
d. Inferior vena cava above the diaphragm (femoral catheters)

Diagram 2.
CVC Tip Positions



Tip positions outside these areas are thought to be related to a significantly higher risk of complications, notably thrombosis.

In practice, CVC tips are not static and their position varies depending on the patient's position, arm movements etc.

(ii) Indications

- To monitor **central venous pressure**
- To administer **large amounts** of intravenous fluids (e.g. colloids, blood products etc.)
- To administer **irritant, vesicant or hyper-osmolar** drugs / fluids (for example Noradrenaline/Adrenaline, NaHCO3, Parenteral Nutrition, chemotherapy etc.)
- To provide **long term access** for frequent or prolonged use (e.g. chemotherapy, antibiotics, blood sampling, apheresis, continuous renal replacement therapy (CRRT), haemodialysis etc.).

(iii) Insertion and Removal

Guidelines for the insertion of central venous catheters are not covered here. **Insertion of a CVC is an invasive procedure** which must only be performed by trained, competent personnel following the latest Department of Health guidelines using "optimal aseptic technique, including a sterile gown, gloves, and a large sterile drape. Chlorhexidine 2% should be used as skinprep (except in cases of hypersensitivity). **The use of ultrasound to achieve venous access is recommended** by NICE guidelines but this relies upon the availability of appropriate equipment and training. Whether the catheter is inserted under general anaesthetic, sedation or simple local anaesthetic will depend upon the situation, the patient, the type of catheter to be inserted and local practice.

Central Venous Catheters should be removed as soon as possible if they are not needed. **Techniques for the removal of a CVC** depend on the type of catheter. See Chapters 1 - 5.

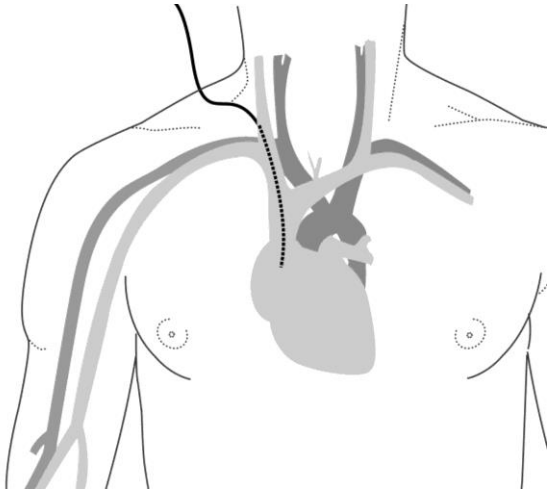
(iv) Choice of Catheter

Various different types of CVCs are available and these are described below.

The choice of device will depend chiefly on the purpose for which it is intended, though patient preference may be a key factor with long-term catheters. As a general principle **the lumen diameter and the number of lumens should be kept to a minimum**, since larger bore catheters and multiple lumens are associated with higher infection and thrombosis risks. Clearly there are many other factors to be weighed against these risks – e.g. in high dependency settings large bore catheters and multiple lumens tend to be used as they are essential for management of the acutely ill patient. Where parenteral nutrition is to be administered, ideally a single-lumen catheter should be used. If multiple lumens are essential, then one lumen should be dedicated "exclusively for that purpose"[i].

a) Non-Tunnelled CVCs *Often called Central Lines / Neck Lines / CVP lines.*

Diagram 3. Centrally Inserted Non-tunnelled CVC



- See Chapter 1 Care of Non-Tunnelled CVCs for care of these catheters.
- Non-tunnelled CVCs are most commonly found in **acute settings.** They are not suitable for long-term use because of the risk of infection and because they are relatively uncomfortable and unsightly.
- **The catheter is usually inserted via the subclavian, jugular or femoral veins** with the tip positioned in the right atrium, the superior or inferior vena cava. It should be attached to the patient's skin using a *Griplok*®.
- **Non-tunnelled CVCs may have single or multiple lumens**. Each lumen provides independent access to the venous circulation, so that incompatible drugs/fluids may be administered simultaneously.
- **Each lumen is equipped with an integral clamp** to seal the catheter and guard against air entry, haemorrhage and infection.

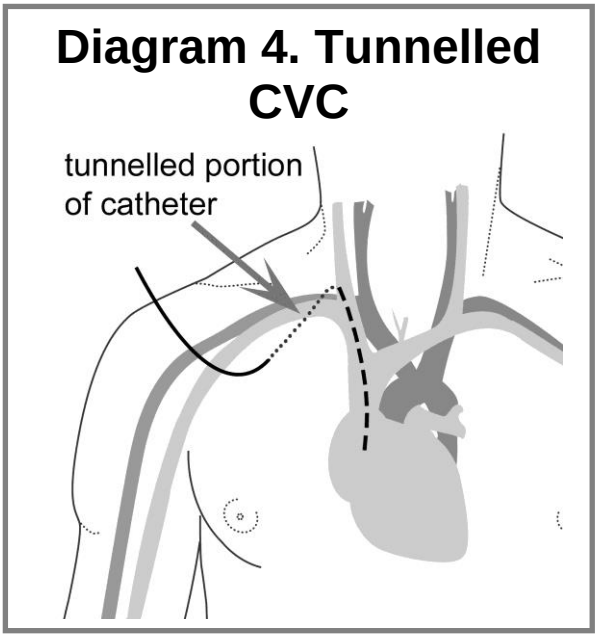
b) Tunnelled CVCs (Often called Hickman Lines)

- See Chapter 2 Care of Tunnelled CVCs (Hickman Lines) for care of these catheters.
- **Tunnelled CVCs (Hickman lines) are intended for longer-term use** in patients who require multiple infusions of fluids, blood products, drugs or parenteral nutrition. They also provide easy access for routine blood sampling. They are more comfortable and discreet than the non-tunnelled CVCs described in a) above, and can last for much longer because of the separation of the exit site and the vein (see below).

The **tunnelled CVC** is inserted via the subclavian, jugular or femoral veins. **The catheter is tunnelled subcutaneously and exits at a convenient site** (usually on the chest wall) where it is secured with temporary sutures. There is a 'cuff' within the tunnel to which fibrous tissue will adhere in the 2 to 3 weeks following insertion. At the end of this time, the sutures can be removed. The

embedded 'cuff' helps to prevent accidental dislodgement and acts as a mechanical barrier to ascending bacteria

Diagram 4. Tunnelled CVC



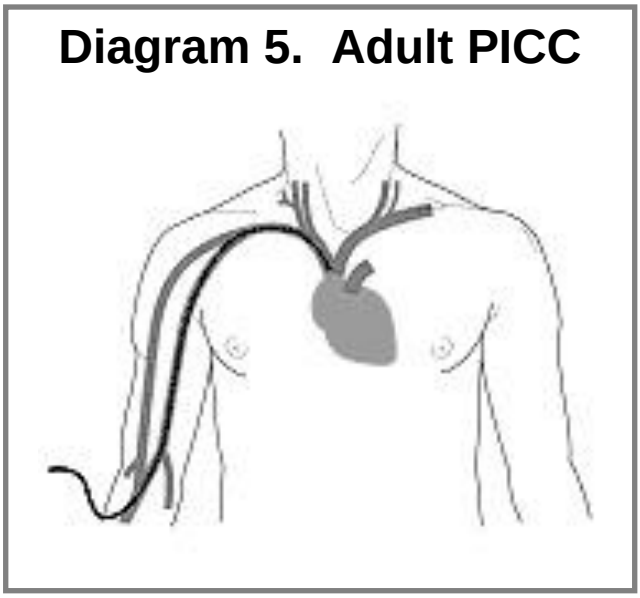
- **Single, double and triple lumen catheters are available**. Each lumen provides independent access to the venous circulation, so that incompatible drugs/fluids may be administered simultaneously.

- **Each lumen of the catheter is equipped with an integral clamp**. The clamp serves to seal the catheter and guard against air entry, haemorrhage and infection

- **Patients with tunnelled CVCs may be discharged home with the catheter in situ**. In these cases patient education regarding the recognition and reporting of complications is of great importance. Where possible, care in hospital should be aimed at the promotion of independence in caring for the line, but liaison with the primary health-care team remains vital.

c) PICCs (Peripherally Inserted Central Catheters).

Diagram 5. Adult PICC



- See Chapter 3 Care of PICCs for care of these catheters.

- PICCs (Peripherally Inserted Central Catheters), like tunnelled lines, are intended for **mid to long-term use** in patients who require multiple infusions of fluids, blood products, drugs or Parenteral Nutrition. They may also provide access for routine blood sampling.

- **A PICC is a fine bore CVC** inserted into a peripheral vein – usually the basilic or brachial vein – and threaded upwards towards the heart. Tip position is verified by chest x-ray following insertion (unless the tip has been screened during insertion using Fluoroscopy or ECG tip confirmation device).

- Unlike tunnelled Lines, **PICCs do not possess a "cuff" to secure the** catheter**.** There is nothing to keep the PICC in place unless it is secured to the skin of the patient's arm using steri-strips and a *Griplok*®. In some Trusts PICCs may be stitched in position but this is not current practice at SDHCT. Checking the external length of the PICC should be a routine part of care before administering drugs or fluids. See Chapter 3 for detailed guidelines.

PICCs can be single or double lumen. Each lumen provides independent access to the venous circulation, so that incompatible drugs/fluids may be administered simultaneously.

- **Each lumen of a PICC is equipped with an integral clamp**. The clamp serves to seal the catheter and guard against air entry, haemorrhage and infection

- **Patients may return home with a PICC in situ**, and therefore patient education regarding the recognition and reporting of complications is of great importance. The PICC usually exits onto the patient's arm and so it is generally not practical for the patient to care for the catheter him/herself. Liaison with the primary health-care team is vital

- **Placement is contraindicated** following axillary node dissection or irradiation, or in the case of lymphoedema of the arm, axillary node disease or skin infection at the insertion site[ii].

- **The PICC should not be confused with a "midline catheter"** which is usually "20cm in length, with the tip terminating in the region of the axillary vein, and is designed for short-term peripheral drug delivery"[iii]. **A midline catheter is not a Central Venous Catheter.**

d) Implantable Ports *Often called Portacaths*

- See Chapter 4 Care of Implantable Ports for care of these catheters.

- **The Implantable Port is similar to a tunnelled line** but instead of protruding from the patient's chest, the catheter terminates in a self-sealing injection port which is implanted under the skin. **There are therefore no external parts.** The port is accessed through the skin using a dedicated non-coring needle (see diagram next page)

- Some patients find an Implantable Port **more discreet and less intrusive** than a tunnelled CVC[iv]. **Ports require less maintenance** when not in use than other types of catheter. They may also offer a lower risk of infection [17].

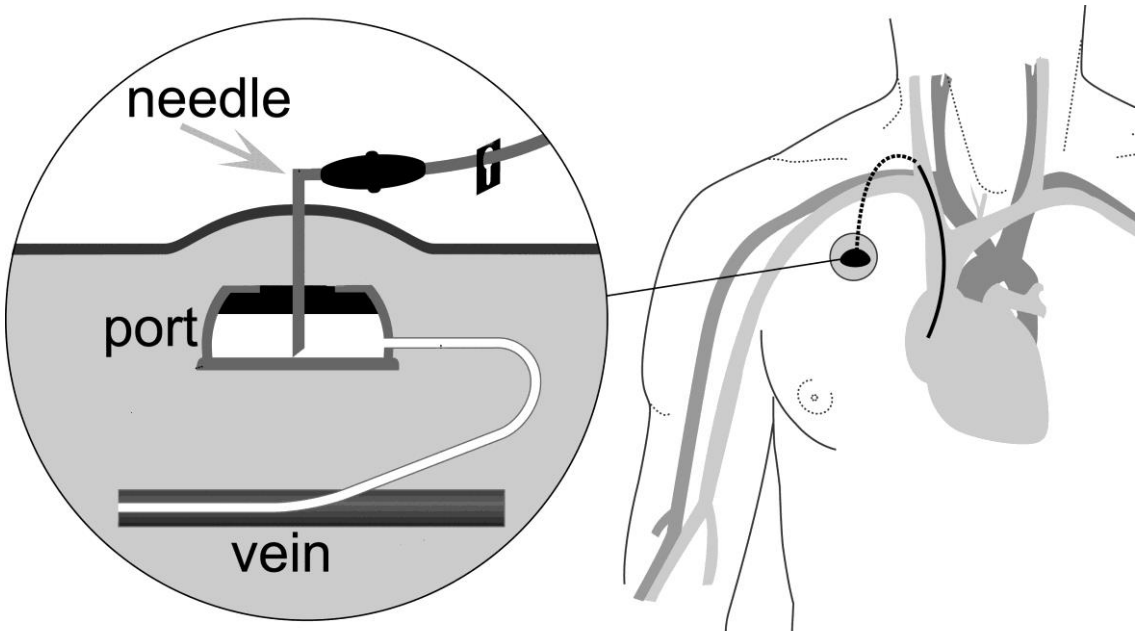
- Implantable Ports are suitable for patients who require **long-term frequent and intermittent venous access**. Arguably they are less than ideal for long-running continuous infusions because of the risk of needle dislodgement[v]. **The patient may return home with the port in situ**, and therefore patient education regarding the recognition and reporting of complications is of great importance.

- **Dual lumen devices are available.** These are equipped with two access ports side-by-side which can be accessed separately using two different needles. Each lumen provides independent access to the venous circulation, so that incompatible drugs/fluids may be administered simultaneously.

- Ports may also be used as **an alternative to subcutaneous administration** of long-term maintenance therapies when the subcutaneous route has become unacceptable to the patient or unreliable – e.g. due to subcutaneous nodule formation.

Placement is not recommended in obese or cachexic patients, before or after chest irradiation, or at mastectomy sites [iv].

Diagram 6. Implantable Port



e) CVCs used for Blood Processing (eg Apheresis) *Often called Permacaths / Vascaths.*

- See Chapter 5 Care of CVCs Used For Blood Processing for care of these catheters.

- CVCs used for blood processing – eg apheresis - are very similar to the catheters described in a) and b) above. **They can be non-tunnelled (eg *Vascaths*) or tunnelled (eg *Permacaths*).**

- **These catheters differ from other CVCs in the following respects**:

    - **Larger lumen size** compared to other CVCs.

    - **The internal tip of the catheter is designed differently** so as to allow blood to be withdrawn freely via one lumen and returned via the other lumen downstream of the blood being withdrawn (thus avoiding recycling of the treated blood). Confusingly, the lumens are often colour-coded red and blue and referred to as the “arterial” and “venous” lumens. In fact both lumens lead into a vein and not an artery.

    - **In some settings these catheters are locked between uses with an exact volume of concentrated heparin** solution to minimise the risk of occlusion. This varies depending on the patient’s clinical status and local guidelines. If heparin **is** used as a lock, the lumen must be clearly labelled and the heparin must be withdrawn from the catheter before use otherwise the patient will receive an unacceptably high dose of heparin. See Chapter 5 Care of CVCs Used for Blood Processing for details.

In other respects these catheters are identical to the CVCs described in a) and b) above.

Appendix II: Background Information: Principles of Care

(i) General Principles

- **Infection i**s the most common complication associated with central venous access and one of the most serious. You must be familiar with the latest infection control guidance when caring for patients with CVCs.

- **Decontaminate hands** before and after each patient contact using correct hand hygiene procedure.

- **Use an aseptic, non-touch technique ANTT** whenever the CVC is accessed and during procedures involving exit sites. *To prevent infection. A strong correlation exists between bacteraemia and the presence of a CVC*[vi]*.*

- **Regularly inspect for signs of infection** (at least daily if patient is in hospital) including inspection of exit site and monitoring of temperature, pulse and blood pressure at least daily when the patient is in hospital. *To detect infection*

- **Take action immediately** if there are signs of CVC-related infection. These include:
    - Pyrexia, rigor, malaise (see Chapter 6 Managing Complications)
    - Tenderness, inflammation and or pain at exit site (see Chapter 6 Managing Complications)

- **Wear gloves when carrying out dressing changes and when accessing the catheter**. *Sterile gloves should be worn to prevent descaling of bacteria onto key parts*[vii]*.*

- **The practice of administering prophylactic antibiotics** at the time of CVC insertion should NOT be routinely followed. (The exception is if the patient's MRSA status is unknown or positive). *The Department of Health's Epic Guidelines on the prevention of infection in Central Venous Catheters (phase 2) specifically states that this practice is not supported by research and may encourage resistant organisms*[Error! Bookmark not defined.]*.*

- **Do not allow air to enter the catheter**. The catheter should never be left open to air entry and all syringes and intravenous administration sets must be carefully primed. *To prevent air embolism. The negative pressure within the chest may suck air into the catheter during inspiration especially if the patient is sitting up*[viii]*.*

- **Cap off the catheter with a needle-free access device** when not in use. This will minimise interruptions to the closed system. Unless manufacturer's instructions vary, this should be changed every 7 days or every 100 uses, whichever is the sooner. *Risk of contamination increases with every interruption to the closed system* vi*.*

- **When accessing the catheter through the needle-free device, always decontaminate the device using Chlorhexidine 2% in alcohol and using ANTT (see (ii) Accessing the Catheter below)**. The device should be cleaned each time using a 30-second vigorous friction rub and allowed to dry before inserting a sterile syringe-tip.

Whenever the bung/access device is removed from the catheter then it must be replaced with a new, sterile device. *To prevent infection.*

- **If the catheter possesses an integral clamp, keep it closed** whenever the cap is removed and at all other times except when administering or withdrawing fluids. Clamping should always take place at the designated area and never at the thickened area near the hub. *The clamp will prevent air entry and bleeding should the luer lock cap become unattached. Repeated clamping away from the specially reinforced area may result in damage to the catheter.*

- **The practice of administering prophylactic mini-dose Warfarin** to patients with CVCs should NOT be followed. *Mini-dose Warfarin has recently been shown to be ineffective in the prevention of thrombosis in cancer patients with CVCs*[ix]*. (NB dose adjusted Warfarin did show some efficacy but with an increased risk of serious bleeding).*

- **Should the catheter fracture or be accidentally cut**, clamp it atraumatically without delay proximal to the break. Specialist advice should be sought immediately to consider removal or repair of the catheter. *To prevent haemorrhage, air embolism and infection.*

- **Always secure the catheter firmLy to the skin**. *For patient's comfort, to prevent tension or accidental dislodgement, and to reduce 'to and fro' motion which increases the risk of catheter related sepsis* vi*.*

- **Central Venous Catheters** should be removed as soon as possible if they are not needed.

(ii) Accessing the Catheter

- **Decontaminate hub using Chlorhexidine 2% in alcohol (eg *Sanicloth wipe*) using a 30-second friction rub and allow to dry before accessing any lumen. Use an aseptic, non-touch technique (ANTT)** whenever the CVC is accessed. *To prevent bacteria from entering the blood stream. A strong correlation exists between bacteraemia and the presence of a CVC*[x]*.*

- **Before it is used for administering therapeutic drugs or fluids, the patency and correct functioning of the catheter should be established**[xi]. Signs of catheter occlusion, whether partial or complete, should be taken seriously and action should be taken earlier rather than later to restore full patency. Ignoring the early signs may lead to the development of more serious problems which cannot then be easily rectified – eg complete blockage[xii]. In addition unresolved patency problems may mask a malpositioned catheter which carries and increased risk of thrombosis.

- **Nurses using CVCs can be confident of access** if all three of the following apply

    - The catheter can be **flushed with ease**.
    - **Blood can be withdrawn** from the catheter (see below for technique)
    - The patient experiences **no discomfort** during flushing/infusion and there are no other complications

- **If any of these criteria are not met** see Chapter 6 Managing Complications.

- **Ways of assessing these three criteria will vary with the setting**. Here are some points to note:

A proper assessment of the catheter involves observing the exit site and the area around as this may reveal any signs of thrombosis, leakage, infection etc. While this is not necessarily appropriate every time the catheter is used it should be a regular part of your practice.

- **When checking for flashback of blood, do not discard blood unnecessarily. To assess for flashback you can either**
  - attach a syringe containing 10mLs 0.9% sodium chloride to the catheter, flush a couple of mLs into the line and then withdraw. As soon as you see a trace of blood in the catheter just flush the rest of the sodium chloride into the line using the push-pause technique as described in (iii) a) below.
  - or use a gravity technique (ie with clamps open briefly hold an attached infusion below the level of the patient's heart until you see flashback of blood).
  - BUT note that if there are infusional vasoactive drugs in the lumen, withdraw prior to flushing to avoid bolus dose.

- **For patients receiving parenteral nutrition (PN)**, testing for flashback via the PN lumen on a regular basis is not advised as it may increase the infection risk[xii]. But note that a full assessment of any central venous catheter is advised if there are doubts about patency or if malposition is suspected.

- **Assessing CVCs in patients requiring blood processing (eg apheresis) requires specialist knowledge**: refer to Chapter 5 Care of CVCs used for Blood Processing for care of these patients.

(iii) Flushing After and Between Uses

(a) Flushing Technique:

- **Do not use syringes smaller than 10 mLs** for infusion into the catheterii. *To prevent excessive pressure being exerted on the lumen which might cause it to rupture. Smaller syringes exert greater pressure.*

- **Use a brisk 'push-pause' flushing technique** routinely when flushing the catheter - i.e. flush briskly, pausing briefly after approximately each mL of fluid. *The 'push-pause' technique causes turbulence within the catheter, which helps to flush away any debris and prevent occlusion of the lumen[ii,xi].*

- **If the catheter possesses a clamp, clamp the line while the final mL of the flush is being injected**. If there is no clamp you can achieve a "positive pressure finish" by removing the syringe from the needle free hub while injecting the last mL, being careful to avoid any spray from the syringe. *Maintaining positive pressure helps prevent blood entering the catheter after flushing, which might lead to occlusion or thrombus formation*ii.

- **Do not routinely withdraw and discard blood from the catheter before flushing** in an attempt to avoid flushing bacteria and clots into the patientxi. *There is no evidence that withdrawing prior to flushing reduces infection or embolism.* **But note that if the catheter is to be used for administering drugs or fluids, checking for "flashback" should be a routine part of catheter assessment**: see ii) Accessing the Catheter (above).

For patients receiving parenteral nutrition (PN), testing for flashback via the PN lumen on a regular basis is not advised as it may increase the infection risk[xii]. But note that a full assessment of any central venous catheter is advised if there are doubts about patency or if malposition is suspected.

(b) Frequency of flushing and flushing solutions:

- For IJ CVCs, Hickman CVCs, PICCs & Midlines flush with 10mL 0.9% Sodium chloride with a positive pressure finish.
- For Ports flush with 10mL 0.9% Sodium chloride and then flush with 5mL 10units/mL heparin solution with a positive pressure finish.
- For dialysis CVCs flush with 10mL 0.9% Sodium chloride and then flush the exact prime volume of the lumen with 1000units/mL heparin solution with a positive pressure finish and label the line.

(iv) Care Of The Exit Site

a) Dressings:

- **Patients aged 16+:** *Tegaderm™ or IV3000* dressing changed every 7 days or sooner if dressing becomes detached or soiled.
- **Patients under 16: IV-dedicated occlusive transparent dressing**, changed every 7 days xi. *Some researchers have found iv-dedicated transparent dressings to be associated with a lower risk of infection than other dressings*[xiii].
- **Patients who cannot tolerate *Tegaderm™*** use IV3000 and vice versa, changed every 7 days.
- **Patients who cannot tolerate a transparent dressing at all:** use a sterile dry dressing changed at least weekly or more frequently if necessary for inspection or adherence xi.
- **No dressing**. This may be suitable for some patients with tunnelled CVCs from 21 days post insertion once the tissues have fibrosed around the cuff and in the absence of exudate or signs of infection. *"No dressing" performed just as well as 3 types of dressing in one study comparing infection rates* vi,[xiv],[xv].

- As a general principle, where a dressing is used it should be **inspected regularly and renewed immediately should it become soiled, wet or detached** viii**.** *A moist environment is one in which bacteria readily multiply*[xvi].
- **If the exit site is reddened, painful, exudating or infected**, take a swab and inform the medical team with a view to antibiotics and / or removal of the device. Increase the frequency of dressing change depending on the amount of exudate. Seek advice from the vascular access team if required.

b) **Dressings Immediately post insertion:**

- Exit sites may bleed immediately post insertion. In this case a gauze pad covered with an iv-dedicated transparent may be used.

c) Cleaning of Exit Site:

Cleaning should be carried out using ANTT.

- **Clean exit site at dressing changes** with a sterile single-use swabstick containing chlorhexidine 2% in alcohol (eg *Chloraprep 3mLs*®) and using a 30-second back and forth friction rub. Allow to dry. (NB *Chloraprep*® can be used for patients aged 2 months and over.)
- **Loose blood, exudate or other debris** which might provide a focus or infection or might impair inspection of the wound may be gently removed with sterile gauze soaked with 0.9% sodium chloride prior to cleaning with Chlorhexidine[xvii].

(v) Removal

Some CVCS are simple and relatively safe to remove. With others, there is high risk of air embolism[xviii] and so removal requires a higher level of training and skill. See Chapters 1 – 5 for guidelines on removal.

Appendix III: Background Information: Complications of CVCs

(i) Pneumothorax

A pneumothorax is the presence of air in the pleural space between the lungs and the chest wall. It can occur during the insertion of a CVC when a needle used to access the subclavian or jugular veins inadvertently punctures the lung. The risk of pneumothorax is considerably reduced when ultrasound guidance is used to access the veins. Since most CVCs are placed with imaging, a chest x-ray to screen for pneumothorax following insertion is no longer routinely carried out. If the catheter has been inserted using an ECG tip location machine or fluoroscopy to screen the tip position, then there will be no need for a post insertion chest x-ray at all. However, if the catheter has been inserted without fluoroscopy or ECG a post-insertion chest x-ray will still be required to check the tip position. The exception is with short term femoral CVCs and Midlines. Here there is no risk of pneumothorax and the tip position is not routinely checked.

A pneumothorax may be clinically silent, or may lead to a life-threatening emergency situation with respiratory distress, reduced oxygen saturation levels, tachycardia or hypotension. A small pneumothorax may resolve spontaneously. In severe cases a chest drain may be necessary.

(ii) Infection

Infection is the most common complication associated with central venous access[xix] and one of the most serious[xx] with estimated mortality rates ranging from 1 – 35%[xxi].

Much effort has been put into reducing CVC infections over the last few years, including the implementation of a "**Central Venous Catheter Care Bundle**" based on the Department of Health Saving Lives campaign and focusing on measures to reduce infection including skin preparation, use of standardised insertion packs, choice of catheters, securement techniques, exit site care, documentation and removal of CVCs as soon as they are no longer needed . For further information contact Infection Control.

Contamination can occur during insertion of the CVC or at a later stage via the hands of healthcare workers, or transferred from the patient's skin or other anatomical sites. Infection may be relatively minor or may be life-threatening.

Bacteria can colonise a CVC either on its exterior or interior surface: ie colonisation is either **extra**luminal or **intra**luminal. **Extra**luminal infections usually begin at the exit site and may remain confined to that area or may track along the catheter into the bloodstream. **Intra**luminal infections are caused by contamination via the hub of the catheter [xxii].

A Microbiology opinion should usually be sought in deciding the best action to take in the event of signs of infection. Exit site infections can often be treated successfully with antibiotics, especially in PICCs, and in tunnelled CVCs (Hickman lines) where the vein and the exit site are separated by the tunnel. In non-tunnelled centrally inserted CVCs, however, treatment is less likely to be successful, as there is less distance between the exit site and the blood stream **Error! Bookmark not defined.**. By the same token, infections in tunnelled CVCs involving the skin tunnel itself above the cuff are notoriously difficult to treat and the same applies in implantable ports where there is infection of the port pocket.

The risk of infection can be reduced by strict adherence to the Central Venous Catheter Bundle and using Aseptic Non-Touch Technique. Intravenous tubing and stopcocks should be changed according Infection Control Guidelines. If Parenteral Nutrition is to be given, the CVC should be used exclusively for this purpose. In cases of very difficult access, one lumen of a multi-lumen CVC should be used exclusively for this purpose. Contact the Nutrition Team for advice.

(iii) Thrombosis

Thrombosis occurs when a clot develops within the vein around the catheter. Unless the clot is at the internal tip of the catheter, it will not usually affect the patency of the catheter. Thrombosis formation is a natural response to vascular injury. Damage to the vessel wall can occur during catheter insertion, or may be due to mechanical or chemical irritation in an incorrectly placed catheter eg where the tip of the catheter is in too small a vein, or rubbing against the vein wall instead of floating parallel to it.

The risk of thrombosis is increased in patients who are pregnant or immobile or who have diabetes or cancer. Surgery, chemotherapy, hormonal agents, haemodialysis and CVC-related infection are all thought to be risk factors [Error! Bookmark not defined.],[xii],[xxiii],[xxiv]. It used to be thought that minidose Warfarin might reduce the risk of thrombosis in patients, but this has recently been disproved ix.

Patients who develop thrombosis are at increased risk of pulmonary embolism and infection [xxiii].

A large proportion of patients with CVCs have thromboses which are never detected[xxv],[xxvi]. When a thrombosis does become symptomatic, it will usually cause swelling of the arm, neck, face or lower limb. There may be associated pain, tingling or numbness, distended neck or peripheral veins[xxvii],[xxviii]. The presence of a thrombosis can usually be confirmed by use of Doppler ultrasound.

Clinically evident thrombosis is more common in patients with PICCs than with tunnelled CVCs or implantable ports, probably because they occupy smaller veins which are more easily occluded.

Unless the catheter is incorrectly positioned, it may be possible to treat a thrombosis using anticoagulants without removing the catheter.

(iv) Air Embolism

An air embolism is a potentially fatal complication. It can happen at any stage if air is allowed to enter the catheter – eg if a catheter is left unclamped when the cap is removed – but is most likely to occur during the insertion or removal of the catheter. The risk is increased if the patient is dehydrated, is unable to lie flat, or has an uncontrolled cough at the time of insertion or removal.

As with pneumothorax, air embolism may be clinically silent or may be accompanied by any or all of the following: anxiety, cyanosis, dyspnoea, tachycardia, hypotension, chest pain, loss of consciousness and death.

(v) Cardiac Arrhythmias

Atrial or ventricular arrhythmias can occur when the tip of the CVC is placed within the heart[xxix],[xxx]. In practice, non-tunnelled and tunnelled CVC tips correctly placed in the right atrium rarely cause arrhythmias. PICCs are probably most likely to cause problems because the PICCs are more floppy and more likely to move within the vein than other CVCs. They can also move further into the heart as the patient moves his / her arm. Arrhythmias caused in this way will usually resolve when the catheter is pulled back by a few centimetres. Any patient experiencing unresolved palpitations or arrhythmias should be assessed by a medical team as soon as possible.

(vi) Cardiac Tamponade

This is a rare complication of CVCs, seen mainly in neonates. Cardiac tamponade arises when fluid (in this case blood) accumulates in the pericardial space around the heart and impairs cardiac function. This is a catastrophic, often fatal event. The patient is likely to exhibit a sudden onset of severe cardiorespiratory symptoms.

Cardiac tamponade can arise in a patient with a CVC if the heart is punctured either during insertion or subsequently by a malpositioned catheter.

(vii) Patency Impairment

Patency is said to be impaired in any of the following situations:

- The catheter is completely blocked and cannot be flushed at all.
- The catheter can be flushed using a syringe but there is sluggish, absent or intermittent free-flow when infusion of fluids is attempted.
- The catheter flushes easily but aspiration of blood is sluggish or absent.

Patency problems should be taken seriously. Ignoring the early signs may lead to the development of more serious problems which cannot then be easily rectified – eg complete blockage or thrombosis xii.

The causes of patency problems include

Clotted blood within the catheter: This can be avoided by good flushing techniques as described in these guidelines. When problems do arise, they can usually be solved relatively easily by use of a thrombolytic such as Urokinase: see Chapter 7 Maintaining Patency.

Fibrin Sheath: Fibrin sheaths are thought to occur in most CVCs left in place for over 7 days[xxxi]. A fibrin sheath is a kind of sleeve made of a fibrous collagen substance which can form around the catheter within the blood stream. It may extend to form a kind of "wind sock" protruding beyond the tip of the catheter, and if this happens it may impair the patency of the catheter: most commonly it will prevent blood from being withdrawn from the catheter because the fibrin sheath is sucked against the tip of the catheter. In severe cases a fibrin sheath may also lead to backtracking of infused fluids between the fibrin sheath and the catheter, causing leakage of those fluids into the tissues[xxxii]. Fibrin sheaths may be diagnosed using fluoroscopy and are associated with an increased risk of infection[xxxiii] as they provide an ideal medium for the proliferation of bacteria. They can sometimes be removed by stripping under imaging or by an infusion of a thrombolytic.

Mechanical obstruction: A mechanical obstruction can occur internally or externally. Internal obstruction may be due the catheter being incorrectly positioned: eg it may be kinked or the tip of the catheter may be resting against a vessel wall rather than floating free within the bloodstream (see Incorrect Position below). This might be due to poor insertion technique, or due to catheter dislodgement. A simple chest x-ray will often reveal an incorrectly positioned catheter. External kinking of the catheter can also cause patency problems: its' worth checking for a bra-strap or an over-tight stitch before looking for a more complicated cause!

Build up of lipids from parenteral nutrition or drug precipitation within the catheter caused by too high a concentration or incompatibility of drugs: If this appears to be a likely cause of occlusion, a 4mL solution of 70% ethanol should be inserted gently into the lumen and locked in place for one hour to unblock the catheter. If it is not known whether occlusion is caused by lipid or clots, it is recommended that urokinase be tried first [LI].

If occlusion is caused by lipids, the urokinase can completely block the line; however, this can be reversed by an ethanol lock.

If a precipitation of medication or minerals is suspected, the pharmacy department's advice should be sought to ensure the correct solution is used to unblock the line. Hydrochloric acid decreases the pH content, while sodium bicarbonate increases it. Both can effectively clear blockages caused by certain antibiotics and heparin.

Hydrochloric acid has also been used successfully to dissolve insoluble calcium phosphate precipitate. When it is not known which way to alter the pH balance, both methods can be attempted before resorting to removing the catheter [LI].
As the volume of an occluded catheter is not known, extreme force must not be used.

(viii) Incorrect Position

A CVC should be considered to be in an incorrect position when any of the following apply:

- The tip is not in the right atrium, the superior or the inferior vena cava.
- The tip of the catheter is not floating freely parallel to the vein wall.
- The catheter is kinked within the body or pinched between internal structures

Incorrect position may be the result of poor insertion technique or may occur spontaneously in a previously well-positioned catheter. It is not unknown for a CVC to "migrate" within the venous system for no apparent reason. Hadaway reports that "Changes in intrathoracic pressure, coughing, sneezing, Valsalva manoeuvre such as during heavy lifting, vigorous extremity use, forceful flushing, or congestive heart failure could lead to migration of the tip" xii. In addition the catheter may become dislodged if it is not correctly secured in place, or is accidentally pulled.

If a CVC is incorrectly positioned there is a high risk of thrombosis and patency impairment[xxxiv]. If it is kinked internally there is also the risk that the catheter may split, leading to extravasation of drugs / fluids and in serious cases, embolisation of the catheter itself.

You should suspect incorrect position if there are patency problems despite the use of a thrombolytic, if the patient complains of pain on flushing, if the external length of the catheter increases, if the patient develops a thrombosis, or if the cuff of a tunnelled CVC protrudes from the exit site[xxxv].

A malpositioned, kinked or pinched catheter should be repositioned, replaced or removed as soon as practicable (except PICCs in certain situations discussed below). Leaving it in place for any length of time represents a high risk of thrombosis and/or catheter fracture / embolism.

Immediately following insertion, PICCs are sometimes found on X-ray to have fed up into the jugular vein, across into the opposite subclavian, or back down an arm vein. In these cases it may be worth leaving the PICC in overnight or flushing briskly with 20mL 0.9% sodium chloride and then repeating the X-ray as the PICC will often move into the Superior Vena Cava[xxxvi],[xxxvii]. Discuss with the person inserting the PICC and patient's medical team.

(ix) Extravasation of Fluids / Drugs due to Incorrect Needle Position or Needle Dislodgement (in Implantable Ports)

The non-coring needle should be correctly placed into the port (see Appendix I (iv) d) Diagram 6). If the needle is not inserted far enough into the port or if the needle misses the port altogether this may lead to fluids / drugs being infused into the subcutaneous tissues.

The needle may become dislodged if it is inadequately secured with dressing tape, if there is tension on the extension tubing or if the needle used is of insufficient length, causing the patient's normal movements to loosen the needle. The problem will usually be noticed when there is discomfort and/or oedema at the entry site combined with lack of free-flow of fluids.

If extravasation has occurred or is suspected, the needle should be removed and a fresh needle used to access the port correctly. If vesicant or irritant solutions (eg chemotherapy) are extravasated, seek medical / pharmacy advice and refer to the Extravasation of Cytotoxic Drugs Policy.

(x) Catheter Fracture

This may occur **externally** or **internally** and may result from over-forceful flushing, trauma to the catheter or incorrect position (eg kinking leading to wear-and-tear).

An **externa**l fracture will result in leakage of blood or fluids from the catheter. Sometimes there is an obvious fracture. The line must be clamped or folded over on itself immediately to prevent air embolism. Sometimes the catheter can be repaired or replaced over a guidewire but the advisability of this will depend on the patient's clinical status. In addition, unless the correct equipment and expertise are available for a repair to be carried out, the catheter should be removed immediately, as there is a high risk of infection and air embolism.

Internal fracture will usually result in patency impairment and / or pain, redness and swelling when the catheter is flushed.. There is a risk that the catheter itself will embolise. If this occurs there may be no symptoms at all or there may be signs of pulmonary embolism. ie acute onset of any or all of the following - anxiety, pallor, cyanosis, shortness of breath, rapid weak pulse, hypotension, chest pain, loss of consciousness.

(xi) Separation of port and catheter (in Implantable Ports)

This is rare[xxxviii] but should always be considered when problems arise with patency of the port or there is Extravasation with associated discomfort and oedema despite proper position of needle.

As with catheter fracture (see (x) above) there is a risk that the catheter may embolise. Surgical removal or repair of the port and catheter is essential if separation is confirmed.

Appendix IV: Community PMAR Discharge Document

Linked to Forms Library
Central Venous Catheter (CVC) – Community PMAR Discharge Document

http://nww.sdhct.nhs.uk/contact/forms/Clinical%20Documents/Central%20Venous%20Catheter%20-%20Community%20PMAR%20Discharge%20Document.pdf

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Does this document have financial implications? *If yes please state:*	☒	☐
Cost saving as reduced drug use.		
Is this document a direct replacement for another? *If yes please state which documents are being replaced:*	☒	☐
Update of 0209		

Document Amendment History

Issue	Date	Status	Authorised
1	May 1997	New	Director of Nursing & Quality Medical Director
2	September 1998	Revised	Director of Nursing & Quality Medical Director
3	December 2000	Revised	Director of Nursing & Quality Medical Director
3	January 2002	Date change	Director of Nursing & Quality Medical Director
4	January 2002	Revised	Director of Nursing & Quality Medical Director
4	10 June 2004	Date change	Director of Nursing & Quality Medical Director

5	14 September 2006	Revised	Director of Nursing & Quality Medical Director Medicines Governance Group
6	23 April 2009	Revised	Director of Nursing and Governance Medical Director Clinical Director of Pharmacy
7	12 November 2010	Revised	Director of Nursing and Governance Medical Director Clinical Director of Pharmacy
7	23 November 2012	Date change	Ricky Grant Day Unit Manager
8	1 May 2015	Revised	Director of Nursing, Professional Practice and People's Experience Medical Director Clinical Director of Pharmacy Care and Clinical Policies Committee
9	28 April 2017	Revised	Care and Clinical Policies Group Clinical Director of Pharmacy Chief Nurse Medical Director
9	26 January 2018	Review Date Extended – 2 Years to 3 Years	

The Mental Capacity Act 2005

The Mental Capacity Act provides a statutory framework for people who lack capacity to make decisions for themselves, or who have capacity and want to make preparations for a time when they lack capacity in the future. It sets out who can take decisions, in which situations, and how they should go about this. It covers a wide range of decision making from health and welfare decisions to finance and property decisions

Enshrined in the Mental Capacity Act is the principle that people must be assumed to have capacity unless it is established that they do not. This is an important aspect of law that all health and social care practitioners must implement when proposing to undertake any act in connection with care and treatment that requires consent. In circumstances where there is an element of doubt about a person's ability to make a decision due to 'an impairment of or disturbance in the functioning of the mind or brain' the practitioner must implement the Mental Capacity Act.

The legal framework provided by the Mental Capacity Act 2005 is supported by a Code of Practice, which provides guidance and information about how the Act works in practice. The Code of Practice has statutory force which means that health and social care practitioners have a legal duty to have regard to it when working with or caring for adults who may lack capacity to make decisions for themselves.

"The Act is intended to assist and support people who may lack capacity and to discourage anyone who is involved in caring for someone who lacks capacity from being overly restrictive or controlling. It aims to balance an individual's right to make decisions for themselves with their right to be protected from harm if they lack the capacity to make decisions to protect themselves". (3)

All Trust workers can access the Code of Practice, Mental Capacity Act 2005 Policy, Mental Capacity Act 2005 Practice Guidance, information booklets and all assessment, checklists and Independent Mental Capacity Advocate referral forms on iCare

http://icare/Operations/mental_capacity_act/Pages/default.aspx

Infection Control

All staff will have access to Infection Control Policies and comply with the standards within them in the work place. All staff will attend Infection Control Training annually as part of their mandatory training programme.

Quality Impact Assessment (QIA)

	Please select			
Who may be affected by this document?	Patient / Service Users	☒	Visitors / Relatives	☒
	General Public	☐	Voluntary / Community Groups	☐
	Trade Unions	☐	GPs	☐
	NHS Organisations	☐	Police	☐
	Councils	☐	Carers	☒
	Staff	☒	Other Statutory Agencies	☐
	Others *(please state):*			

Does this document require a service redesign, or substantial amendments to an existing process?	☐
If you answer yes to this question, please complete a full Quality Impact Assessment.	

Are there concerns that the document could adversely impact on people and aspects of the Trust under one of the nine strands of diversity?	Age	☐	Disability	☐
	Gender re-assignment	☐	Marriage and Civil Partnership	☐
	Pregnancy and maternity	☐	Race, including nationality and ethnicity	☐
	Religion or Belief	☐	Sex	☐
	Sexual orientation	☐		
If you answer yes to any of these strands, please complete a full Quality Impact Assessment.				
If applicable, what action has been taken to mitigate any concerns?				

Who have you consulted with in the creation of this document? *Note - It may not be sufficient to just speak to other health & social care professionals.*	Patients / Service Users	☐	Visitors / Relatives	☐
	General Public	☐	Voluntary / Community Groups	☐
	Trade Unions	☐	GPs	☐
	NHS Organisations	☐	Police	☐
	Councils	☐	Carers	☐
	Staff	☐	Other Statutory Agencies	☐
	Details *(please state):*			

Rapid Equality Impact Assessment *(for use when writing policies and procedures)*

Policy Title (and number)	CVC 0209	Version and Date	V9 November 2016
Policy Author	Advanced Nurse Practitioner		

An equality impact assessment (EIA) is a process designed to ensure that a policy, project or scheme does not discriminate or disadvantage people. EIAs also improve and promote equality. Consider the nature and extent of the impact, not the number of people affected.

EQUALITY ANALYSIS: How well do people from protected groups fare in relation to the general population?
PLEASE NOTE: Any 'Yes' answers may trigger a full EIA and must be referred to the equality leads below

Is it likely that the policy/procedure could treat people from protected groups less favorably than the general population? (see below)

Age	Yes ☐ No☒	Disability	Yes ☐ No☒	Sexual Orientation	Yes ☐ No☒
Race	Yes ☐ No☒	Gender	Yes ☐ No☒	Religion/Belief (non)	Yes ☐ No☒
Gender Reassignment	Yes ☐ No☒	Pregnancy/ Maternity	Yes ☐ No☒	Marriage/ Civil Partnership	Yes ☐ No☒

Is it likely that the policy/procedure could affect particular 'Inclusion Health' groups less favorably than the general population? (substance misuse; teenage mums; carers[1]; travellers[2]; homeless[3]; convictions; social isolation[4]; refugees)	Yes ☐ No☒

Please provide details for each protected group where you have indicated 'Yes'.

VISION AND VALUES: Policies must aim to remove unintentional barriers and promote inclusion

Is inclusive language[5] used throughout?	Yes ☒ No☐
Are the services outlined in the policy/procedure fully accessible[6]?	Yes ☒ No☐
Does the policy/procedure encourage individualised and person-centered care?	Yes ☒ No☐
Could there be an adverse impact on an individual's independence or autonomy[7]?	Yes ☐ No☒

If 'Yes', how will you mitigate this risk to ensure fair and equal access?

EXTERNAL FACTORS

Is the policy/procedure a result of national legislation which cannot be modified in any way?	Yes ☐ No☒

What is the reason for writing this policy? (Is it a result in a change of legislation/ national research?)

New national evidence

Who was consulted when drafting this policy/procedure? What were the recommendations/suggestions?

New Urokinase procedure from updated SPC – collaborative work between synermed, Lisa Doughty vascular access nurse consultant at the royal marsden and Lee Merry vascular access ANP at torbay hospital. Removal of Hepsal from IJ CVC, Hickmans, PICC & Midlines – national guidance and approval from oncology consultant pharmacist.

ACTION PLAN: Please list all actions identified to address any impacts

Action	Person responsible	Completion date

AUTHORISATION:
By signing below, I confirm that the named person responsible above is aware of the actions assigned to them

Name of person completing the form	Advanced Nurse Practitioner	**Signature**	
Validated by (line manager)	Chief Nurse	**Signature**	

Clinical and Non-Clinical Policies – New Data Protection Regulation (NDPR)

Torbay and South Devon NHS Foundation Trust (TSDFT) has a commitment to ensure that all policies and procedures developed act in accordance with all relevant data protection regulations and guidance. This policy has been designed with the EU New Data Protection Regulation (NDPR) in mind and therefore provides the reader with assurance of effective information governance practice.

NDPR intends to strengthen and unify data protection for all persons; consequently, the rights of individuals have changed. It is assured that these rights have been considered throughout the development of this policy.

Furthermore, NDPR requires that the Trust is open and transparent with its personal identifiable processing activities and this has a considerable effect on the way TSDFT holds, uses, and shares personal identifiable data. The most effective way of being open is through data mapping. Data mapping for NDPR was initially undertaken in November 2017 and must be completed on a triannual (every 3 years) basis to maintain compliance. This policy supports the data mapping requirement of the NDPR.

For more information:

- Contact the Data Access and Disclosure Office on dataprotection.tsdft@nhs.net,
- See TSDFT's Data Protection & Access Policy,
- Visit our GDPR page on ICON.