**Canberra Hospital and Health Services**

**Operational/Clinical Procedure**

**Central Venous Access Device (CVAD) Management – Children, Adolescents and Adults (NOT Neonates)**

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| Purpose |

The purpose of this Clinical Procedure - Central Venous Access Device (CVAD) Management is to outline the safe and effective management of a Central Venous Access Device (CVAD) in people being cared for under the direction of ACT Health.

*CVAD Management* provides information for the use of a CVAD in clinical settings, where patients require a CVAD to be used for intravenous medications, nutrition, fluids, blood sampling, and/or invasive haemodynamic monitoring.

General Principles of care to prevent complications in the management of CVADs include:

* Adhere to strict asepsis when inserting/accessing and maintaining lines
* Insertion performed under sterile aseptic technique by qualified personnel under optimal conditions with maximal barrier precautions and thorough skin preparation of insertion site
* Selection of best site and device to minimise infections and mechanical complications
* Daily site inspections for signs of infection/thrombus/catheter migration
* Cover site with sterile semipermable transparent dressings, replaced every 7 days and/or when wet/soiled/dislodged.
* Patient education and ownership of care and management of their CVAD
* Prompt removal of lines when indicated or no longer needed

(Reference: Centres for Disease Control Toolkit (2011) Checklist for prevention of Central line associated blood stream infections)

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| Alerts |

* Correct placement of a CVAD tip is determined via fluoroscopy, ECG Tip Confirmation or Chest X-Ray.
* Patients presenting from another Hospital should have a CXR attended to determine the current tip location.
* Apheresis and Haemodialysis lines are ONLY accessed by accredited, specialist staff in those areas according to their area-specific guidelines. Dressings may be attended adhering to the same principles of Section 7-*Change of Dressing and Needleless Injection Cap of a CVAD*
* Under no circumstances, are nurses of any experience, in any division, permitted to insert external jugular access cannulas.

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| Scope |

The Clinical Procedure *– CVAD Management* pertains to all medical and nursing clinicians who are credentialed as being competent to manage CVAD’s and who assess patients, select, insert, manage access and remove CVADs.

The ACT Health Central Venous Access Device Insertion eLearning and competency package is available on Capabiliti (<https://training.health.act.gov.au/ClientView/>) and all staff must successfully complete this package to manage those patients with CVADs.

New nursing or medical staff, or students (if within their defined scope of practice) will be required to perform these skills under the direct supervision of a credentialed and competent practitioner.

*CVAD management* also describes effective prescription and use of a gait aid when required by a physiotherapist or physiotherapy student under the supervision of a physiotherapist.

For the purpose of this Clinical Procedure the term CVAD refers to any line that terminates in the lower third of the Superior Vena Cava (SVC) close to or at the junction of the SVC and Right Atrium – known as the cavoatrial junction and includes:

* **CVC (tunnelled and non tunnelled) -** Central Venous Catheter is placed into a large vein in the neck (internal jugular vein), chest (subclavian vein) or groin (femoral vein) but excluding CVC lines used solely for Apheresis/haemodialysis. A Hickman line is a tunnelled CVC
* **PICC** – Peripherally Inserted Central catheter – usually inserted in the upper arm above the cubital fossa
* **Implanted Venous Port** – a tunnelled catheter that is implanted entirely under the skin. Access is made using a non-coring needle device (Gripper™) to enable the infusion of intravenous fluids and blood collection
* All patients with a CVAD in situ require education on the care and use of the device in the hospital and when returning home. Patients returning home with a PICC, tunnelled CVC or Implanted Venous Port also require education to prevent and recognise potential complications, and what action is required in response.  While a patient of the ACT Health Directorate, contact details of the unit caring for the patient must be provided in case of emergencies related to their CVAD.
* Patients with a PICC line must receive the CHHS “*PICC Patient Information Pamphlet*”
* **To determine if a CVAD is required refer to Attachment 1 and 2: Vascular Access Device decision tree**

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| Section 1 – Aseptic Non Touch Technique |

Refer toCanberra Hospital and Health Services Standard Operating Procedure: Aseptic Non Touch Technique

ANTT guidelines help standardise practice, technique and equipment levels. ANTT can be separated into two types:

**Standard ANTT** — Clinical procedures managed with Standard ANTT will characteristically be technically simple, short in duration (approximately less than 20 minutes), and involve relatively few and small key sites and key parts (such as accessing IV devices small wound dressings). Standard ANTT requires a main general aseptic field and non-sterile gloves. The use of aseptic fields and a non-touch technique is essential to protect key parts and key sites. Standard ANTT can be performed by experienced staff without touching key areas. If staff do not feel confident to complete the procedure without touching key sites or parts then sterile gloves should be used.

**Used for:**

* Change of line
* Flushing of CVAD
* Blood aspiration excluding blood cultures
* De-access of Implanted Venous Port
* Calibration
* Using Sterile gloves:
* Blood culture collection
* Needleless injection cap change
* Access of Implanted Venous Port
* Management of occluded CVAD
* Removal of short term CVC
* CVAD dressing change

**Surgical ANTT** — Surgical ANTT is demanded when procedures are technically complex, involve extended periods of time, large open key sites or large or numerous key parts. To counter these risks, a main critical aseptic field and sterile gloves are required and often full barrier precautions.

**Used for:**

* Insertion of a CVAD
* Removal of long term CVAD

Hand hygiene is an essential component of ANTT. In standard ANTT, hand hygiene or a procedural wash should be performed for one (1) minute if using antimicrobial hand wash and water or in the case of the surgical ANTT then the first scrub is five (5) minutes thereafter a three (3) minute scrub is required as per the ACORN Standard.

* Environmental considerations are necessary – set up must occur immediately prior to insertion and ensure sterile area is positioned away from walk ways, curtain drapes, after cleaning, and any other consideration that may increase the likelihood of contamination. Adhere to manual handling principles for on bed tasks. Assistants are expected to assist in a manner that maintains the sterility of equipment.

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| Section 2 – Insertion of Central Venous Catheter |

**Background – Insertion of Central Venous Catheter**

Central Venous Catheters (CVCs) are to be inserted by an appropriately trained medical officer with mandatory ECG monitoring throughout the procedure. Insertion usually occurs in the Operating Rooms, the Emergency Department, The Intensive Care Unit or Medical Imaging. Refer to Attachment 1 for the selection of the appropriate central venous catheter required.

**Note:**

Insertion of a CVAD is a Surgical Aseptic Non Touch Technique using a full body sterile drape

Advantages of a central venous access device (CVAD) include:

* Administer medications or nutritional solutions that are highly irritating to peripheral veins
* Reduce the need for frequent peripheral venous access in patients who require long-term intravenous therapy
* Obtain intravenous access in patients with poor peripheral vein access
* Obtain central venous pressure measurement

When a multi lumen CVC line is used:

* All lines must be appropriately labelled
* Needleless injection caps are used for each lumen and the connections should be left visible and accessible

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

[](http://www.google.com.au/imgres?imgurl=http://cdn2.bigcommerce.com/server5800/664b7/products/226735/images/156899/4EE91F39D33E12A0E1008000D400106F4EE91F3BD33E12A0E1008000D400106F__77573.1343682018.220.220.jpg&imgrefurl=http://careforde.com/b-braun-caresite-extension-sets-415122-caresite-luer-access-device-200-cs/&usg=__m3N1ijWBfROjDgIPFs2xgZ3-9EM=&h=178&w=178&sz=4&hl=en&start=3&zoom=1&tbnid=OyBHSxCUUOI9HM:&tbnh=101&tbnw=101&ei=L3eVUY6eMsW1iQfGyICIAw&prev=/images?q=caresite+luer+access+device&sa=X&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDAQrQMwAg)

**Caresite™ Luer Lock Access device**

**(Positive Pressure**)

Following insertion of the CVC the following information is documented by the medical officer on the **Canberra Hospital CVAD sticker** and placed in the patient’s clinical record, documentation includes:

* Time and date of insertion
* Site of insertion and vessel accessed
* Type and gauge of the catheter
* Catheter brand, reference and lot number
* Distance inserted
* Identification of the individual who inserted the catheter
* Radiographic confirmation and catheter tip position documented

**Note:**

For patients in Intensive Care Unit (ICU) electronic confirmation and documentation of CVC insertion is required. The Medical officer inserting the device is also required to complete a Central Venous Catheter Insertion Checklist, as prompted

**Insertion of Central Venous Catheter**

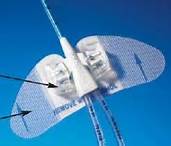
**Equipment**

* Personal protective equipment (PPE) including safety glasses, shield or goggles theatre cap and mask for proceduralist and assistants
* CVC Procedure pack Sterile gown and sterile gloves x 2 pairs + for assistants
* ChloraPrep™ applicator 3mL
* Local anaesthetic ampoules (as clinically indicated)
* Sodium chloride 0.9% 10mL for injection X 4
* Central venous catheter pack
* ECG Tip Confirmation System and components if available
* Needleless injection caps (one for each lumen) as appropriate
* Suture material
* Sutureless Securement device
* Semi-permeable transparent occlusive dressing
* Chlorhexidine-impregnated sponge (Biopatch™)
* Note:
* Not for use in Paediatrics or Haemodialysis.
* Mupirocin ointment will be applied to the CVC insertion site of Haemodialysis patients
* Ultrasound equipment with sterile sleeve
* Underpad
* If CVC monitoring indicated, see Section 4: Set up and calibration of Pressure Transducer

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**Biopatch ™ Chlorhexidine impregnated sponge** (Blue facing up, white sponge skin side down)

**Sutureless Securement Devices**

[](http://www.google.com.au/imgres?imgurl=https://www.indemed.com/_cache/1/15492f1213c36366f2dd580649dc207c.jpg&imgrefurl=https://www.indemed.com/Products/ProductDetails.cfm?PSKU=VEVUPD1214&quantity=&gotocart=0&wes=&usg=__DV_rpD_IMdsNSvvws9sK0-wR4vQ=&h=300&w=300&sz=25&hl=en&start=7&zoom=1&tbnid=4hTipFvV57292M:&tbnh=116&tbnw=116&ei=E4qVUezGM4yUiQeQ24HoBw&prev=/images?q=statlock+universal&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDgQrQMwBg)  ****

**Statlock™ for Hickman line Statlock™ for PICC Grip-Lok™ for CVAD’s**

**Note:**

Never use a syringe smaller than 10mL to access a CVAD, as smaller syringes increase the intra-luminal pressure and risk rupturing or damaging the catheter.

**Procedure**

* Environmental considerations are necessary – set up must occur immediately prior to insertion and ensure sterile area is positioned away from walk ways, curtain drapes, after cleaning, and any other consideration that may increase the likelihood of contamination. Adhere to manual handling principles for on bed tasks.
* Assistants are expected to assist in a manner that maintains the sterility of equipment.
* Patient must be prepped by having a Triclosan pre-procedural body wash.
* Explain procedure to patient. Obtain written consent, if appropriate, as per *Consent to Treatment Policy.*
* Wash hands or apply Alcohol Based Hand Rub (ABHR).
* Conduct positive patient identification procedure as per Patient Identification - Correct Patient, Correct Site, Correct Procedure SOP.
* Connect patient to ECG monitoring.
* Record/confirm pre-procedure vital signs.
* Ensure privacy.
* Wash hands or apply ABHR.
* Clip unnecessary hair from the proposed site if required.
* Wash hands or apply ABHR.
* Position the patient according to the access site:
* Jugular/Subclavian Vein - Supine. Lower the head of the bed 30 degrees unless contraindicated. Place a rolled towel vertically between the patient’s shoulder blades and down the spine if required for easier access, if not contraindicated. If the jugular or subclavian vein is the proposed site, ask the patient to turn his/her head away from the insertion site, if not contraindicated. Ultrasound is used for jugular cannulation.
* Femoral Vein - Supine. Ultrasound is used for cannulation.
* Wash hands or apply ABHR.
* Attach ECG Tip confirmation system if available
* Don safety glasses, shield or goggles, theatre cap and mask.
* Perform surgical scrub as per SURGICAL ANTT, don sterile gown and gloves.
* Prepare equipment- including flushing of all lumens of CVC, clamp all lumens except the distal lumen to prevent air embolism.
* Prepare Ultrasound.
* Reassure the patient and ensure patient comfort during the procedure.
* Site is prepared with Chlorhexidine 2% in alcohol (ChloraPrep™)prior to sterile draping.
* The assisting nurse assists the medical officer/ clinician (as required) as CVC is inserted.
* CVC may be secured by suturing the hub and catheter clamps to the skin, or using a sutureless securement device.
* Ensure Chlorhexidine-impregnated sponge (Biopatch™) is applied around line at insertion site.
* Ensure that occlusive dressing is secure.
* Observe closely for signs of complications (e.g. pneumothorax, cardiac arrhythmia, respiratory distress, tachycardia or restlessness) during and after the procedure.
* Ensure that needleless injection caps are in place and secure.
* Remove gloves and wash hands or use ABHR.
* Reposition the bed horizontally and make the patient comfortable on completion of the procedure.
* Label occlusive dressing with date and time.
* Wash hands or use ABHR.
* Record/confirm post procedure vital signs (pulse, respiration and blood pressure)
* **Catheter tip position must be verified via ECG Tip confirmation or chest X-Ray before use** (not applicable for femoral vascaths). Tip position and recommendations for use or catheter adjustments are documented in the patient record.
* If required, CVP readings may be done after the position of the catheter is verified by x-ray. See *Calibration of Pressure Transducer* (page 14)for set up and calibration of pressure transducer.
* Perform Hand Hygiene and don clean gloves - STANDARD ANTT.
* Swab needleless injection cap with Chlorhexidine & Alcohol swab vigorously for 10 seconds, **allow to dry for 30 seconds.**
* Flush all lumens with Sodium Chloride 0.9% to achieve positive pressure, using correct procedure for the type of needleless injection cap used
* Remove gloves and perform hand hygiene.
* Complete CVAD Sticker or as prompted on electronic system in ICU, and document in clinical record.

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

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**(Positive Pressure**)

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| Section 3 – Insertion of Peripherally Inserted Central Catheter (PICC) |

A PICC is inserted by a credentialed registered nurse or medical officer and an assistant/s to:

* Administer medications or parenteral nutrition solutions that are highly irritating to peripheral veins
* Reduce the need for frequent peripheral venous access in patients who require long-term intravenous therapy
* Obtain intravenous access in patients with collapsed and /or poor peripheral vein access

Note:

* To request a PICC line in Adolescents 12 years and over and Adults, contact the Intravenous Access Team (Monday to Friday) and complete the *Intravenous Access Team Referral and Booking* form which can be found on the [Clinical Forms Register](http://inhealth/acthmr/default.aspx). IVAT will then assess the patient and book a time for insertion
* For urgent PICC insertions out of hours contact Anaesthetics
* Oncology/Haematology patients are referred to Medical Oncology outpatient department

**Note:**

Insertion of a PICC is a SURGICAL Aseptic Non Touch Technique using a full body sterile drape

**Equipment**

* Personal protective equipment (PPE) including safety glasses, shield or goggles, theatre cap and mask.
* Sterile gown and gloves (indicator and outer gloves)
* PICC procedure pack
* ChloraPrep™ 3mL applicator x 2 \* If Chlorhexidine is contra-indicated, use 5% povidone iodine in alcohol.
* Lignocaine 1% 50mg/5mL or 2% 100mg/5mL Sodium chloride 0.9% 10mL for injection ampoules
* 5mL heparinised Saline (50 units/5mL) may be used in each lumen when inserted in the Operating Room or in Medical Imaging. Heparinised saline 50u/5mL only instilled elsewhere after confirmation of position and if patient is being discharged

**Note:**

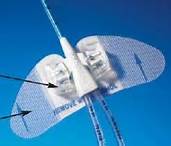
The use of heparinised saline flushes may be contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy – check with Medical Officer before use.

* PICC set of appropriate size and lumens , including corresponding ‘modified seldinger insertion set’ and size 11 disposable blade (if not contained with PICC set)
* Needleless injection caps for each lumen, preferably positive pressure Caresite Luer Access Device™
* PICC securement device to secure line(usually included in PICC)
* Semi-permeable transparent occlusive dressing
* Chlorhexidine-impregnated sponge (Biopatch™) - Not for use in Paediatrics or Haemodialysis
* Ultrasound Machine with sterile sleeve(contained in PICC pack)
* ECG Tip Confirmation System and components if available
* Underpad
* Tourniquet

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**(Positive Pressure**)

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**Biopatch ™ Chlorhexidine impregnated sponge Statlock™ for PICC**

(Blue facing up, white sponge skin side down) **Statlock ™ Securement Devices**

**Procedure**

1. Explain procedure, purpose and potential complications of PICCs, and provide CHHS “*PICC Patient Information Pamphlet*”(available on ACTH Policy portal under Consumer Handouts [Link](http://inhealth/PPR/Policy%20and%20Plans%20Register/Peripherally%20Inserted%20Central%20Catheter%20PICC.pdf%20) )Obtain informed and written consent, as per *Consent to Treatment Policy.* Ensure privacy.
2. Patient must be prepped by having a Triclosan pre-procedural body wash.
3. Wash hands or apply ABHR.
4. Conduct positive patient identification procedure as per Patient Identification and Procedure Matching Clinical Policy.
5. Perform ultrasound scanning of both upper arm vessels to determine the best vein and site for insertion. Ideally the insertion site is located 5cms or greater above the cubital fossa to minimise complications and improve patient comfort.
6. Record/confirm pre-procedure vital signs and baseline measurements of wrist/upper arm and measure approximate insertion length of PICC.
7. Wash hands or apply ABHR.
8. Clip unnecessary hair from the proposed site, if required.
9. If available attach monitoring system of ECG TCS as per manufacturer – observe ECG trace for consistent presence of P waves.
10. Connect patient to pulse oximetry monitor.
11. Wash hands or apply ABHR.
12. Prepare equipment.
13. Wash hands or apply ABHR.
14. Position the patient according to the access site: **Basilic, Cephalic, Brachial Vein:** Supine, with the **arm supported.**
15. Observe closely for signs of complications (e.g., cardiac arrhythmia, respiratory distress, tachycardia or restlessness) during and after the procedure.
16. Reassure the patient and ensure patient comfort during the procedure.
17. Don safety glasses, shield or goggles, theatre cap and mask. Perform surgical scrub, don sterile gown & gloves, if performing the procedure.
18. Insertion of PICC.
19. Ensure that needleless injection caps and the chlorhexidine impregnated sponge (Biopatch™) are in place and secure.
20. Secure line with sutureless securement device.
21. Apply occlusive dressing cover PICC line to the hub, label date and time on dressing
22. Remove gloves perform hand hygiene.
23. Ensure patient comfort on completion of the procedure.
24. Record post procedure vital signs (pulse, respiration and blood pressure).
25. **If an ECG TCS is not used Catheter position must be verified by chest X-Ray before use.** Tip position to be documented in patient notes by the medical officer reading the chest x-ray.
26. Flush all lumens with Sodium Chloride 0.9% to achieve positive pressure, using correct procedure for the type of needleless injection cap used.

**Note:**

If the patient is known to be using or requires a gait aid with a PICC line please ensure referral to the treating physiotherapist to fit and provide the most appropriate aid.

If crutches are required the provision of axillary crutches will be the standard practice.

**Verification of PICC tip placement via magnetic tracking with electrocardiograph (ECG) and Tip confirmation Systems (TCS)**

PICC tip location can be determined by a verified tip confirmation system (TCS) and ECG changes to the P wave without the requirement of confirmatory chest X-ray.

Only competent-verified clinicians may release lines for use via a TCS. Competence is achieved by successful completion of:

1. A theoretical educational program addressing:

* Normal and abnormal PICC placement by ECG guidance and/or chest radiograph,
* Contraindications to use of ECG.

1. Clinical supervision during PICC insertion procedures using the TCS until independent clinical competence is demonstrated and recorded through the Intravenous Access Team PICC insertion credentialing package as endorsed by Standard 3 Healthcare Associated Infections Group. Or an appropriate formal assessment process undertaken by a TCS accredited and experienced clinician.

In order for TCS tip placement to confirm PICC tip position in lieu of CXR, during insertion the inserter must identify:

1. A present and consistent ‘P’ wave on the external ECG read out
2. A consistent elevation of the ‘P’ wave on the internal ECG read out as the catheter is advanced internally, followed by:
3. A consistent ‘P’ wave deflection/biphasic image proving placement into the right atrium (RA), followed by:
4. A return to consistent peak ‘P’ wave amplitude with no evidence of deflection after the catheter has been withdrawn back from the RA, thus indicating the tip is at the Cavoatrial junction in the optimal position for use.

If any of criteria 1-4 are not met, or the inserter is not 100% confident of correct tip placement, a CXR is required to verify position of the PICC catheter. If there is an acute bend at the tip of the central line on the frontal CXR, then a lateral view initially or a linogram with contrast would be useful to exclude that the tip is not in the azygous vein. The treating MO is responsible for ordering (at the request of the inserter) and checking the CXR to confirm correct tip placement or advising adjustment of the line as appropriate.

* Where CXR has been undertaken to determine tip placement and uncertainty still remains: at the discretion of the treating consultant, a small injection of contrast may be administered under fluoroscopy in the radiology department to identify exact tip location.

Documentation:

* Following TCS tip placement, demonstration of the visualised maximum P-wave amplitude and P-wave deflection must be printed and placed in the patient progress notes along with documentation of the PICC insertion procedure.
* Credentialed inserters including Registered Nurses may document the tip location and release the line for use.



* Document procedure in clinical record and complete CVAD Sticker, or as prompted on electronic system in ICU.

Note:

* Record external measurement of PICC line in centimetres on the CVAD sticker and in the Patient Care and Accountability form.
* Educate patient and significant others on care of PICC line in hospital and at home. Provide written instructions with *PICC patient information pamphlet* and completed PICC manufacturers patient information with baseline measurements for future reference.
* Where gauze is applied to insertion site, dressing must be attended 24 hours post insertion, followed by weekly dressings.

Note:

* The Bard Power PICC and Power PICC SOLO catheter (purple in colour) and the Groshong PICC are able to be trimmed in length prior to insertion. The Power PICC Solo and Groshong PICC do not need a clamp as they have a neutral pressure valve in the hub (Solo) or the distal end (Groshong). Only flush with sodium chloride 0.9%. No clamping is required for needleless injection cap change.
* The Arrow Pressure Injectable and Bard Power PICC’s (also purple)come with a clamp, can be clamped and may be flushed with heparinised saline.

The instruction for no heparin flush/lock and saline flushes should be written on the Medical Officers orders form for CVAD management and placed in the clinical file.

**Alert:**

NEVER use a syringe smaller than 10mL to access a CVAD, as smaller syringes increase the intra-luminal pressure and risk rupturing or damaging the catheter.

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

[](http://www.google.com.au/imgres?imgurl=http://cdn2.bigcommerce.com/server5800/664b7/products/226735/images/156899/4EE91F39D33E12A0E1008000D400106F4EE91F3BD33E12A0E1008000D400106F__77573.1343682018.220.220.jpg&imgrefurl=http://careforde.com/b-braun-caresite-extension-sets-415122-caresite-luer-access-device-200-cs/&usg=__m3N1ijWBfROjDgIPFs2xgZ3-9EM=&h=178&w=178&sz=4&hl=en&start=3&zoom=1&tbnid=OyBHSxCUUOI9HM:&tbnh=101&tbnw=101&ei=L3eVUY6eMsW1iQfGyICIAw&prev=/images?q=caresite+luer+access+device&sa=X&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDAQrQMwAg)

**Caresite™ Luer Lock Access device (Positive Pressure**)

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| Section 4 – Set up and Calibration of Pressure Transducer |

**Purpose**

Central venous pressure transducers are utilised in the critical care environment and occasionally in the emergency department and in operating theatres/PACU for the purpose of obtaining accurate central venous pressures through Central Venous Catheters (CVC). The purpose of this Section is to outline the process for setting up and zeroing a pressure transducer to account for atmospheric pressure. (See Attachment 2 and 3)

**Equipment:**

* Pressure module
* Cable
* Pressure “bag”

**Procedure**

The process of zeroing should be undertaken at the beginning of each shift, or where practicable in the Emergency Department and the findings confirmed on MetaVision and documented in the patient’s clinical record.

**To set up transducer:** Procedure to be done at patient’s bed side

1. Once tip position determined, the Central Venous Pressure Monitoring System can be set up on the distal lumen of a CVC.
2. Wash hands or apply ABHR
3. Using a STANDARD aseptic non-touch technique with clean gloves, the disposable transducer kit is used to spike the 500mL Sodium chloride 0.9% flush bag.
4. The 500mL sodium chloride 0.9% bag is inserted into the pressure bag and pressurised to 300mmHg.
5. The transducer is opened via pull tab (see Attachment 1) and the line is fully flushed.
6. The distal lumen is swabbed vigorously with chlorhexidine 2% alcohol 70% wipe X 1 for 10 seconds and, after allowing a **30 second dry time**, can be connected to the transducer kit using a non-touch technique.
7. The transducer reference point is maintained at the level of the right atrium, (4th intercostal space mid axillary line). (see Attachment 2)
8. The transducer must now be zeroed to atmospheric pressure.

**To zero transducer:**

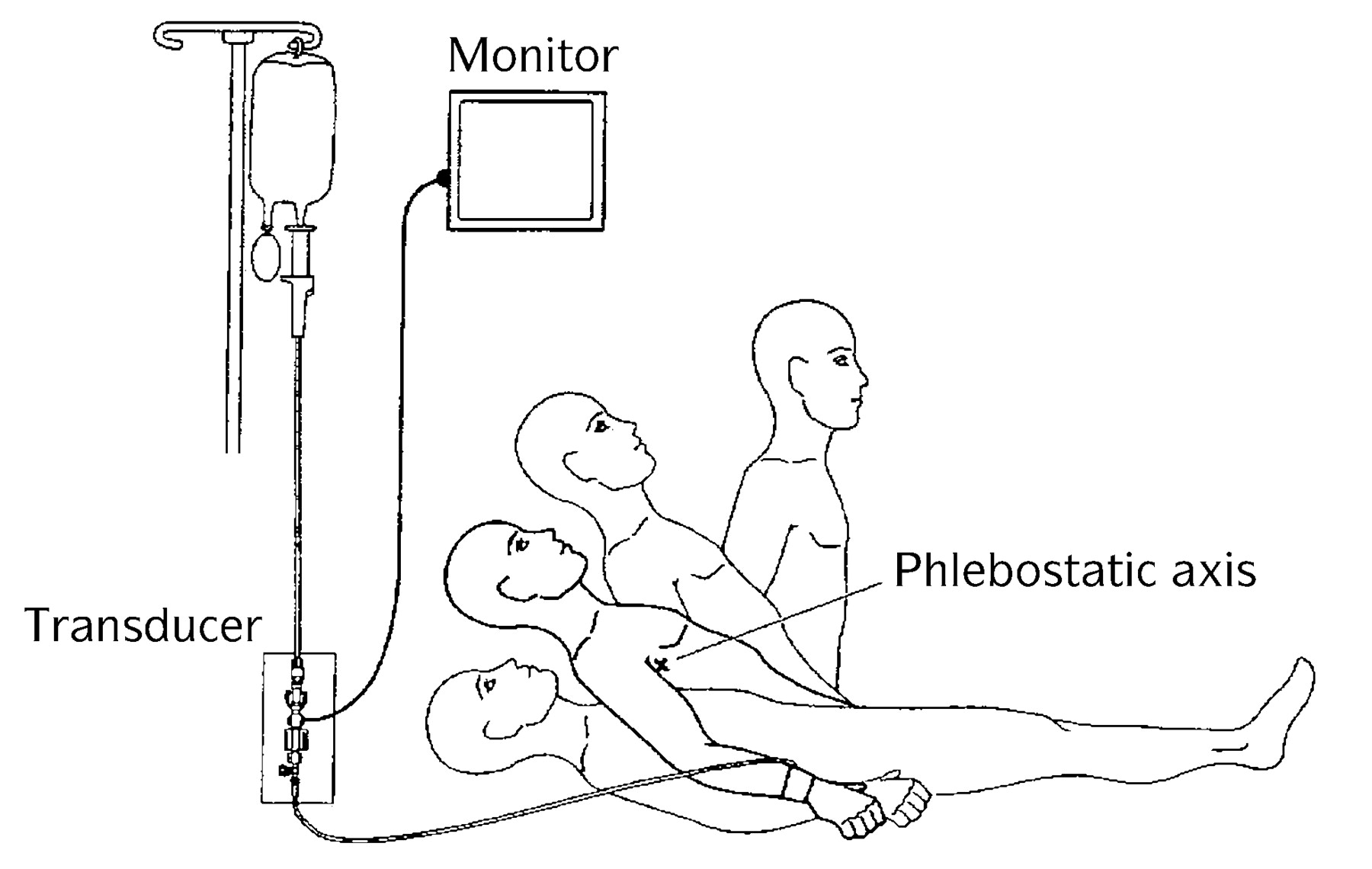
1. Transducer should be connected to cable and pressure module on monitor.
2. Turn stopcock off to the patient and release cap of pressure module, opening transducer to atmospheric pressure.
3. Press ‘ZERO TRANSDUCER’ key on main control panel, zero transducer highlighted.
4. Press Zero CVP transducer key until "ZERO IN PROCESS" appears on screen. Zero completed when "ZERO DONE" appears on the screen. An audible beep can be heard at completion of the procedure. Check date and time information on the screen.
5. If calibrated correctly the pressure waveform should appear as a straight line on the horizontal axis, with “0” in brackets.
6. If ‘unstable signal’ error message appears, ensure line is stable and press appropriate ‘zero transducer’ again.
7. Replace cap of pressure module, close transducer to atmosphere and open line to patient. The appropriate wave form should be present
8. Remove gloves and perform hand hygiene
9. Confirm pressure readings on MetaVision chart/ patients’ observational chart.

**Note:**

If CVP monitor present, the CVP should be measured 4th hourly or more regularly if needed.

**Set up and Calibration of Pressure Transducer**

CVP Transducer

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| Section 5 – Implanted Venous Port Management (PortaCath™) |

**Purpose**

The purpose of this section is to outline the access of Implanted Venous Ports.

Implanted Venous Ports are inserted under general anaesthetic by a Vascular or Paediatric surgeon. The procedure may also be performed privately at the Canberra Imaging Group under local anaesthetic. A subcutaneous pocket is formed and a reservoir is placed: a catheter is attached to the reservoir and tunnelled subcutaneously, with the catheter tip placed in the superior vena cava. The large target surface of the portal septum is easy to locate and access. Correct and secure needle placement is assured by the deep chamber and septum design*.*

***Blood collection, flushing and needless injection cap changes follow the same principles of any CVAD.*** The Port allows repeated venous access for blood aspiration and collection, and the administration of IV fluids, medications, blood products and chemotherapy.

**Note:**

Non-coring needles (eg. Gripper™) are used when accessing Ports. Non-coring needles must be changed weekly from date of access while in use. The bevelled tip of the non-coring needle allows for the tip of the needle to sit flush with the back of the port without impeding the flow of the solution infusing and prevents holes forming in the septum of the device.. Non-coring needles should not be manipulated sideways or rotated once insitu as this may damage the port or create a hole in the base of the chamber.

**Note:**

Subcutaneous Venous Port access is a STANDARD Aseptic Non Touch Technique using sterile gloves

**Equipment**

* Dressing trolley- cleaned
* Basic dressing pack
* Gown (non sterile)
* Sterile gloves
* PPE including safety goggles or face Shield
* Chlorhexidine 2% Alcohol 70% swab sticks x 3
* Chlorhexidine 2% alcohol 70% swabs, as required
* Non-coring needle (eg. Gripper™), appropriate gauge and needle length for patient
* Clear occlusive film dressing
* Optional second IV occlusive film dressing
* Needleless injection caps x 2
* 10mL syringe x 2
* 10mL sodium chloride 0.9% x 2
* Blunt drawing up needle
* Heparinised saline 50 units in 5mL + 10mL syringe + drawing up needle, if for blood collection or infrequent use, additional 10mL syringes as required for blood collection
* Optional port stabilising device

**Non-coring needle (Gripper™) Caresite™ Luer Lock Access device**

**(Positive Pressure)**

**Topical anaesthetic cream may be applied to the skin over the portal chamber prior to access. Allow sufficient time for effect.**

**Procedure**

1. Explain procedure to patient and gain verbal consent.
2. Ensure privacy.
3. Wash hands or apply ABHR.
4. Assist the patient to a supine or semi-upright position unless contra-indicated.
5. Wash hands or apply ABHR.
6. Remove local anaesthetic using appropriate solution.
7. Wash hands or apply ABHR.
8. Palpate the port chamber to become familiar with its type, location and angle before you prepare the sterile field and scrub.
9. Don PPE (mask and goggles/safety glasses).
10. Wash hands or apply ABHR.
11. Prepare sterile equipment.
12. Perform hand wash up to elbows for 60 seconds with Triclosan or ABHR for 30 seconds, as per STANDARD ANTT.
13. Don sterile gloves.
14. Position sterile dressing towel.
15. Cleanse the port site with the Chlorhexidine 2% alcohol 70% swab sticks using friction and a continuous circular motion outwards from the centre, to a 15cm diameter. Repeat with 2nd and 3rd swab sticks. **Leave until visibly dry.**
16. Draw up 2 x 10mL syringes of sodium chloride 0.9% using blunt drawing up needle.
17. Attach needless injection caps to non-coring needle set and prime caps and line with sodium chloride 0.9%, leave syringe attached, clamp line and place on sterile field.
18. Locate the Implanted Venous Port margins and stabilise the device with the thumb, index and middle finger of the non-dominant hand, or stabilising device .
19. Push the non-coring needle firmly through the skin and portal septum at a 90 degree angle until the needle touches the metal base of the portal chamber. Avoid any old access sites or scars.
20. Remove stabilising device if used.
21. Blood return indicates correct placement and line patency. Using the attached 10mL syringe, unclamp the line and aspirate 5mL of blood and discard, (3-5mL in paediatric patients) unless required for blood cultures. This is to avoid delivering a septic shower.

**Alert:**

There is a **risk of delivering a septic shower** when ANY CVAD is accessed. This is due to the colonisation of microbes within the internal chamber or in the line itself that are flushed into circulation when the CVAD is flushed. To avoid this, aspirate and discard 5-7mL of blood (unless blood cultures are required). DO NOT flush the aspirated blood into the patient. Signs of septic shock include: fever, rigors and hypotension.

**If resistance is encountered when attempting to obtain blood return** from the CVAD, reposition the patient, ask them to cough, inhale deeply or raise arms over their head. If still unable to aspirate blood, using a 10mL syringe, gently flush with no more than 5mL of sodium chloride 0.9%. This may clear the internal lumen and blood aspiration can be restored. If still unsuccessful, refer to *Section 13: Management of an Occluded CVAD*

1. Clamp line, if not using positive pressure needleless injection caps.
2. If blood collection is required attach syringe or vacuette, unclamp line and withdraw amount required, see Blood Aspiration from a CVAD (page 33).
3. Attach syringe with sodium chloride and slowly flush the system using a pulsatile action, as per Positive Pressure Flushing Methods. It may be necessary to flush both needleless injection caps in order to clear blood from the line completely.
4. Observe for site swelling or pain. If any of these are present cease the procedure and remove the needle.
5. Observe for resistance to flushing. Refer to Troubleshooting, section 15.
6. Remove the Gripper™ “wings” and tape the device into place using steristrips if required apply a clear occlusive dressing. To further secure the line an optional second IV occlusive film dressing may be used. When bloods have been collected or Implanted Venous Port is not to be immediately used, flush with Heparinised Saline 50 units in 5mL.
7. Connect IV giving set and fluids if prescribed.
8. Label dressing with date of application.
9. Document procedure and findings in the clinical record.

**Note:**

The use of heparinised saline flushes in contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy – check with Medical officer before use.

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mLsodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

[](http://www.google.com.au/imgres?imgurl=http://cdn2.bigcommerce.com/server5800/664b7/products/226735/images/156899/4EE91F39D33E12A0E1008000D400106F4EE91F3BD33E12A0E1008000D400106F__77573.1343682018.220.220.jpg&imgrefurl=http://careforde.com/b-braun-caresite-extension-sets-415122-caresite-luer-access-device-200-cs/&usg=__m3N1ijWBfROjDgIPFs2xgZ3-9EM=&h=178&w=178&sz=4&hl=en&start=3&zoom=1&tbnid=OyBHSxCUUOI9HM:&tbnh=101&tbnw=101&ei=L3eVUY6eMsW1iQfGyICIAw&prev=/images?q=caresite+luer+access+device&sa=X&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDAQrQMwAg)

**Caresite™ Luer Lock Access device**

**(Positive Pressure**)

**Note:**

**Power Ports** must be accessed with a Power Port needle if CT contrast is required. The patient should have a supply, or obtain from Medical Imaging. For routine use, Power Ports can be accessed with a non-coring needle (GripperTM).

**Site Assessment**

* Document in the patient’s clinical record and care plan:
* The time and date of the needle and dressing change
* Assessment of the insertion site
* The time and date of the dressing change is recorded on the occlusive dressing
* The insertion site is routinely inspected each shift.

**Note:**

A wound swab is required if the insertion site appears red and inflamed or has exudate evident

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| Section 6 – Implanted Venous Port De-Access |

Implanted Venous Ports must be de-accessed and re-accessed **every 7 days** while in use.

When not in use, Implanted Venous Ports are accessed, flushed with sodium chloride 0.9% followed by heparinised saline 50 units in 5mL, then de-accessed every 4-6 weeks.

**Note:**

Implanted Venous Port De-access is a STANDARD Aseptic Non Touch Technique

**Equipment**

* PPE (goggles/safety glasses)
* Gown (non-sterile)
* Non-sterile gloves
* Chlorhexidine 2% alcohol 70% swabs x 3
* 10mL syringe x 1
* 10mL syringe x 1
* Pressure dressing
* Sodium chloride 0.9% for injection - 10mL x 2
* Heparinised saline 50 units in 5mL x 1
* Blunt drawing up needles X 2
* Sharps container

**Procedure**

1. Explain procedure to patient.
2. Ensure privacy.
3. Wash hands or apply ABHR.
4. Draw up 10mL sodium chloride 0.9% in 20mL syringe and 5mL heparinised saline in 10mL syringe.
5. Assist the patient to a supine or semi-upright position unless contra-indicated.
6. Don protective eyewear.
7. Wash hands or apply ABHR.
8. Don gown and non sterile gloves.
9. Disconnect IV tubing from extension tubing, if required.
10. Clean needleless injection cap vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds, **allow to dry for 30 seconds.**
11. Attach 10mL sodium chloride 0.9% and flush according to *Positive Pressure Flushing Methods.*
12. Disconnect syringe and attach heparinised saline 50 units in 5mL and flush according to *Positive Pressure Flushing Methods.*
13. Clamp tubing and remove occlusive dressing.
14. Stabilize port with one hand and remove needle in an upwards direction with the other hand and dispose of in the sharps container.
15. Apply dressing and apply pressure to puncture site if bleeding present.
16. Remove gloves and perform hand hygiene.
17. Document procedure and site assessment in patient’s clinical record and care plan
18. Ensure follow up appointments made for 4-6 week for flushing.

**Note:**

The use of heparinised saline flushes is contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy- check with Medical Officer before use

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| Section 7 – Change of Dressing and Needleless Injection Cap of a CVAD |

**Purpose**

* Describe the process for changing the central venous access device (CVAD) dressing and needleless injection caps to minimise the risk of complications through regular assessment of the CVAD site, dressing and needleless injection caps
* CVAD insertion sites are assessed each shift (at each visit in the community) and dressings are assessed and attended:
* At least weekly to minimise the risk of infection
* When there is evidence of inflammation at the insertion site
* If there is excessive fluid accumulation under the dressing
* When the integrity of the dressing or seal is breached
* Where gauze is applied to PICC site at insertion, dressing must be attended 24 hours post insertion to allow inspection of insertion site, followed by weekly dressings
* NEEDLELESS INJECTION CAPS are changed weekly

Note:

* Check the external measurement of CVAD lines prior to commencing dressing change. Refer to the CVAD sticker in the patient’s clinical records, patient’s electronic record or card provided to patient at insertion to determine external centimetre markings. If the CVAD has migrated in or out by 2cms or greater notify the Intravenous Access Team or Medical Oncology for CACHS patients.

**Note:**

When more than one central venous catheter is in situ, each catheter’s change of dressing MUST be a separate procedure

**NOTE:**

Change of Dressing and Needleless Injection Cap is a STANDARD Aseptic Non Touch Technique using sterile gloves

**Equipment**

* Basic dressing pack
* Dressing Trolley
* Chlorhexidine 2% alcohol 70% swab sticks x 4 ( 3 for skin + 1 for line)
* 30-50mL sodium chloride 0.9% for irrigation if required(for cleaning debris)
* Extra gauze as necessary
* 10 mL syringes (1 per lumen)
* 10 mL sodium chloride 0.9% (1 per lumen) for priming needleless injection caps
* Drawing up needles
* Clear, transparent occlusive dressing
* Personal protective equipment (PPE) including safety glasses, shield or goggles.
* Gown (non-sterile)
* Unsterile gloves
* Sterile gloves
* Chlorhexidine impregnated sponge (Biopatch™)- or Film dressing impregnated with CHG gel- **Not for use in Paediatrics or Haemodialysis**
* Sterile swab stick with medium if infection is suspected
* Securement device (Statlock™), size appropriate to line
* FOR NEEDLELESS INJECTION CAP CHANGE
* Chlorhexidine 2% Alcohol 70% swabs X 4-6 (2 for each lumen)
* Needleless injection caps (1 per lumen)
* Gauze swabs
* Sodium chloride 0.9% and 10mL syringes, as above
* Heparinised saline 50 units in 5mL x 1 per lumen
* 10mL syringe x 1 per lumen for heparinised saline
* Drawing up needles

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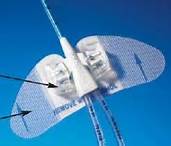
**Caresite™ Luer Lock Access device**

**(Positive Pressure**)

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**Biopatch ™ Chlorhexidine impregnated sponge**

(Blue facing up, white sponge skin side down)

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**Statlock™ for Hickman line Statlock™ for PICC Adults and Paediatric**

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**Grip-Lok™ securement device**

**Procedure**

1. Explain procedure to patient and obtain verbal consent (if possible).
2. Ensure privacy.
3. Wash hands or apply ABHR.
4. Assist the patient to a supine or semi-upright position unless contra-indicated.
5. Don protective glasses or goggles.
6. Wash hands or apply ABHR.
7. Prepare sterile equipment.
8. Wash hands or apply ABHR.
9. Don gown and unsterile gloves.
10. Remove old dressing, Impregnated Sponge and StatlockTM and discard.

**Alert**

Never use scissors or other sharp implements to remove dressings or securement devices as accidental cutting of the line can occur. Use adhesive dressing removal swabs if patient’s skin is fragile or if difficulty is encountered.

1. Observe the site for signs of infection. If infection is suspected, swab the site for culture and inform the medical officer.
2. **Observe for catheter migration by checking the catheter position using centimetre markings.** Refer to the CVAD sticker in the patient’s clinical records, patient’s electronic record or card provided to patient at insertion. If migration has occurred refer patient to the Intravenous Access Team or Medical Oncology for CACHS patients.
3. Remove gloves.
4. Perform hand hygiene: 60 second hand wash with Triclosan hand wash up to elbows, or apply Alcohol Based Hand Rub for 30 seconds up to elbows, as per STANDARD ANTT
5. Don sterile gloves.
6. Draw up sodium chloride 0.9% using 10mL syringe and drawing up needle.
7. Prime needleless injection caps with sodium chloride 0.9% and leave on sterile field.
8. Position sterile dressing towel.
9. If evidence of old crusted blood or debris at insertion site, clean first with sodium chloride 0.9%. **Allow to dry** as sodium chloride 0.9% will inactivate Chlorhexidine (CNSA Guidelines, 2007).
10. Cleanse the area around the catheter insertion site with Chlorhexidine 2% alcohol 70% swab sticks X 3, starting at the catheter insertion site and extending outwards using friction and a continuous circular motion, to incorporate the area that will be covered by the CVAD dressing. Use the 4th swab stick to cleanse the catheter line. **Allow the area to** **dry for at least 30 seconds**, or until visibly dry.
11. Place Chlorhexidine Impregnated sponge (Biopatch TM) around insertion site with blue side up. **Not for use in Paediatrics or Haemodialysis.**
12. Check the sutures, if present, to determine stability of the catheter. Sutures to be removed from tunnelled Hickman line 7-10 days post insertion.
13. Secure line with securement device (Statlock™) after preparing skin with enclosed swab, as per manufacturer’s instructions.
14. Cover the insertion site with semi-permeable transparent occlusive dressing. Ensure that the centre of the dressing is over the insertion site and that the Statlock is covered.

**Note:**

Coiling of the catheter is **not** recommended on adults, due to the risk of occluding the line. **In Paediatrics patients only,** due to the length of the line, it may be necessary to form a large loop under the occlusive dressing to incorporate the bifurcation. Loop the tunnelled CVC lumen around the exit site. The position of the loop may be changed if the skin is compromised, though the CVC should not be *forced* to loop in the other direction. The dressing should be placed so that the exit site is in the centre of the dressing and the bifurcation is covered

Ref: Children’s Hospital at Westmead, Sydney, Australia, Practice Guideline on Central Venous Access Devices (CVAD), [Internet, last updated 14 December 2010, date viewed 2 May 2013], Available from http://www.chw.edu.au/about/policies/pdf/2006-8175.pdf

1. ***CHANGING NEEDLELESS INJECTION CAPS is a STANDARD Aseptic Non Touch Technique*:** Using gauze X 2 (1 to hold line, 1 to remove needleless injection cap to maintain sterility), clamp lines, then remove old needleless injection cap, discard, and clean vigorously around the end of the lumen with 1 chlorhexidine 2% alcohol 70% swab for 10 seconds, then repeat with 2nd swab. **Allow to dry for 30 secs**. Repeat for each lumen
2. Replace with new needleless injection cap and flush according to Positive Pressure Flushing Methods.

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

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**Caresite™ Luer Lock Access device**

**(Positive Pressure**)

**Alert:**

* The use of heparinised saline flushes is contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy- check with Medical Officer before use.
* NEVER use a syringe smaller than 10mL to access a CVAD, as smaller syringes increase the intra-luminal pressure and risk rupturing or damaging the catheter.
* Ensure the dressing seals around the catheter. A second IV transparent dressing may be required to ensure seal, particularly in the community setting. Discard equipment
* Remove gloves
* Wash hands or apply ABHR
* Record the time and date on the dressing
* Document assessment of the insertion site, dressing change & needleless injection cap change in the patient’s clinical/ electronic record and on the patient’s care plan

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| Section 8 – Observation and Labelling of a CVAD |

**Purpose**

* Detect infection at the site of entry of the central venous catheter
* Observe for and prevent catheter migration.
* Ensure that all lines are labelled according to relevant standards

The central venous access device (CVAD) insertion site must be observed through the transparent dressing each shift (each visit in the community) and whenever the line is accessed for IV medication. Observation of the state of the CVAD site and any action taken must be documented in the patient’s clinical record or electronically documented.

**Procedure**

1. Explain the procedure to the patient. Ensure privacy.
2. Wash hand or apply Alcohol Based Hand Rub (ABHR)
3. Observe the dressing, ensuring that it is dry and intact
4. Observe the site for any signs of inflammation, swelling and redness and report to treating MO if observed.
5. Gently palpate the insertion site for tenderness
6. Check centimetre markings to ensure that the catheter has not moved. Correlate with CVAD sticker or documentation on MetaVision (ICU specific)
7. Check that the date on the dressing application is legible.
8. Ensure that all lines are labelled with the date of commencement of infusion and the type of infusion. Refer to *Injectable Medicines, Fluids & Lines for clarification* andAttachment 3
9. Check the injection site for any blood residue. Change if required as per *Change of Dressing and Needleless Injection Cap of a CVAD SOP.*
10. Wash hands or apply ABHR
11. Redress the CVAD weekly and/or as required as per Change of Dressing and Needleless Injection Cap of a CVAD SOP
12. Document the state of the CVAD site and any action taken in the patient’s clinical record, electronic record and on the patient’s care plan

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| Section 9 – Changing of Intravenous Line of a CVAD |

This Section describes the process and frequency for changing Intravenous lines on central venous access devices (CVAD’s). IV administration sets include both the IV line and any additional attachments such as needleless injection caps, 3-way stopcocks, multi-flow adaptors and extension tubing that may be added.

| **Line Use** | **Frequency of line changes** |
| --- | --- |
| Attached to standard CVADs | Every 72 hours and when needleless injection caps changed. In the community, intravenous line changed at each weekly CVAD dressing change |
| Used to infuse blood and blood products | When the infusion is complete |
| Total Parental Nutrition (TPN) | Every 24 hours |
| Lipid emulsions (including TPN with lipids) | Every 24 hours |
| Used to infuse propenol | Every 12 hours |
| Neutropenic patients | Every 24 hours (daily) |
| Main lines with additives | Every 24 hours |
| Side lines and syringe lines for intermittent medications, eg antibiotics | Single use |

**NOTE:**

Changing of an Intravenous Line is a STANDARD Aseptic Non Touch Technique

**Equipment**

* IV administration set(s)
* IV fluids
* Chlorhexidine 2% alcohol 70% swabs
* Extra gauze as necessary
* Y-type extension **for Paediatrics**
* Clean Gloves

**Procedure**

1. Explain the procedure to the patient and gain verbal consent if appropriate. Ensure privacy.
2. Wash hands or apply Alcohol Based Hand Rub (ABHR).
3. Assemble equipment.
4. Prime lines with IV fluids. **For Paediatrics,** also prime the Y-type extension set at the lower end of the giving set.
5. Wash hands or apply ABHR.
6. Don clean gloves- STANDARD Aseptic Non Touch Technique (ANTT).
7. Clean needleless injection cap vigorously with Chlorhexidine 2% alcohol 70% swab for 10 seconds, **allow to dry for 30 seconds.**
8. Using ANTT, attach IV giving set to needleless injection cap. Do not over tighten.
9. Discard equipment and remove gloves.
10. Wash hands or apply ABHR.
11. Ensure that all lines are labelled with the date of commencement of infusion and the type of infusion. See Observation and Labelling of a CVAD.

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| Section 10 – Flushing of a CVAD |

**Purpose**

This Section describes the procedure for flushing a CVAD

* To ensure and maintain patency of short and long term CVAD catheters
* To ensure that the patient receives a complete dose of medication
* To prevent the mixing of medications, that may be residual and or incompatible, in the line.
* To prevent build up of fibrin
* To prevent drug precipitates from forming within the CVAD line and/or blood vessel

CVAD lines that are not in continuous use are flushed to ensure patency, before and after medication, blood transfusion, blood products, lipid emulsions and chemotherapy.

For short-term multi-lumen catheters, long term tunnelled catheters (e.g. Hickman) and for subcutaneous venous ports the following flushing procedure is followed:

* Central venous access devices should be flushed with 10mL sodium chloride 0.9% **at least once a shift** and when needleless injection caps are changed. Heparin saline 50 units in 5mL is not routinely used if the CVAD is being accessed regularly, but is recommended after blood collection.
* For accessing an Implanted venous port, refer to *Management of Implanted Venous Port* **Flushing a port follows the same principles as flushing any CVAD*.***
* Community Nurses flush CVAD’s once a week with 10mL sodium chloride 0.9%, followed by Heparinised saline (50 units per 5mL)
* Catheters used for haemodialysis and apheresis have a heparin lock left in situ and are not accessed between dialysis*.* **Only competent Renal Dialysis/ Apheresis nurses or Intensive Care staff are to access these lines.**

**Note**:

* The Bard Power PICC SOLO catheter (purple in colour) and the Groshong PICC are able to be trimmed in length prior to insertion. They do not need a clamp as they have a neutral pressure valve in the hub. Only flush with sodium chloride 0.9%. No clamping is required for needleless injection cap change
* The BARD Power PICC and ARROW Pressure Injectable PICC come with a clamp, can be clamped when changing needless injection caps and may be flushed with heparinised saline
* The instruction for no heparin flush/lock and saline flushes should be written on the Medical Officers orders form for CVAD management and placed in the clinical file
* NEVER use a syringe smaller than 10mL to access a CVAD, as smaller syringes increase the intra-luminal pressure and risk rupturing or damaging the catheter.
* Heparin **FLUSHES** (50 units in 5mL) are instilled after blood collection if required to maintain patency, on discharge and if the CVAD is not being used regularly.
* Heparin **LOCKS** (100units/mL in 9mL sodium chloride 0.9%) are **ONLY** used in Apheresis, Haemodialysis, Operating Theatres and Medical Imaging and must be aspirated and discarded prior to use.

**NOTE:**

Changing of an Intravenous Line is a STANDARD Aseptic Non Touch Technique

**Note**:

That all lumen ports on a multi-lumen CVAD *must* be flushed using separate 10mL syringes.

**Equipment**

* Personal protective equipment (PPE) including safety glasses, shield or goggles
* Clean gloves
* Kidney dish (or similar receptacle ) with the following:
* 10mL sodium chloride 0.9% (1 per lumen)
* 10mL syringes ( 1 per lumen)
* Drawing up needles
* If Heparinised saline flush indicated: 10mL syringe with Heparinised saline 50 units in 5mL per lumen
* Chlorhexidine 2% alcohol 70% swabs (minimum 1 per lumen)

**Procedure**

1. Explain procedure to the patient and gain verbal consent, as appropriate. Ensure privacy
2. Assemble equipment.
3. Don protective goggles.
4. Wash hands or apply Alcohol Based Hand Rub (ABHR).
5. Don clean gloves.
6. Draw sodium chloride into syringe.
7. Swab injection site cap vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds. Allow to dry for 30 seconds.
8. Connect syringe and release catheter clamps if not using positive pressure needleless injection caps.
9. If heparin LOCK instilled, withdraw required amount of infuscate. Heparin LOCK is usually only instilled when tunnelled Hickman line is inserted, where orange alert sticker will be on dressing, withdraw 10mL and discard. Remove orange alert sticker.
10. Heparin FLUSH (50 units in 5mL) does not need to be removed.
11. Swab needleless injection cap vigorously with Chlorhexidine 2% alcohol 70% swab for 10 seconds, allow drying for 30 seconds.
12. Attach 10mL sodium chloride 0.9% in syringe; withdraw to establish patency by observing blood return, then flush in pulsatile motion, as per Positive Pressure Flushing Methods. Flushing post IV medication does not require blood return check. Disconnect. Swab needleless injection cap if necessary.

**Note:**

There is a **risk of delivering a septic shower** when ANY CVAD is accessed. This is due to the colonisation of microbes within the internal chamber or in the line itself that are flushed into circulation when the CVAD is flushed. To avoid this, aspirate and discard 5mL of blood (unless blood cultures are required). DO NOT flush the aspirated blood into the patient. Signs of septic shock include: fever, rigors and hypotension.

**If resistance is encountered when attempting to obtain blood return** from the CVAD, reposition the patient, ask them to cough, take a big breath or raise arms over their heard. If still unable to aspirate blood, using a 10mL syringe, gently flush with no more than 5mL of sodium chloride 0.9%. This may clear the internal lumen and blood aspiration can be restored. If still unsuccessful, refer to *Section 13: Management of an Occluded CVAD*

* Heparinised Saline flush (50units/5mL) in 10mL syringe is only required after blood collection, to maintain patency, on discharge and when de-accessing subcutaneous venous ports. If required, swab injection site cap vigorously with Chlorhexidine 2% alcohol 70% swab for 10 secs, allow drying for 30 seconds. Instil Heparinised saline flushes as per Positive Pressure Flushing Methods. Disconnect. Swab needleless injection cap if necessary.

**PAEDIATRIC Heparin flushes:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Use** | **Solution required** | **Frequency** | **Volume** |
| CVAD (including ports)not in use for up to 7 days | Heparinised Sodium 50 units/5mL | Weekly | 3mL per lumen |
| CVAD (including ports) not in use for up to one month | Heparinised Sodium 50 units/5mL | Monthly | 4mL per lumen |
| PICC not in use for up to 7 days | Heparinised Sodium 50 units/5mL | Weekly | 1.5mL per lumen |

Reference: Sydney Children’s Hospitals Network, Sydney, Australia, Practice Guideline on Central Venous Access Devices (CVAD),

[Internet, last updated 21st January, 2015, date viewed 20th June, 2016 ], Available from <http://www.schn.health.nsw.gov.au/_policies/pdf/2013-9037.pdf>

1. Remove gloves and perform hand hygiene

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

[](http://www.google.com.au/imgres?imgurl=http://cdn2.bigcommerce.com/server5800/664b7/products/226735/images/156899/4EE91F39D33E12A0E1008000D400106F4EE91F3BD33E12A0E1008000D400106F__77573.1343682018.220.220.jpg&imgrefurl=http://careforde.com/b-braun-caresite-extension-sets-415122-caresite-luer-access-device-200-cs/&usg=__m3N1ijWBfROjDgIPFs2xgZ3-9EM=&h=178&w=178&sz=4&hl=en&start=3&zoom=1&tbnid=OyBHSxCUUOI9HM:&tbnh=101&tbnw=101&ei=L3eVUY6eMsW1iQfGyICIAw&prev=/images?q=caresite+luer+access+device&sa=X&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDAQrQMwAg)

**Caresite™ Luer Lock Access device**

**(Positive Pressure**)

**Note:**

The use of heparinised saline flushes is contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy- check with Medical Officer before use.

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| Section 11 – Blood Aspiration from a CVAD – Adult and Paediatric |

**Note:**

Adult blood collection is covered in Section 11.1, and paediatric blood collection is covered in Section 11.2

**Purpose**

The purpose of this Section is to outline the procedure for collecting blood from a central venous access device (CVAD).

Blood may be aspirated from a central line for laboratory testing **except** in the following situations:

* Inotropes should **never** be ceased for procedures such as blood aspiration. An alternative method of blood sampling should be used.
* CVAD lines being used for parenteral nutrition should **not** be ceased then accessed for blood sampling because of the risk of hypoglycaemia and infection.
* CVAD lines being used for IV Heparin should **not** be ceased then accessed for blood sampling because of the risk of inaccurate results.
* When taking blood for coagulation studies (APTT, INR), ensure any line which may have been flushed with Heparinised saline is flushed with at least 10mL sodium chloride 0.9%, wait 1 minute, then withdraw 5mL blood and discard. Attach vacuette & obtain blood specimen.

When IV fluids are running through any lumen port in a central line, which is to be accessed for blood sampling it is necessary to cease that fluid for at least **two minutes** before blood taking.

**Note:**

There is **a risk of delivering a septic shower** when ANY Central Venous Access Device (CVAD) is accessed. This is due to the colonisation of microbes within the internal chamber or in the line itself that are flushed into circulation when the CVAD is flushed. To avoid this, aspirate and discard 5-7mL of blood (unless blood cultures are required). DO NOT flush the aspirated blood into the patient. Signs of septic shock include: fever, rigors and hypotension.

**If resistance is encountered when attempting to obtain blood return** from the CVAD, reposition the patient, ask them to cough, take a big breath or raise arms over their heard. If still unable to aspirate blood, using a 10mL syringe, gently flush with no more than 5mL of sodium chloride 0.9%. This may clear the internal lumen and blood aspiration can be restored. If still unsuccessful, refer to *Section 13: Management of an Occluded CVAD*

**Note:**

Blood Aspiration from a CVAD is a STANDARD Aseptic Non Touch Technique

**Section 11.1 Blood Aspiration from a CVAD (Adults)**

**Equipment**

* Syringes, 10mL x 2, 20mL x 1 (For Paediatric patients- Syringes 10mL x3)
* 10mL sodium chloride 0.9% x 3
* 5mL ampoule Heparinised Saline (50 units in 5mL)
* Chlorhexidine 2% alcohol 70% swabs
* Vacuette with luer adaptor (Vacutainer™)
* Extra gauze as necessary
* Kidney dish
* Personal protective equipment (PPE) including safety glasses, shield or goggles
* Clean gloves
* Pathology blood sample tubes/bottles as per tests ordered
* ABHR

**Procedure**

1. Explain the procedure to the patient, and gain consent if appropriate.
2. Check patient identification: verbally with patient, and with ID band and pathology request form.
3. Ensure privacy.
4. Ensure that IV fluids have been ceased for at least two minutes before attempting to take a blood sample if needed.
5. Don protective glasses or goggles.
6. Wash hands or apply ABHR.
7. Prepare equipment.
8. Wash hands or apply ABHR.
9. Don clean gloves, if blood cultures are collected don sterile gloves.
10. Swab the injection site thoroughly with Chlorhexidine 2% alcohol 70% swab for 10 seconds. **Allow to dry for 30 seconds.**
11. Attach 10mL syringe and, withdraw 5mL of blood and discard.
12. Remove syringe containing discarded blood.
13. Swab needleless injection cap vigorously with Chlorhexidine 2% alcohol 70% swab for 10 seconds (if there is visible blood on cap after disconnection) and **allow to dry for 30 seconds.**
14. Attach vacuette to the needleless injection cap.
15. Blood culture collection is a STANDARD Aseptic Non Touch Technique with the addition of sterile gloves. Refer to *Blood Culture Collection SOP.*
16. For other blood tests, select appropriate blood sampling tube, withdraw blood by piercing the rubber top with the spike in the vacuette and allowing the blood to fill to the required level.
17. Remove the blood sampling tube.
18. Only clamp the CVAD line if NOT a positive pressure needleless injection cap.
19. Remove the vacuette and discard in sharps container.
20. Swab the needleless injection cap vigorously with Chlorhexidine 2% alcohol 70% swab and **allow to dry for 30 seconds**, if there is visible blood after disconnection.
21. Flush lumen with 20mL of sodium chloride 0.9% using pulsatile action, followed by Heparinised Saline 50 units in 5mL – for CVC, PICC (no heparin to Power PICC Solo), Hickman line and Implanted Venous Port.

**Note:**

The use of heparinised saline flushes in contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy – check with Medical Officer before use.

1. If blood remains visible in the needleless injection cap, the cap should be replaced. Remove gloves and perform Hand Hygiene.
2. Clearly label tubes and bottles with patient’s pathology labels or write details on tubes and bottles, labels, and complete and sign pathology request. Send to Pathology
3. Document procedure in the patient’s clinical record.

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

[](http://www.google.com.au/imgres?imgurl=http://cdn2.bigcommerce.com/server5800/664b7/products/226735/images/156899/4EE91F39D33E12A0E1008000D400106F4EE91F3BD33E12A0E1008000D400106F__77573.1343682018.220.220.jpg&imgrefurl=http://careforde.com/b-braun-caresite-extension-sets-415122-caresite-luer-access-device-200-cs/&usg=__m3N1ijWBfROjDgIPFs2xgZ3-9EM=&h=178&w=178&sz=4&hl=en&start=3&zoom=1&tbnid=OyBHSxCUUOI9HM:&tbnh=101&tbnw=101&ei=L3eVUY6eMsW1iQfGyICIAw&prev=/images?q=caresite+luer+access+device&sa=X&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDAQrQMwAg)

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**Section 11.2 - Blood Aspiration from a CVAD (Paediatric)**

**Note:**

Blood Aspiration from a CVAD is a STANDARD Aseptic Non Touch Technique

* CVADs **should not** be accessed for the sole purpose of routine blood sampling (e.g. more than once per day). If clinically possible, Venepuncture or capillary blood sampling e.g. finger/heel prick should be used. All drug levels for paediatric patients are taken from a capillary sample, unless ordered by a medical officer.
* If blood cultures are required, blood should be collected from all lumens and specimens should be labelled with specific lumens ie white, brown.
* Small diameter PICCs have an increased likelihood of clot formation. (< Size 5 Fr in Paediatric patients) These PICCs should only be used for blood collection in extreme circumstances under the direction of the consultant.

**Equipment**

* Basic Dressing pack
* Syringes, 10mL x 4
* 10mL ampoule 0.9% sodium chloride x 2
* Blunt drawing up needle
* 5mL Heparinised saline (50 units in 5 mL)
* Chlorhexidine 2% alcohol 70% swabs
* Extra gauze or chlorhexidine swabs as required
* Clean gloves
* PPE including safety glasses, shield or goggles.
* Pathology blood sample tubes as per tests ordered
* Blood transfer device

**Procedure**

1. Explain the procedure to the patient, and gain consent as appropriate.
2. Check identification of patient against request form. Ensure privacy
3. Wash hands or apply ABHR.
4. Don protective glasses or goggles.
5. Prepare equipment.
6. Perform hand hygiene or ABHR.
7. Don gloves.
8. Place sterile sheet down.
9. Swab the needleless injection cap, (this will be the y-type extension on a CVAD in use) vigorously for 10 seconds with chlorhexidine swab and **allow to dry for 30 seconds**
10. Withdraw blood until a rich blood return is visible, usually 3-4mL. This blood is for discard. NOTE: If collecting blood cultures, this blood should be used for the culture sample.
11. Remove syringe containing discarded blood.
12. Swab the needleless injection cap vigorously for 10 seconds; **allow to dry for 30 seconds.**
13. Attach empty 10mL syringe and withdraw amount of blood required for samples.
14. Remove syringe, agitate gently and place on sterile field.
15. Swab the needleless injection cap vigorously for 10 seconds; **allow to dry for 30 seconds.**
16. Attach syringe containing Heparin Saline and inject 3 mL using pulsatile action.
17. Attach syringe containing sodium chloride flush and inject 5-10 mL using pulsatile action.
18. Place blood into required pathology tubes, using blood transfer device.
19. If blood remains visible in the needleless injection cap, it should be replaced, using a Standard Non Touch Technique. Refer to *Change of Dressing and Needleless Injection Cap .*

**Note:**

Where appropriate, and as stipulated by individual unit protocols, **POSITIVE PRESSURE NEEDLELESS INJECTION CAPS** are recommended to be used for CVAD’s. DO NOT CLAMP positive pressure valves while the syringe is attached as this cancels the positive displacement mechanism. **Once the syringe is detached the line may be clamped, this is recommended for patients in the community.** If a positive pressure valve is NOT in place, CVAD’s should be maintained using a positive pressure method: perform pulsatile flush with 10mL sodium chloride 0.9%, then simultaneously flush and clamp when 1mL remaining to achieve positive pressure, this prevents the backflow of blood in the catheter, thereby reducing the risk of catheter occlusion.

[](http://www.google.com.au/imgres?imgurl=http://cdn2.bigcommerce.com/server5800/664b7/products/226735/images/156899/4EE91F39D33E12A0E1008000D400106F4EE91F3BD33E12A0E1008000D400106F__77573.1343682018.220.220.jpg&imgrefurl=http://careforde.com/b-braun-caresite-extension-sets-415122-caresite-luer-access-device-200-cs/&usg=__m3N1ijWBfROjDgIPFs2xgZ3-9EM=&h=178&w=178&sz=4&hl=en&start=3&zoom=1&tbnid=OyBHSxCUUOI9HM:&tbnh=101&tbnw=101&ei=L3eVUY6eMsW1iQfGyICIAw&prev=/images?q=caresite+luer+access+device&sa=X&hl=en-AU&gbv=1&ie=UTF-8&tbm=isch&itbs=1&sa=X&ved=0CDAQrQMwAg)

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| Section 12 – Management of an occluded CVAD |

**Purpose**

This Section outlines the process of clearing CVAD Lumen(s) when there is resistance to flush or no blood return on aspiration. All attempts should be made to avoid blocked lumens (see *Section 10: Flushing of a CVAD.* Should there be resistance or absence of blood return, check potential positional causes in the first instance: instruct patient to sit up, turn head, cough, or move arm.

**Scope**

The procedure for instillation and removal of a recombinant tissue plasminogen activator, (alteplase is only performed by qualified nursing and medical staff who have been as assessed as competent in this procedure.

**Note:**

Priming volumes of individual lines and lumens MUST be ascertained prior to use of alteplase. Line lengths may differ as they can be shortened when inserted. Check patient record or insertion card that patient should carry.

**Note:**

Instillation and removal of alteplase is a STANDARD Aseptic Non Touch Technique

**Equipment**

2mL syringe containing alteplase 2mg/2mL. Reduce to the precise priming value of the blocked lumen plus 10%.

* Sterile gloves
* Sterile drape
* Sterile 3-way tap
* Needleless injection cap
* Chlorhexidine 2% alcohol 70% swabs
* Gauze as necessary
* Syringes 5mL x 2
* Red stopper (Combi-Stopper™) x 2
* Sodium chloride 0.9% 10mL for injection x 2
* Syringes 10mL x 3
* Blunt drawing up needles

**Procedure**

1. Explain procedure and obtain informed verbal consent from the patient unless patient unable to consent.
2. Check the priming volume of the catheter (See Attachment 5) prior to instilling alteplaseas well as the individual priming volumes as the catheter may have been shortened on insertion.
3. Ensure medication order on treatment sheet. Check medication as per *Medication Handling policy.*
4. Wash hands or apply ABHR.
5. Position the patient in semi-recumbent position in bed (for CVC).
6. Position the patient’s arm on a pillow protected by a waterproof sheet (for PICC).
7. Wash hands or apply ABHR.
8. Prepare equipment.
9. Don safety goggles.
10. Perform hand hygiene: 60 second hand wash with Triclosan hand wash up to elbows, or apply Alcohol Based Hand Rub for 30 seconds up to elbows, as per *STANDARD ANTT.*
11. Don sterile gloves.
12. Place sterile drape between patient’s forearm and access lumen/s (for PICC).
13. Prepare 3 way tap – attach the 2mL syringe containing alteplase reduced to priming volume plus 3 way tap plus 10%, to one port and prime 3 way tap, attach 10mL syringe to remaining port.
14. Clamp lumen and remove and discard needleless injection cap. Swab lumen vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds. **Allow to dry for 30 seconds**
15. Attach prepared 3-way tap in its place.
16. Open 3-way tap to lumen & 10mL syringe.
17. Attempt to aspirate the catheter, if possible removing a volume of blood equal to the catheter volume. Discontinue process if able to aspirate blood.
18. If unable to aspirate fluid, use the empty 10mL syringe, to aspirate the catheter, creating a negative pressure in the catheter. Clamp the portal off, and open the portal where the alteplase is attached. The catheter will fill the negative space created by the suction.
19. Close 3-way tap off to patient.
20. Remove both syringes and replace with red Combi-Stoppers™ (to stop any attempted access).
21. Remove gloves and perform hand hygiene.
22. Label line to prevent use.
23. Document in patients clinical record
24. Leave for 30 – 60 minutes.
25. Perform hand hygiene: 60 second hand wash with Triclosan hand wash up to elbows, or apply Alcohol Based Hand Rub for 30 seconds up to elbows - as per STANDARD ANTT.
26. Don sterile gloves.
27. Attempt to aspirate the alteplase and the residual dissolved clot with a 5mL syringe.
28. If patency is not restored, repeat aspiration attempts every 5mins up to 5 times. **Note:** Care ***must***be taken not to flush the alteplase solution into circulation.
29. If patency has still not been restored, a second injection of alteplase can then be given and the procedure repeated.
30. When patency is restored, **aspirate 5mL of blood to ensure that all alteplase has been removed.**
31. **Flush lumen with 10mLs of sodium chloride 0.9%**
32. Prime needleless injection cap with 10mL sodium chloride 0.9%, leave syringe attached
33. Disconnect and discard 3-way tap.
34. Clean end of lumen vigorously with chlorhexidine 2% alcohol 70% for 10 seconds, **allow to dry for 30 seconds.** Attach needleless injection cap and flush using *Positive Pressure Flushing Techniques*, follow with Heparinised saline 50 units in 5mL flush. More than one lumen can be treated simultaneously if required.
35. Document procedure and outcome in patient’s clinical record and on care plan.

**Note:**

The use of heparinised saline flushes is contraindicated in thrombocytopenic patients, patients with Heparin Induced Thrombocytopenia/Thrombosis (HITTS) and patients with significant coagulopathy- check with Medical Officer before use.

If catheter patency cannot be restored by the 2nd alteplase instillation, a linogram or Doppler should be ordered by the medical officer to determine whether further attempts and/or infusions of alteplase are indicated.

| CVAD type | Brand | Gauge | Length | Priming volume (mL) |
| --- | --- | --- | --- | --- |
| PICC | Arrow  Double lumen | 5F | 55cm | 0.4 |
| PICC | Arrow Double Lumen Pressure Injectable | 5F  18g  18g | 50cm | 0.4  0.4 |
| PICC | Arrow  Single Lumen | 4F | 55cm | 0.5 |
| PICC | Arrow Single Lumen Midline |  | 20cm | 0.28 |
| PICC | BARD  Single Lumen | 4Fr | 55cm(may be trimmed- refer to clinical record) | 0.67 |
| PICC | BARD  Double Lumen | 5Fr | 55cm(may be trimmed- refer to clinical record) | 0.57  0.57 |
| CVC | Standard triple lumen | Proximal (white) 18g | (unreadable on original) | 0.39 |
| Medial (blue) 18g | 0.39 |
| Distal (brown) 16g | 0.44 |
| CVC | Standard triple lumen | Proximal (white) 18g | 30cm | 0.44 |
| Medial (blue) 18g | 0.44 |
| Distal (brown) 16g | 0.49 |
| Dialysis/  Apheresis CVAD | Vascath® | Arterial lumen | 20cm | 1.4 |
| Venous lumen | 1.4 |
| Dialysis/  Apheresis CVAD | Trialysis® | Arterial lumen | 35cm | 0.95 |
| Venous lumen | 1.0 |
| Clear lumen | 0.55 |
| CVC | Hickman®  12FG | Large lumen | 90cm untrimmed | 2.7 |
| Small lumen | 2.0 |
|  |  |  |  |  |
| Caresite™ Luer Lock Access Device | | | | 0.22 |
| Safeflow TM Luer Lock Access Device | | | | 0.09 |

**Note:**

Priming volumes of individual lines and lumens MUST be ascertained prior to use of alteplase. Line lengths may differ as they can be shortened when inserted. Check patient record or insertion card that patient should carry**.**

**Add 10% of the determined volume to ensure fibrin sheaths at the tip of the lumen are reached**

**If the patient has a trimmed Bard Power PICC insitu refer to Intravascular Access Team for priming volume and instillation**

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| Section 13 – Ethanol Lock to Salvage an Infected CVAD |

**ALERT:**

This is a **HIGH RISK** procedure and should be considered as a last resort action.

Removal of the Central Venous Access Device (CVAD) is preferable. The procedure is only to be undertaken after consultation with the Infectious Diseases Physician or Infectious Diseases Registrar

**Background**

This procedure is to improve outcomes of patients requiring a long-term CVAD by providing an alternative to line removal, in the treatment of specific CVAD associated Blood Stream Infections.

The procedure can only be undertaken for specific brands of CVAD, infected with specific micro-organisms. See Attachment 4, for guidelines on which micro-organism may be considered for the procedure and for the absolute contraindications.

The procedure is to be used when the intent is to attempt salvage of a CVAD, in a patient who has a CVAD associated Blood Stream Infection (BSI). The seventy per cent (70%) ethanol lock solution disinfects the lumen of the CVAD, in an attempt to salvage the line. The ethanol lock is to be used in conjunction with appropriate intravenous antibiotic therapy.

**Before decision to proceed, staff must**

1. Commence clinical form Ethanol Lock Checklist Attachment 6
2. Notify *Infection Prevention and Control Unit* of the intention to undertake this procedure.
3. Consult withthe Infectious Diseases Physician or Infectious Diseases Registrar.
4. Determine if the specific micro-organism, isolated from the blood culture, is considered suitable for the procedure (See attachment 4 and review absolute contraindications).
5. Determine if the catheter is suitable:
6. CVAD’s listed in Attachment 5 – catheter volumes, are ethanol compatible. If not listed check with the catheter manufacturer prior to the procedure being undertaken.
7. Not all plastics used in CVAD manufacture are ethanol compatible. CVAD’s must be on the attached list or approved by manufacturer for the use of ethanol.
8. Ethanol can result in catheter fracture if placed in a non compatible CVAD.
9. Check priming volume of the catheter prior to instilling the ethanol lock. The volume instilled should always match the priming volume of the catheter.
10. Consider the placement of peripheral venous access for intravenous (IV) antibiotic treatment whilst CVAD is being treated.
11. Ensure the patient is aware of the indications for the procedure, risks of the procedure, alternate options and provides verbal consent prior to undertaking the procedure.

**Following decision to proceed**

The medical officer must chart an order for seventy per cent (70%) ethanol lock solution on the medication chart, to be administered between 9am and 5pm (due to availability of medical support).

Complete the **Special Access Scheme form** available from pharmacy or via the following links:

1. <https://www.tga.gov.au/sites/default/files/access-forms-sas-categorya-140901.pdf>.
2. <https://www.tga.gov.au/sites/default/files/access-forms-sas-categoryb-140901.pdf>.

The SAS refers to arrangements which provide for the import and/or supply of an unapproved therapeutic good for a single patient, on a case by case basis. Patients are grouped into two categories under the scheme:

* Category A patients are defined as 'persons who are seriously ill with a condition from which death is reasonably likely to occur within a matter of months, or from which premature death is reasonably likely to occur in the absence of early treatment'.
* Category B patients are all other patients that do not fit the Category A definition.

1. The appropriate lumen volumes and the number of lumens to be treated must be detailed before pharmacy will prepare the ethanol solution.
2. The medication chart, the completed Ethanol Lock Order Checklist and the special access scheme form must be scanned to Pharmacy before 4pm on Day one before commencement of lock therapy. Notify pharmacy immediately if therapy is to be ceased prematurely (See standard duration under Treatment Time Section).
3. The 70% ethanol lock solution will be prepared by the Pharmacy Department under laminar flow conditions. At Canberra Hospital and Health Services this will only be undertaken by the IV room during working hours (9am-4pm Mon-Sun).
4. The Pharmacy Department prepares the prescribed volume (as per medication chart order) of 70% ethanol lock solution into a 3mL syringe.
5. One syringe is used for each lumen.

**Single and Multi-lumen devices**

1. For single lumen CVAD the ethanol lock is instilled during the downtime of therapy.
2. For multi lumen CVAD the ethanol lock is instilled into the unused lumen. The lumen in use should be changed on alternate days, i.e. Day one proximal lumen is in use, ethanol lock to distal lumen. Day two proximal lumen is ethanol locked and distal lumen is in use.

#### Treatment Time

#### The minimum dwell time for the ethanol lock is 2 hours.

#### The maximum dwell time is 24 hours.

1. The ethanol lock is to be continued for a period of five days per lumen (total 10 days for multi-lumen CVAD’s with alternating locking).
2. Allow the ethanol lock to remain in the catheter while-ever the line is not in use.

**Equipment**

1. Dressing trolley
2. Detergent impregnated wipes (to clean trolley)
3. Personal protective equipment (PPE) includes, safety goggles or face shield and gown
4. Sterile gloves
5. Basic dressing pack
6. Syringes - 10mL x 3
7. 10 mL sodium chloride 0.9% for injection x 2
8. Alcohol chlorhexidine 2% swab
9. Syringes containing 70% ethanol lock solution
10. General waste receptacle
11. Clinical waste receptacle

**Procedure**

1. Check patient’s clinical record and medication chart for medical orders.
2. Check ethanol lock has been supplied by Pharmacy.
3. Attend hand hygiene before touching the patient by either hand washing or using Alcohol Based Hand Rub (ABHR).
4. Ensure Privacy.
5. Check patient identification as per Patient Identification and Procedure Matching Procedure.
6. Explain the process and purpose of the ethanol lock procedure.
7. Obtain verbal consent to proceed and document this in the patient notes.
8. Clean trolley with detergent impregnated wipes and wipe dry.
9. Collect required equipment onto base of trolley.
10. Proceed to the patient’s bedside to set up basic dressing pack and other equipment on trolley.
11. Attend hand hygiene by either hand washing or using ABHR.
12. Set up dressing pack and sterile equipment on dressing trolley using the setting up forceps.
13. Discard setting up forceps and packaging in general waste receptacle.
14. Don Personal Protective Equipment (PPE) - protective glasses or goggles.
15. Attend hand hygiene by either hand washing, with antimicrobial wash, or using ABHR.
16. Don sterile gloves.
17. Fill 2 syringes with sodium chloride 0.9% solution.
18. Swab the injection site of the lumen with alcohol chlorhexidine 2% swab. Allow to dry.
19. Access the CVAD with an empty syringe.
20. Release catheter clamp if relevant.
21. Aspirate volume of fluid equal to the volume of the catheter to remove previous ethanol solution (only if existing ethanol lock in in-situ).
22. Connect the syringe with sodium chloride 0.9% to the lumen and flush to ensure patency.
23. Connect the seventy per cent (70%) ethanol lock syringe to the lumen and instill previously determined volume of solution according to manufacturer’s recommendations (Refer to Attachment 5).
24. Care should be taken **NOT to FLUSH** the ethanol solution into the patient’s circulation.
25. Never use excessive force or pressure on a central line.
26. Re-clamp CVAD if no positive pressure bung in place.
27. Label the lumen to indicate ethanol lock in place.
28. If unable to aspirate or instill the ethanol lock solution, notify the medical officer.
29. Discard equipment and gloves into clinical waste receptacle.
30. Clean trolley with detergent impregnated wipes.
31. Attend hand hygiene by either hand washing or using ABHR.
32. Ensure patient is comfortable.
33. Document procedure and outcome in the patient’s clinical records.
34. Before using the line, staff must **aspirate** the ethanol solution and then flush each lumen with 10 mL sodium chloride 0.9%. Labelling and documentation of the ethanol lock procedure is an essential component of the communication.
35. Breaches of this procedure must be reported in the RiskMan incident reporting system.

**Monitoring During the Treatment**

|  |  |
| --- | --- |
| **Patient status** | **Management** |
| Evidence of **ongoing sepsis** following commencement of ethanol treatment | Immediate removal of CVAD |
| **Pyrexia** (>380C) persisting **within 48 hour** period following commencement of ethanol treatment | Removal of CVAD |
| **Pyrexia** (>380C) starting **more than 48 hours** following commencement of ethanol treatment | Collect blood cultures from   - all CVAD lumens and   - peripheral venepuncture  Remove CVAD if blood cultures positive |

**Post Treatment Investigations**

Two days after completion of therapy, blood cultures should be collected from all lumens of the CVAD as per the Blood Culture Collection Procedure.

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| Section 14 – Removal of a Non-Tunnelled Central Venous Catheter |

**Purpose**

The purpose of this section is to outline the process for a safe removal of a non-tunnelled central venous catheter- CVAD’s including PICCs. It does not apply for removal of long term catheters such as tunnelled lines (Hickman) or implanted venous ports. Non-tunnelled CVAD’s are only removed in the hospital setting.

A credentialed Registered Nurse may remove a short-term CVAD. Tips of ALL central lines (short and long term) MUST be sent to Pathology for culture. Cut the catheter 5cm from the tip with sterile scissors and place in a sterile specimen container. If the CVAD has evidence of infection (redness, purulent discharge etc) then Peripheral and Central Blood cultures (from the infected CVAD) must be collected and sent for culture prior to removal.

**Note:**

Some PICC lines are shortened prior to insertion so may not have a defined tip. A section of line must still be sent to Pathology. Check patient notes for the trimmed length of the PICC to ensure the line is removed intact.

**Note:**

Removal of a non-tunnelled central venous catheter is a STANDARD Aseptic Non Touch Technique using sterile gloves

**Equipment**

* PPE including safety glasses, shield or goggles
* Clean gown
* Basic dressing pack
* Gauze swabs
* Chlorhexidine 2% alcohol 70% swab x 2
* Gauze, as necessary
* Stitch cutter
* Sterile gloves
* Sterile specimen container (yellow top) for catheter tip
* Clear occlusive dressing
* Sterile scissors

**Procedure**

1. Confirm the written medical order to remove the central line.
2. Wash hands or apply ABHR.
3. Explain procedure to patient and gain consent, as appropriate.
4. Ensure privacy.
5. Wash hands or apply ABHR.
6. Prepare equipment.
7. **For PICC removal**: Position the patient so that the PICC insertion site is lower than the level of the heart. HITH patients may be positioned in a procedural chair which has been laid flat. Loosely apply tourniquet (see alert on next page) on the arm in which the PICC is inserted, in case of catheter fracture and potential migration .
8. **For CVC removal;** Position the patient supine unless contraindicated. Lower head of bed 30 degrees if tolerated. The patient should **not** be sitting out of bed for this procedure because of the increased risk of air embolus.
9. Instruct the patient in the method of performing a Valsalva manoeuvre.
10. **The Valsalva Manoeuvre:** Ask the patient to take a deep breath and hold it while the catheter is removed with even pressure. Rationale: The Valsalva manoeuvre will raise intra-thoracic pressures, decrease venous return and prevent air being drawn into the circulation. For intubated patients, ensure removal of CVAD during exhalation.
11. Practice with the patient to ensure the patient is competent in the manoeuvre.
12. Don protective glasses or goggles.
13. Wash hands or apply ABHR.
14. Don gown and clean gloves.
15. Remove the old dressing. Discard gloves.
16. Perform hand hygiene: 60 second hand wash with Triclosan hand wash up to elbows, or apply ABHR.
17. Don sterile gloves.
18. Cleanse insertion site with Chlorhexidine 2% alcohol 70% swabs x 2, minimum. Inspect the site and **allow to dry for 30 seconds.**
19. Drape the area beneath the site with a sterile drape.
20. Cut the suture knot and remove suture if applicable.
21. Grasp the catheter hub firmly. Request the patient to perform the Valsalva manoeuvre, if able. Withdraw the catheter with a constant and even pressure.
22. If removing PICC do not force line if resistance is felt, venous spasm can occur making the PICC difficult to remove and more likely to fracture.

**If resistance occurs, the following strategies may be effective:**

* Warm compresses to relax the vessel if venous spasm is the cause.
* Warm isotonic IV solution (ordered by a medical officer) infused from a site below the PICC insertion site.
* Request the patient to breathe normally.
* Immediately apply pressure to the insertion site with gauze swabs for approximately 15 minutes or until bleeding has ceased.
* Apply clear occlusive dressing to the site, over folded gauze swab. This clear occlusive dressing should remain insitu for 24 hours at a minimum.
* If the catheter is being removed because of leakage from the exit site, inspect the catheter for damage by flushing the catheter with sodium chloride 0.9% to ensure that it is intact. If it is not intact, notify the medical officer.
* Cut the catheter 5cm from the tip with sterile scissors and place in a sterile specimen container.
* Remove gloves and perform Hand Hygiene.
* Continue to observe the insertion site for ooze. Apply pressure if bleeding is significant.
* Confirm patient identity and label the specimen container with patient’s identification label, date, time & nature of specimen. Send to Pathology.
* Educate patient on aftercare and measures to take if complications occur.
* Record the procedure in the patient's clinical records.

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| Section 15 – Removal of a Tunnelled Central Venous Catheter |

**Purpose**

The purpose of this Section is to outline the safe removal of a long term central venous catheter. Central venous catheter tips of ALL central lines (short and long term) must be sent to Pathology for culture. Cut the catheter 5cm from the tip with sterile scissors and place in a sterile specimen container. If the CVAD has evidence of infection (redness, purulent discharge etc) then Peripheral and Central Blood cultures (from the infected CVAD) must be collected and sent for culture.

**Scope**

A **medical officer** must remove the long-term tunnelled central venous catheters (e.g. Hickman) in the hospital setting.

**Note:**

Removal of a tunnelled central venous catheter is a SURGICAL Aseptic Non Touch Technique

**Equipment**

* Personal protective equipment (PPE) including safety glasses, shield or goggles
* Clean gown
* Sterile gloves
* Basic dressing pack
* Chlorhexidine 2% alcohol 70% swabs
* Gauze swabs
* Syringes 10mL x 1
* Needles, 19G, 25G x 1 each
* Local anaesthetic (Lignocaine 1%) ampoules x 2
* Suture set
* Scalpel blade, size 11
* Clear occlusive dressing
* Suture material 2/0 silk
* Sterile specimen container
* Sterile scissors
* Blunt drawing up needle

**Procedure**

1. Wash hands or apply ABHR.
2. Explain procedure to patient and gain consent as appropriate.
3. Ensure privacy.
4. Don protective glasses or goggles.
5. Position the patient supine, unless contraindicated. Lower head of bed 30 degrees if tolerate:
   1. Instruct the patient in the method of performing a Valsalva manoeuvre: **The Valsalva Manoeuvre:** Ask the patient to take a deep breath and hold it while the catheter is removed with even pressure. Rationale: The Valsalva manoeuvre will raise intra-thoracic pressures, decrease venous return and prevent air being drawn into the circulation. For intubated patients, ensure removal of CVAD during exhalation*.*
6. Wash hands or apply ABHR.
7. Prepare equipment.
8. Medical Officer to perform hand hygiene: As per Surgical ANTT.
9. Assist the medical officer as required.
10. Instruct patient to perform the Valsalva Manoever.
11. Tunnelled line is removed by Medical Officer.
12. Insertion site may require suturing after removal of tunnelled catheter.
13. Cut the tip of the catheter 5cm from the tip with sterile scissors and place in a sterile specimen container:
    1. Apply clear occlusive dressing to the site, over folded gauze swab. This clear occlusive dressing should remain in situ for 24 hours at a minimum.
    2. Remove gloves, perform hand hygiene.
14. Patient to lie flat with 1 litre bag of sodium chloride 0.9% on insertion site.
15. Observe insertion site for ooze.
    1. Label the specimen container with patient’s sticky label, date, time & nature of specimen. Send to Pathology.
16. After 1 hour, allow patient to sit up. Observe site for ooze. May get up if nil ooze.
17. Record the procedure in the patient's clinical record.
18. Arrange removal of sutures if required.

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| Section 16 – Trouble Shooting Section |

**Central Venous Access Devices Trouble shooting Guide**

The invasive nature of CVAD’s and the longer dwell times are associated with higher risks for potential complications. Below is an overview of potential CVAD problems, the signs and symptoms associated, causes and risks and management. Complete Riskman reports as indicated. All suspected and confirmed complications must be documented in the patient’s progress notes, including action taken.

| **Problem** | **Symptoms/Signs** | **Causes/ Risks** | **Management** |
| --- | --- | --- | --- |
| Local Infection | * Redness * swelling * Fever * Exudate * Tenderness / pain at the insertion site * Tracking (redness extending along the catheter path) or at port pocket site * Note signs and symptoms may be subtle in immune compromised patients | * Poor CVAD management during insertion * Poor routine care * Failure to follow hand hygiene guidelines or SOP for management of CVAD’s   Increased risks:   * Presence of other infections, co morbidities and underlying illness * Age; those <1 and > 60 years are at greater risk * Type of device and number of lumens * Catheter material * Method of insertion/ site of insertion and type of fluid infused (TPN infusions at greater risk) | * Refer to medical officer * Discontinue use of CVAD if possible * Inspect dressing and site for break in sterility * Swab site for microbiology * Oral or IV antibiotics * Consider CVAD removal if unable to control infection * Short term CVAD’s should be removed once infection is established * Send tip of CVAD to microbiology * Complete Riskman report |
| Systemic Infection  Catheter related Blood Stream Infection (CRBSI) | * Fever, chills, rigors * Tachycardia * Hypotension * Shortness of breath * Tachypnoea, * Nausea and vomiting, * Diaphoresis, * Decreased level of consciousness Altered mental state * No obvious signs of alternate infection focus | Bacterial invasion – may be caused by:   * Poor CVAD management * Septic shower – accessing the CVAD and flushing microbes into the blood circulation – patient may develop Signs and symptoms from minutes to hours after the last access. | * Urgent medical review- contact treating team’ * Discontinue use of CVAD if possible * Blood cultures – all lumens plus a peripheral site * IV antibiotics * Fluid resuscitation * Cardiovascular monitoring * Activate MET if patient fits MET criteria or concerned * Complete Riskman report |
| Blocked / occluded CVAD | * CVAD won’t flush or difficult to flush/sluggish * Unable to aspirate blood * Infusion device alarms activated * Swelling in chest wall during infusion * Leakage of fluid at insertion site | * Clamped CVAD * Twisted CVAD lines * Poor flushing techniques * Infrequent flushing/ or not enough fluid used to flush line * Fibrin clots due to reflux of blood into the catheter * Chemical precipitation in the line due to delay in flushing line once fluids are ceased/completed * Line tip against vein wall * Incorrect use of crutches if applicable * Malpositioned tip | * Check line – ensure all clamps in fluid path are undone * Check for kinks and twists * Flush with 0.9% sodium chloride in 10mL syringe using a pulsatile action (stop, start motion; See section 9)   **Do not use undue force to flush line**   * Ask patient to change position, cough, raise arm * If line remains blocked refer to IVAT for treatment to unblock CVAD as per section 10 * Check CXR to determine tip position * Refer to physiotherapist for mobility aid assessment if appropriate |
| Venous Thrombosis  Superior Vena cava Thrombosis | * May have swelling of the neck, face, arm or supra clavicular area * Chest, neck, jaw, arm or leg pain (femoral lines) * Headache * Numbness and redness of the affected arm or leg * Claudication in limb, hand or foot * Prominent neck veins * Leakage form CVAD exit site * Poor flow rates/difficulty flushing * Inability to aspirate blood | CVAD’s that are at a greater risk of thrombosis include:   * Poor tip placement – those not at the cavoatrial junction are at greater risk * Length of dwell time – increased incident of thrombus with lines in for a greater length of time * CVAD’s with multiple lumens * Infusions of hyperosmolar or sclerosing agents i.e. TPN * Mechanical trauma to vein * Patients with hyper coagulation states and certain malignancies i.e. adenocarcinoma lung * Patient immobility | * Refer to Medical officer for ultrasound investigation * Monitor Vital signs * Check measurements of upper arm/ wrist with baseline from insertion (CVAD sticker) * Cease use of CVAD if possible * Anticoagulant therapy as directed by MO * Removal of CVAD * Line replacement using an alternate site |
| Breaking or splitting of lumens | * Fluid leaking – blood or infusion leaking onto the dressing and/or around exit site * Pain and or swelling along CVAD pathway, neck, chest. | Accidental damage   * Never use scissors or sharp implements to remove dressings. * Use dedicated clamps or protected clamps only   Flushing lines with syringes <10mL diameter – smaller syringes increase pressure and can cause fractures or splits in the line | * Clamp CVAD with protected clamps between exit site and site of leakage * Discontinue use of CVAD * Wrap CVAD in sterile gauze and notify Medical officer to repair or replace as soon as possible |
| Air embolism  **Potential life threatening situation** | Signs and symptoms increase in severity the larger the embolus present. They may include:   * Dysponea * Chest pain * Tachycardia * Cyanosis * Thready pulse * Hypotension * Nausea * Syncope * Confusion * Decreased level of consciousness * Seizures * Cardiovascular collapse | * CVAD lines unclamped or open without needleless injection cap or syringe attached * Patient breathing in deeply during insertion/procedures or when line is open to air * Larger sized catheters increase the risk   Following removal:   * A persistent tract in the patient after CVAD removed * CVAD removal site not covered with an occlusive dressing | This is a potentially life threatening situation requiring immediate action   * Clamp CVAD * Activate MET if MET criteria meet * Apply oxygen assess DR ABC as necessary * Place patient head down on the left side in Trendelenburg position * Contact treating team * Investigate cause * Complete Riskman report |
| Pneumothorax | * Shortness of breath shortly after insertion * Decreased breath sounds * Chest pain * Cyanosis | This is an increased risk with subclavian and jugular insertions | * Notify Medical Officer * Activate MET if criteria reached * Cease fluids/infusion via CVAD * Chest X ray to confirm diagnosis * Insertion of intercostal catheter * Complete Riskman Report |
| Cardiac tamponade  **Potentially fatal complication of CVAD insertion** | * Dyspnoea * Tachycardia * Hypotension * Chest pain * Syncope * Fatigue * Respiratory distress * Distended neck veins * Shock * Anuria * Agitation and restlessness * Muffled heart sounds * Pulsus paradoxus | Occurs during CVAD insertion due to guide wire or catheter perforation of pericardium.   * May occur as a late complication due to erosion of CVC into pericardial space * Patients on anticoagulant therapy and those with poor existing health status are at greater risk | * Activate MET * Cease using CVAD – using the same CVAD can exacerbate the situation * Fluid administration via alternate device * Drainage of pericardial collection |
| Cardiac Arrhythmias  Decreased cardiac output | * Pulse rate changes or ECG rhythm changes * Haemodynamic instability and signs of shock may be present | Catheter tip mal positioned or migrated to right atrium or ventricle   * Most often occurs during insertion however can occur at any time if CVC tip is located in the heart chambers. | If patient unstable activate MET   * Notify inserter/MO * ECG monitoring * Cease use of CVAD * Treat arrhythmias and/or decreased cardiac output * Check site for migration of CVAD further into patients vasculature * Chest X-ray to determine tip position * Withdraw CVAD tip to lower third of SVC if indicated by CXR |
| CVAD Tip Migration | * Inability to flush line * Patient experiences a sensation in the neck or whooshing noise in ear when line is flushed * Line has migrated in or out by more than 2 cms | * Excessive/violent coughing spasms, vomiting * Strenuous upper arm movements from exercise, employment or hobbies | * Cease CVAD infusion * Chest X Ray to check tip position * If tip is no longer in the SVC: * Refer to IVAT for repositioning /salvage * Replacement if unable to reposition tip |
| Infiltration/Extravasation | * Pain, tenderness or burning at insertion site and/or along catheter tunnel * Oedema, redness, swelling * Fluid leakage at exit site * Resistance to flushing | * Development of fibrin sheath at tip of catheter * Thrombus of vein along CVAD location | * Cease infusion – necrosis from vesicant drugs may occur up to two weeks after extravasation * Refer to Medical officer/Medical Imaging for investigation of line. |
| Pinch off syndrome | * Inability to withdraw or infuse fluids. * May improve following repositioning of the patient | CVAD is compressed by the clavicle and first rib   * More commonly occurs in tunnelled lines | * Chest Xray to confirm catheter position. * Refer to Medical Imaging for management/salvage of line |
| Difficulty removing line | * Resistance felt when trying to remove CVAD, line does not withdraw when gently pulled or stops and will not withdraw further | * Spasms of vein while removing line * Twists and kinks in the line * Fibrin formation | * Do not use force   For PICC removals:   * Stop withdrawal, wait try again to remove gently * Warm extremity – apply warm blankets * Run warmed 0.9%NaCl through line and attempt removal * If unable to remove- cover with sterile occlusive dressing and refer to medical imaging for removal under ultrasound * For Internal Jugular or Subclavian CVC’s: * Inform MO and refer to Medical Imaging for removal under ultrasound |

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| Related Policies and Standard Operating Procedures |

**Policy**

* Health Directorate Nursing and Midwifery Continuing Competence Policy
* CHHS Consent and Treatment policy
* CHHS Medication Handling Policy
* Health Directorate Consumer and Carer Participation in ACT Health Policy

**Procedures**

* CHHS Healthcare Associated Infections procedure
* CHHS Wound Management procedure
* CHHS Aseptic Non Touch Technique
* CHHS [Patient Identification and Procedure Matching procedure](http://inhealth/PPR/Policy%20and%20Plans%20Register/Patient%20Identification%20and%20Procedure%20Matching%20Procedure.docx)
* Health Directorate [Patient Identification - Pathology Specimen Labelling](http://inhealth/PPR/Policy%20and%20Plans%20Register/Patient%20Identification%20-%20Pathology%20Specimen%20Labelling.docx)
* CHHS Clinical Handover procedure
* Blood Culture Collection procedure

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| Definition of Terms |

**Apheresis -** Process in which the blood of a donor or patient is passed through an apparatus that separates out one particular constituent and returns the remainder to the circulation.

**Arterial lines –** A small thin plastic tube, similar to an IV catheter that is inserted into an artery, allowing for continuous invasive haemodynamic monitoring and for frequent access.

**Arteriovenous fistulae -** (AV fistula) the connection of a vein and an artery, usually in the forearm, to allow access to the vascular system usually for renal replacement therapy, a procedure that performs the functions of the kidneys in people whose kidneys have failed. Connecting the vein and artery is a surgical procedure. The fistula develops over a period of months after the surgery. *AV Fistula and loop cannulation require expertise and should not be attempted by inexperienced staff unless the patient is in a life threatening situation with no other suitable access.*

**Ateriovenous Graft -**(AVG) arteriovenous fistula consisting of a venous autograft or xenograft or a synthetic tube grafted onto the artery and vein. *AV Fistula and loop cannulation require expertise and should not be attempted by inexperienced staff unless the patient is in a life threatening situation with no other suitable access.*

**Blood Stream Infection (BSI) / bacteraemia** - the presence of bacteria in the blood demonstrated by growth of microorganisms in a blood culture.

**Cavoatrial junction** The junction of the distal end of the Superior vena cava and right atrium

**Central Venous Access Device** A catheter placed into a large vein in the neck (internal jugular vein), chest (subclavian vein), groin (femoral vein), basilica/brachial or cephalic vein in the upper arm (PICC) with the tip terminating at the Cavoatrial junction

**Central venous catheter (CVC)** *-* as above but placed into the jugular, femoral or subclavian veins. These catheters may be tunnelled or non-tunnelled.

**Clinician** – refers to medical officers, registered nurses and midwives and enrolled nurses.

**Ethanol** - (alcohol) a clear colourless volatile liquid used as a topical antiseptic and solvent.

**Hickman / BroviacTM CVC** - a brand of central venous catheter manufactured by Bard, tunnelled under the skin to the vein, for long term administration of substances via the venous system. These can have either a single or double lumen.

**Implanted venous port -** A tunneled catheter that is implanted entirely under the skin. Infusate is injected through the skin into port with a non coring needle (gripper).

**Infusate -** A fluid given intravenously over a period of time for medication or diagnostic purposes.

**Intraosseous access device -** A device used for the injection of infusate directly into the marrow of the bone.

**Invasive haemodynamic monitoring -** Measurement and interpretation of invasive haemodynamic parameters to determine cardiovascular function blood sampling.

**IVAD -** Intravascular access device – Any medical device inserted into a patient’s vascular system to allow the administration of medication, fluid or nutrition or for the removal of blood. Includes peripheral intravenous cannulae (PIVC), midlines/extended dwell caths, implanted venous port, central venous access devices either tunnelled (Hickmans) and non-tunnelled and peripherally inserted central catheters (PICCs), haemodialysis / apheresis catheters intraosseous devices, arterial lines, arteriovenous fistulae, arteriovenous loops (AVG) and umbilical catheters.

**Midline/Extended Dwell catheter** A

**PICC -** Peripherally Inserted Central Catheter

**Pyrexia** *(*fever) -elevated body temperature above the normal circadian range.

**Tunnelled Central line -** A catheter that is inserted into a vein at one location (neck, chest or groin), and tunneled under the skin to a separate exit site.

**Haemodialysis Central Venous Catheter (Vas-cath™)** A specialised central venous catheter used primarily in dialysis and stem cell harvest / transplantation. It is usually inserted via the femoral or jugular vein, it may be tunnelled or non-tunnelled.

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|  |
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| Search Terms |

CVAD, PICC, Central, Port a Cath, Intravenous Access, Implanted Venous Port, CVC, IVA, Ethanol lock

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| Attachments |

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Attachment 6 – Ethanol Lock Order Checklist

**Disclaimer**: *This document has been developed by ACT Health, Canberra Hospital and Health Service specifically for its own use. Use of this document and any reliance on the information contained therein by any third party is at his or her own risk and Health Directorate assumes no responsibility whatsoever.*

|  |  |  |
| --- | --- | --- |
| Date Amended | Section Amended | Approved By |
| 10 Aug 2017 | * Reference to Urokinase replaced with alteplase * incorporated changing the needleless injection caps weekly for CACHS staff | CHHS-PC |
|  |  |  |

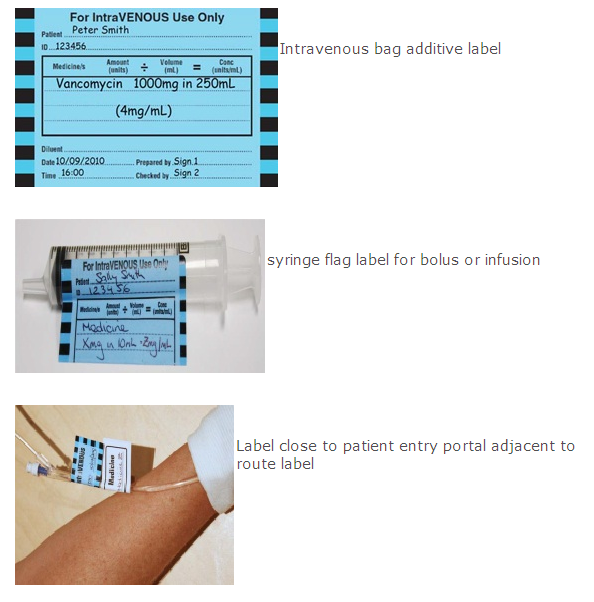
## Attachment 1 – IVAD Decision Tree



## Attachment 2 – Intravenous Access Device Decision Tree *(guideline for vascular access)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of Device** | **Dwell Time** | **Advantages** | **Disadvantages** |
| **Peripheral Intravenous Cannula**  **(PIVC)** | Short term  **72 Hrs per cannula** | Ease of insertion  Low cost  Minimal complications | Easily occluded  Easily dislodged  Potential for local tissue injury  Use limited to certain antibiotics or medications  Risk of thrombosis  Risk of infection |
| **Power Glide / Midline/ Extended dwell Catheter** | **28 days** | Can be used for patients that require up to 4 weeks of IV therapy  **Inserted under Surgical Aseptic technique** | **Not for use with irritant/ Vesicant medications** |
| **Central Venous Catheter**  **Non Tunnelled** | Short Term (4 -14 Days device and site dependant) | Can manage multiple medications  **Can be inserted at the bedside** | Potential for Complications during insertion  **Potential for later thrombosis and infection** |
| **Peripherally inserted central catheter**  **(PICC)** | Short-to- intermediate term  **(Up to 1 year)** | Ease of insertion  Can be used with variety of medications  May be used in the home or outpatient setting  **Relatively safe and inexpensive** | Potential for occlusion and/ or malposition  **Potential for thrombus formation and infection** |
| **Central Venous Catheter Tunnelled**  **(eg, Hickman, Broviac)** | **Long term** | Less thrombogenic (than PICC)  Decreased infection rate  **Safe with most medications** | Increased cost  Requires surgical insertion under sedation  **Risk of infection** |
| **Implantable venous port** | **Long term** | Low visibility, improved body image  Lowest rate of infection  **Lower cost of maintenance** | Increased cost  Requires surgical insertion  **Risk of infection** |

## Attachment 3 – Labels

## Attachment 4 – Micro organisms for which Ethanol Lock may be considered

In consultation with the Infectious Diseases Unit, the following table has been developed as a guide to the organisms for which ethanol lock therapy may be considered.

|  |  |  |
| --- | --- | --- |
| **Absolute Exclusions** | **Considered** | **Inclusions** |
| *Staph. aureus* – MRSA & MSSA | *Acinetobacter* species | *Coagulase Negative Staph*. (CNS) |
| All *Candida species* | *E. coli* | *Corynebacterium* species |
| *Pseudomonas aeruginosa*  - in a neutropenic patient | *Enterobacter* species | *Proprionibacterium* species |
| **Any organism** causing severe sepsis syndrome or septic shock | *Enterococci* species | *Bacillus* species |
|  | *Klebsiella* species |  |
|  | *Pseudomonas* species - in a non neutropenic patient |  |
|  | *Serratia* species |  |
|  | *Stenotrophomonas* species |  |

**NB:** management of all other microorganisms considered on a case by case basis

## Attachment 5 – Catheters brand and catheter volumes (alphabetical)

**NB:** these are untrimmed catheter volumes and need to be recalculated if the catheter has been shortened at time of insertion.

|  |  |  |  |
| --- | --- | --- | --- |
| **Company / Catheter Type** | **Lumen colour** | **Internal Lumen Size** | **Volume to be Injected** |
| **ARROW (Teleflex)** | | | |
| ALL Arrow catheters are polyurethane and **NOT** Ethanol Compatible | | | |
| **BARD** | | | |
| *Silicone catheters only* | | | |
| HickmanTM 9.6 Fr single lumen |  | 1.6 mm | 1.8 mL |
| HickmanTM 7.0 Fr dual lumen | White | 0.8 mm | 0.6 mL |
|  | Red | 1.0 mm | 0.8 mL |
| HickmanTM 9 Fr dual lumen | White | 0.7 mm | 1.0 mL |
|  | Red | 1.3 mm | 1.75mL |
| HickmanTM 9 Fr Paeds dual lumen | White | 0.7 mm | 0.6 mL |
|  | Red | 1.3 mm | 1.3 mL |
| HickmanTM 10 Fr triple lumen | White | 0.8 mm | 0.8 mL |
|  | Blue | 0.8 mm | 0.8 mL |
|  | Red | 1.5 mm | 1.4 mL |
| HickmanTM 12 Fr dual lumen | White | 1.6 mm | 1.8 mL |
|  | Red | 1.6 mm | 1.8 mL |
| HickmanTM 12.5 Fr triple lumen | White | 1.0 mm | 0.7 mL |
|  | Blue | 1.0 mm | 0.7 mL |
|  | Red | 1.5 mm | 1.6 mL |
| BroviacTM 2.7 Fr Single lumen |  | 0.5 mm | 0.15 mL |
| BroviacTM 4.2 Fr Single lumen |  | 0.7 mm | 0.3 mL |
| BroviacTM 6.6 Fr Single lumen |  | 1.0 mm | 0.7 mL |
| BroviacTM 6.6 Fr short length Single lumen |  | 1.0 mm | 0.7 mL |
| GroshongTM | Variable as lines are trimmed to size | | |
| **COOK** | | | |
| *Silicone catheters only* | | | |
| Cook TPN™ Catheter Set |  |  | Check on Catheter Hub for Untrimmed CVC volume |
| **PORT A CATH® Implantable Venous Access Systems (Smiths Medical)** | | | |
| ALL Port A Cath catheters are polyurethane and NOT Ethanol Compatible | | | |
| **SMART PORT Implantable Venous Access Device ( AngioDynamics)** | | | |
| Use of Ethanol **NOT** supported by the Company | | | |

Attachment 6 – Ethanol Lock Order Checklist 