

CLINICAL PROCEDURE

PRINCIPLES OF MANAGEMENT OF CENTRAL VENOUS ACCESS DEVICES (CVADs)

TARGET AUDIENCE

All Peter Mac staff responsible for the management CVADs and who have been appropriately credentialed (please refer to the credentialing statement below).

STATE ANY RELATED PETER MAC POLICIES, PROCEDURES OR GUIDELINES

[Hand Hygiene Procedure](#)

[Aseptic Technique Procedure](#)

[Blood Sampling from a Central Venous Access Device \(CVAD\) Procedure](#)

[Central Venous Access Device \(CVAD\) Dressing, Securement Device Change and Cap Change Procedure](#)

[Implanted Port Management Procedure](#)

[Removal of a Central Venous Access Device \(CVAD\) Procedure](#)

[Use of Alteplase \(r-TPA\) to Unblock Occluded Central Venous Access Devices \(CVADs\) Guideline](#)

PURPOSE

This document outlines evidence-based best practice for the management of PICCs and central venous access devices (CVADs) in adult patients at Peter Mac.

This guideline covers the following:

[Credentialing requirements for CVAD management](#)

[Principles for insertion of a CVAD](#)

[Post-Insertion Management of CVADs](#)

[Asepsis and CVAD care](#)

[Assessment of CVADs](#)

[CVAD dressing materials](#)

[Dressing and cap change procedure principles](#)

[CVAD securement and sutures](#)

[CVAD infusion line management](#)

[Access and maintenance of PICCS, CVCs, Vascaths and Hickmans](#)

[Power-injectable devices](#)

[Access and maintenance of Implanted Ports](#)

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[Vortex LP Ports and Bard High Flow Apheresis Implanted Port management](#)

[Access and maintenance of Permacaths](#)

[Femoral CVADs](#)

[CVAD troubleshooting](#)

[Documentation requirements for CVADs](#)

[Removal of CVADs](#)

Management of RMH Acute Leukaemia and Allogenic Transplant patient CVADs

For patients under the age of 16 requiring paediatric management of CVADs at Peter Mac please refer to the Royal Children’s Hospital guideline [Royal Children’s Hospital CVAD Management Guideline](#). This document provides principles to guide practice in relation to the immediate post insertion and ongoing device management.

For patients being treated for **acute leukaemia, or those undergoing allogeneic bone marrow transplant at the Royal Melbourne Hospital** - The following dressing approach is required if a tunneled CVAD is in use: Use a “sandwich style” dressing with IV 3000 and a Biopatch for tunneled lines.

Credentialing for CVAD management

To ensure standardised management of CVADs an evidenced based standard is required, staff must undertake education, training and assessment in management of a patient with a CVAD to be able to care for a patient with a CVAD at Peter Mac.

This education includes a period of supervised practice as per the requirements of the Unit or Department Manager and completion of an assessment. Evidence of completion of these requirements must be submitted to the relevant manager for approval, as part of their scope of practice. Nursing staff seeking recognition of current competence must also comply with this requirement and submit their evidence to a Nurse Educator/Practice Development Nurse or Nurse Unit Manager.

PROCEDURE

1 Guidelines for the Insertion Procedure

- 1.2 To make a booking for a central venous access device a CVAD order is generated in Epic. Medical staff and nurse practitioners/clinical nurse consultants requesting a device for insertion are responsible for ensuring the device selected, and the number of lumens of the device, is appropriate for the patient’s treatment. The ordering clinician must complete the device line care plan as part of the order set.
- 1.3 Insertion of devices outside of Cancer Imaging business hours should be discussed with the patients Consultant and the urgent clinical need for a central access device determined.

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- 1.4 After hours in an emergency: The high acuity team and the After Hours Hospital Coordinator is to be involved in the plan to insert a temporary line to determine if the CVC can be inserted in Cancer Imaging, ICU at RMH or theatre.
- 1.5 All patients must have had a recent full blood examination (FBE) prior to the line insertion, including platelet count, APTT and INR.

Guideline for Insertion of CVAD: target haemostasis thresholds

*Please note this is a guide only for haemostasis thresholds. Please contact the CI nursing staff who will check with the Interventional Radiologist or Medical officer inserting the device for patient specific preparation information.

	INR	Platelets (x 10⁹/l)	Cease antithrombotic
Subclavian CVAD	<1.5	>50	Yes
Internal Jugular CVAD	<2.5	>20	No
Implanted Port – brachiocephalic/subclavian	<1.5	>50	Yes
PICC-brachiocephalic	<2.5	>20	No

- 1.6 Documentation of the insertion procedure and device specific details for CVADs inserted at Peter Mac can be found in the Interventional Radiologist’s insertion note, within the implanted device note and in the patients LDA navigator under the CVAD device demographics. It is the responsibility of the assisting nurse in Cancer Imaging to add the CVAD to the patients LDA navigator following insertion.
- 1.7 Consent for procedure – The patient should receive information and education about the device and rationale for insertion prior to giving informed consent. Consent is to be obtained by the Interventional Radiologist (clinician inserting the line) immediately prior to the procedure. Following completion of consent the document should be scanned into the patients’ medical record.

2. Post Insertion Care of a CVAD

For outpatients

- 2.1 Detailed patient education is required following the insertion of a CVAD in the outpatient setting. Upon discharge, all patients should be provided with the following information:
 - Written information advising the type of CVAD inserted & specific care that is required (i.e. no heavy lifting on side device is inserted, need for weekly dressing

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changes/flushes if not in use, keep dry and intact, no swimming whilst device insitu)

- Written information on the insertion of a CVAD can be accessed via Eviq.
- Instruction to check their CVAD site daily, observing for:
 - Signs and symptoms of infection (redness, swelling, pain/discomfort)
 - Catheter damage or migration
 - Non-intact dressing and presence of discharge and/or bleeding
- Action to take in the event any of the above is observed
- Contact details of 24/7 medical/nursing support
- Details of when suture removal is required, and the plan for removal of sutures (if applicable, see section 7.2 'Sutures')

2.2 A referral to either Peter Mac at Home, a visiting nurse service or an outpatient CVAD appointment in outpatient pathology needs to be made for care of the patients CVAD as an outpatient. The patient should be discharged with relevant written information regarding the type of CVAD inserted and adequate equipment and supplies should also be provided for patients with Peter Mac at Home/visiting nursing service follow up.

For outpatient follow up bookings can be made by emailing opathologydressings@petermac.org or by calling 85598110. The referral should include the following information:

- Patients' name and UR
- The preferred time and date of the appointment
- Please ensure the patient has a line care plan when referring patients to outpatient pathology for follow up line care.

For inpatients

2.3 Inpatients should also receive detailed education following the insertion of their CVAD. (See 2.1 above for further information and follow up arranged for CVAD care on discharge).

3. Asepsis

3.1 Routine hand hygiene with either soap and water or alcohol-based hand rub is to be performed before and after handling any CVAD.

3.2 Accessing a CVAD through the cap with a syringe, infusion line or via injection ports on an infusion line requires the use of non sterile gloves and aseptic non-touch technique.

3.3 Accessing a CVAD by removing the caps is a sterile procedure requiring routine hand hygiene with either soap and water or alcohol-based hand rub and sterile gloves.

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- 3.4 Use the scrub the hub method (as defined below) to minimise the risk of catheter-related blood stream infections when accessing all types of catheters and when accessing an infusion line and allow time for the hub to dry before accessing.
- 3.5 To minimise the risk of catheter-related blood stream infections and catheter occlusion, frequent connection and disconnection of lines should be avoided e.g. for bathing/showering.
- 3.6 An antimicrobial 2% chlorhexidine gluconate with 70% ethanol protective barrier swab should be used to clean the exit site of all central venous access devices to prevent catheter colonisation or catheter related blood stream infections. Patients who have an allergy to chlorhexidine can have their insertion site cleansed using aseptic technique with either N/Saline or Betadine followed by frequent monitoring and assessment of the site. For guidance with patients with chlorhexidine allergies contact Infection Prevention.
- 3.7 Signs of infection including pain, swelling, redness or tracking should be immediately reported to the responsible medical officer and documented.

4. Regular Assessment

- 4.1 The CVAD insertion site must be assessed:
 - At least once every shift for inpatients and recorded in the LDA section in the EMR. This information can be documented on the Avatar
 - At each episode of care for ambulatory care patients and documented in the patients CVAD Avatar.
- 4.2 The insertion site should be palpated through the intact dressing to assess for tenderness or pain.
- 4.3 The insertion site and surrounding skin should be assessed for any sign of local infection, including redness, swelling or discharge.
- 4.4 PICC exit sites must be assessed for catheter migration. The catheter should be assessed and measured from hub to exit site using the markings on the catheter. Always refer to the documentation on the insertion report or Avatar to confirm position measurement for devices inserted at Peter Mac, RMH or RCH. A general approach to managing catheter migration is as follows: If the CVAD appears to have migrated inwards or outwards from the initial measurement, which is documented in the demographics section of the device in the patients LDA, discuss with the medical team/interventional radiologist for further advice. Any CVAD migration associated with patency issues (unable to flush or yield) must be investigated immediately and the CVAD should not be used.
- 4.5 CVADs and insertion sites must be assessed for:
 - Dressing integrity/catheter integrity
 - Suture/securement device integrity
 - Signs and symptoms of infection

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4.6 Assessment of catheter patency:

- Lumens should be accessed only when required to minimise the risk of catheter-related blood stream infections.
- All devices must be flushed to maintain patency at least every 7 days for both inpatients and ambulatory care patients and every 4-6 weeks for implanted ports. (refer to the Implanted Port clinical procedure for more details)
- Lumen patency and position must be confirmed prior to accessing all CVADs.

4.7 It is the responsibility of the patient's primary Consultant and the nurse caring for the patient to ensure that the CVAD is regularly assessed and reviewed to ensure the device is still required and to arrange for removal of the CVAD as soon as it is no longer required.

5. Dressing Materials

5.1 Transparent semi-permeable membrane (TSM) dressings are the dressings of choice at Peter Mac e.g. Opsite IV3000. A single layer of dressing should be applied to cover the CVAD insertion site. **For patients being treated for acute leukaemia, or those undergoing allogeneic bone marrow transplant a slightly different dressing is required. A sandwich style dressing is required for tunneled lines using IV 3000 as the dressing of choice for these patients.**

5.2 In the case of patient allergy to TSM dressings, either sterile gauze or alternative self-adhesive transparent polyurethane dressing e.g. Tegaderm HP or a self-adhesive nonwoven fabric dressing e.g. Mefix may be used. Tape allergies and hypersensitivities for CVAD care must be documented in the patient's allergies.

5.3 Gauze dressings covered with either a TSM or a nonwoven fabric dressing must be changed at least every 48 hours or as required if not completely intact, dry and clean.

5.4 A Biopatch should be applied to the exit site of all PICCs, tunneled and non-tunneled central venous access devices on insertion. Thereafter;

- A Biopatch should be used for the first 7 days following insertion only on PICC lines.
- A Biopatch is to be changed weekly and used on tunneled devices at every dressing change (for the life of the line).
- A Biopatch is not required on accessed implanted ports.

5.5 CVADs should not be submerged under water e.g. whilst having a bath. Showering is only permissible if the CVAD and dressing are made waterproof with a cover to reduce the risk of introducing organisms into the catheter or exit site. A disposable plastic sleeve (available from Peter Mac Supply Department), or a plastic bag sealed with dressing tape must be used to keep the CVAD and exit site dry while the patient is bathing or showering.

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6. Dressing and cap changes

- 6.1 A thorough assessment ([see section 4.5](#)) should be done 24 hours following insertion of all PICCs and CVADs and the dressing changed only if not intact or post insertion bleeding is present at the site.
- 6.2 Outpatients having a CVAD inserted will require a referral to PM@H or a visiting nursing service for a follow up home visit after 7 days for a dressing and cap change and weekly thereafter.
- 6.3 TSM dressings should then be changed every 7 days and as required if not completely intact, dry and clean.
- 6.4 Neutron and Clave caps must be changed every 7 days.
- 6.5 Where practical, the dressing should be performed at the same time as cap change and/or line changes.
- 6.6 Details of dressing and cap changes should be documented on the Avatar in the patients' medical record.
- 6.6 **A flat pressed dressing is the preferred dressing choice for patients with a CVAD. However, for patients with acute leukemia, and patients during and post allogenic transplant, a sandwich style dressing is required. This is to assist with better securement of the dressing.** However, Hickman's and Permacaths may be left uncovered when completely healed.
- 6.7 Implanted port insertion sites may be left uncovered when not accessed once the surgical incision has healed usually within 7-10 days.
- 6.8 Patients who have an allergy to chlorhexidine can have their insertion site cleansed using aseptic technique with either N/Saline or Betadine followed by frequent monitoring and assessment of the site.

Refer to [Central Venous Access Device \(CVAD\) Dressing and Securement Device Change and Cap Change Procedure](#)

7. CVAD Securement

7.1 Adhesive securement devices

Securement devices for PICCs e.g. StatLock® devices should be changed every 7 days with the dressing change, or if not completely dry and intact. The skin prep swab should be used prior to applying a StatLock®. An antimicrobial 2% chlorhexidine gluconate with 70% ethanol protective barrier swab should be used to remove the StatLock® as the adhesive is dissolved with alcohol and therefore causes less discomfort for patients with removal.

The skin integrity under the StatLock® should be closely monitored and the site adjusted/ rotated if required. No other dressing should be placed under the StatLock®.

PICCs should be measured to monitor for migration. PICC line measurements will be documented in the insertion report and on the device information in the patient's

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Avatar. Device measurements should be done on insertion and as part of the routine assessment requirements

Refer to [Central Venous Access Device \(CVAD\) Dressing and Securement Device Change and Cap Change Procedure](#)

7.2 Sutures

CVC's have non-absorbable sutures that remain in situ for the life of the device.

For implanted ports non-absorbable sutures are removed 7 days after insertion when there is adequate healing of the surgical incision.

Hickman's and Permacaths have non-absorbable sutures that are removed from the puncture entry site 7 days after insertion and from the exit site 14 days after insertion when there is adequate granulation into the catheter cuff and tunnel to ensure the device is well anchored. A securement device can be used on a Permacath, if required, to assist with anchoring the device whilst it is healing.

8. CVAD infusion line management

- 8.1 Continuous administration lines must be changed every 96 hours or sooner if the integrity of the line becomes compromised.
- 8.2 Lines must be labelled with the required user applied 'Central Venous' adhesive labels with the date of the line assembly and connection.
- 8.3 Blood infusion sets must be changed immediately following completion of blood products. This includes hematopoietic progenitor cell lines. For multiple transfusion of multiple products the primary infusion line must be changed a minimum of every 12 hours or if the flow rate is compromised or when a different blood product is to be administered (e.g. Blood and platelets). Refer to Transfusion guidelines for further detailed information.
- 8.4 Lines used to infuse total parenteral nutrition (TPN) must be changed every 24 hours.
- 8.5 Documentation of infusions and medications administered via a CVAD should be completed by linking the infusion/medication to the patient's CVAD lumen on the Avatar.
- 8.5 Where practical, the line change should be performed at the same time as cap change and/or exit site dressing.
- 8.6 Where patients are mobile, lines should be secured with cotton tape and or an elastic viscous tubular bandage around the patient's arm.
- 8.7 Use of a Bifurcator – to be used if blood products are required (as per the detail in the Red Cell policy) and for all inpatients who have continuous IVT or TKVO lines attached so that blood samples can be obtained from the lumen as required without disconnecting infusions.
- 8.8 **To minimise the risk of catheter-related blood stream infections and catheter occlusion, frequent connection and disconnection of lines e.g. for bathing/showering**

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must be avoided. If a line is disconnected for any reason a new administration line must be established.

9. Access and maintenance of CVADs

Power-Injectable Devices

9.1 Peter Mac insert power-injectable PICCs, Implanted Ports and CVC's. Insertion documentation includes the types of device inserted and if it is a power-injectable device. Power-injectable devices can also be identified by the marking 'CT' on the catheter hub. Only power-injectable devices can be used for CT contrast injections and this must be confirmed prior to use (review device insertion notes, check for markings on the device and ask patient for any confirming documentation they may have). Cancer Imaging nursing staff & Radiographers will undertake this check prior to using the device for CT procedures. Devices should be disconnected from infusions on the CT lumen prior to transfer to Cancer Imaging for a CT scan. Power injectable gripper needles should be used when accessing power injectable Implanted Ports.

PICCs, CVC's, Vascaths, Hickman's access and management

9.2 Accessing and de-accessing PICCs, CVC's and Hickman's require the same principles of management.

9.3 **Neutrons must be used on all lumens – excluding Permacaths which require Clave bungs to distinguish them as a device that requires a heparin lock.**

9.4 Before accessing any CVAD the scrub the hub method must be used to disinfect the device.

9.5 Do not use syringes smaller than 10ml to directly access a CVAD. Use of smaller syringes increases pressure on the catheter wall and increase the risk of catheter rupture.

9.6 10ml syringes must be used when flushing PICCs to generate sufficient pressure to adequately flush the line.

9.7 Catheter patency must always be established on initial access by aspirating a small volume of blood (less than 1ml) from the CVAD lumen. This blood must then be discarded.

9.8 Flush with 10-20ml sodium chloride 0.9% before and following the administration of any substance using a pulsatile stop start technique.

9.9 **PICC lines should not be clamped.** Clamping of PICC lines should only occur during a cap change.

9.10 **Hickman lines must be clamped in the 'clamp here' zone when not in use.**

10. Implanted port access and management

10.1 Access of the implanted port should be avoided within the first week after insertion, to allow for adequate healing.

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For outpatients receiving continuous infusions in the community the non-coring gripper needle should be monitored and changed every 7 days.

For outpatients receiving treatment over multiple consecutive days, to avoid multiple accesses, assessment and planning should be completed prior to discharging the patient home with a non-coring safety gripper needle insitu.

Assessment and planning should include;

- Assessment of patient and treatment requirements
- Adequate follow up and planning for the patient and device should treatment no longer take place as planned
- Verbal and written education must be provided to the patient going home with a non-coring gripper needle. This information should include keeping the dressing and port site dry, monitoring the dressing and non-coring safety gripper needle, 24/7 contact details for assistance should the non-coring gripper needle become dislodged or the patient has any concerns about their accessed implanted port
- Assessment and planning for outpatients with accessed implanted ports should be documented in the appropriate sections of the EMR

10.2 For power-injectable implantable ports only power non-coring safety gripper needles should be used.

10.3 The non-coring safety gripper needle (and covering dressing) must be changed every 7 days.

10.4 Flush the non-coring gripper needle with 20mls sodium chloride 0.9% when disconnecting infusion lines (using 2x10ml syringes).

10.5 Flush and lock the non-coring safety gripper needle with 5mls of heparinised saline (50 units/5ml) in a 10 ml syringe when de-accessing implanted ports. Ensure that all lumens of multiple-lumen implanted ports are heparin locked.

10.6 Implanted port patency must be confirmed and the heparin lock replaced every 4 to 6 weeks when the port is not in use. Ensure that the patency of all lumens of multiple-lumen implanted ports is confirmed and each lumen is heparin locked.

10.7 The dose and volume of heparin must be prescribed in the patient's line care plan. Patients being discharged with a community nursing service outside the PM@Home boundary require a long term drug chart and dispensed heparin and saline to go home with the patient.

10.8 Documentation of implanted port care should be completed on the patients Avatar. Documentation for implanted ports occurs as 2 devices on the patient's Avatar. The implanted port and the gripper needle are documented separately. It is important to ensure only the gripper needle is removed when an implanted port is deaccessed, and the implanted port (device) remains on the Avatar (until it requires removal in Cancer Imaging)

10.9 **Vortex LP Implanted Ports & Bard High Flow Apheresis Ports** – are devices required for specific Apheresis procedures as they are able to withstand higher flow rates due to a

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larger reservoir capacity and lumen size. The rounded reservoir of these ports is designed to reduce the build-up of sludge and reduce occlusions. **These devices are not power injectable and must not be used for injection of CT contrast.** They are however MRI compatible. Access is with either a specific non coring needle (Vortex) or with a 16G BD Insyte Autoguard cannula. The device should be flushed 4-6 weekly with 50units of Heparinised Saline in 5 mls (per lumen) when not in use.

The Apheresis Department will have access to the large gauge non coring needles & the 16G BD Insyte Autoguard cannula required for Apheresis procedures only. Any queries or issues regarding these ports should be directed to Apheresis or the on-call Apheresis nurse in the first instance.

Refer to [Implanted Port Management Procedure](#)

*** Please note some Peter Mac patients will have an intraperitoneal implanted ports insitu. These should be managed according to the specific instructions in the “Administration & Management of Anti-Cancer Drugs clinical procedure” and are not covered in this guideline.**

11 Permacaths Access and Management

- 11.1 **A Clave Connector should be applied to each lumen tip. This is to distinguish them as a device that requires a heparin lock.**
- 11.2 When the catheter is not in use, to maintain patency between treatments, a heparin lock must be instilled in each lumen of the catheter.
- 11.3 A solution of 1,000units of heparin sodium in 1ml is used for heparin locks for tunneled haemodialysis catheter lines which will be supplied as a 5,000 units in 5ml ampoule.
- 11.4 The dose and volume of heparin must be prescribed in the patients line care treatment plan. Patients being discharged with community nursing outside of the PM@H boundary with a Permacath will require an order for heparin on the long term drug chart (MR/61D) and supply of Heparin dispensed by pharmacy.
- 11.5 The total volume of each heparin lock to be instilled should be equal to the internal volume of each lumen. The volume should be instilled via a 10 ml syringe. The volume of each lumen is printed on each individual lumen of the CVAD and may vary between device brands therefore it is essential to check the specific volume on each patient’s device.
- 11.6 To create a heparin lock, the lumen clamp should be closed at the same time as the final 0.5 mL of the heparin solution is instilled into the lumen to create a positive pressure environment within the catheter.
- 11.7 Lumens locked with heparin must be labelled with the required user applied ‘Medicine’ adhesive label.
- 11.8 When accessing the Permacath, the heparin lock **must** be removed by aspirating at least 4ml from each lumen immediately prior to use to prevent systemic heparinisation of the patient. The device must be heparin locked on every occasion that the device

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requires deaccessing and is not in use due to the high rate of occlusion with these devices.

12. Femoral CVADs

12.1 Femoral CVADs are occasionally inserted at Peter Mac as short term devices for procedures or patients with difficult venous access. For information about the specific device inserted and management of the device please refer to the individual patient report provided by the interventional radiologist inserting the device.

12.2 The type of the device inserted eg. Vascath, PICC will determine the management of the CVAD (refer to section 9).

12.3 Ambulation of the patient will depend on the type of device inserted and the risk assessment made by the interventional radiologist inserting the device.

13. CVAD Troubleshooting

13.1 CVAD patency is confirmed by:

- blood return upon aspiration; and
- the ability to inject fluids; and
- normal catheter appearance; and
- correct catheter tip position.

13.2 CVAD catheter tip placement is confirmed by: chest x-ray, fluoroscopy screening and/or catheter-gram.

13.3 If any difficulty is encountered aspirating blood or injecting fluid:

- Check for mechanical occlusion: catheter clamped or kinked
- Ask the patient to change position and/or raise their arms above their head
- Check catheter securement and length and position for signs of migration
- Do not apply force when accessing device
- Do not attempt to access catheter if pain, leakage or signs of infection (swelling, redness, pain or tracking) are present
- If unable to aspirate blood change the cap on the device and then reattempt to aspirate and flush.
- If unable to confirm patency following a cap change contact a medical officer for assessment of the device and consider administration of Alteplase into the device lumen.
- Persistent occlusion of a CVAD caused by a suspected or confirmed thrombotic occlusion may be treated by instillation of a thrombolytic. Refer to table below

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and [Use of Alteplase \(r-TPA\) to unblock occluded Central Venous Access Devices Procedure](#)

- If unable to confirm patency following these steps do not use the device and contact Cancer Imaging to arrange for further assessment and imaging.
- Document all CVAD related complications and intervention(s) in the patient's Avatar.

14 Documentation

14.1 For all clinical areas documentation of a CVAD should occur in the patient Avatar in the LDA navigator of the patients' medical record. The device will remain active on the patients Avatar throughout multiple episodes of care until it is documented as removed.

Documentation should occur:

- Daily for all inpatients
- Following each episode of care for ambulatory patients
- Following interventions e.g. accessing an implanted port, dressing change or infusion line change.
- Troubleshooting the device and if any complications occur

14.2 Documentation regarding CVADs should include details of:

- Any signs of local infection at the insertion site
- Dressing integrity
- Sutures/securement device integrity
- For PICCs, catheter hub placement measurement (length from catheter exit site to hub)
- Patency of lumens if accessed
- Interventions e.g. accessing an implanted port, dressing change or infusion line change
- Patient education regarding CVAD indications or care

15 Removal

15.1 It is the responsibility of the Registrar in consultation with the primary medical Consultant to assess the ongoing need for a CVAD and to arrange for its removal when it is no longer required.

15.2 Nursing staff with the appropriate training and credentialing can remove PICC's and CVCs following a documented order for removal.

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15.3 Removal of tunneled CVADs (Hickman or Permacath) is a medical procedure and must be done by a senior medical officer. Removal of these devices should be undertaken in the Cancer Imaging department.

15.4 For urgent non planned removal of tunneled devices contact the Interventional Radiologist directly.

15.5 For routine planned removal of tunneled devices contact Cancer Imaging for bookings.

15.6 Removal of Implanted Ports is a surgical procedure and is undertaken in Cancer Imaging.

For removal of non-tunneled devices refer to [Removal of a Central Venous Access Device](#)

15.7 An order for removal must be documented in the patients' medical record.

15.8 Upon removal, documentation of this should occur in the removal section of the patient's device on the Avatar.

KEY PERFORMANCE INDICATOR/S OR MONITORING

Evaluation will be undertaken through review of any incidents/adverse patient outcomes relating to the management of all CVAD's in the inpatient/ambulatory environment - this will be achieved through the regular review of Riskman incident reports and infection prevention data.

Monitoring & KPI's will be measured through the CVAD credentialing and competency assessment process – this information will be managed at a local level by NUM's/PDN's and in the Academic Nursing Unit by the CNE's

DEVICE TABLE

Device	Supplier		Lumen (Dwell) Volume for Alteplase
ARROWgard Blue CS Triple Lumen CVC Set 7Fr x 20cm	Teleflex		Distal- 0.44ml Medial-0.39ml Proximal-0.39ml
Apheresis CVC 15cm 11.5Fr Double Lumen	MedComp®		Art = 1.2ml Venous = 1.1ml
Apheresis CVC 20cm 11.5Fr Double Lumen	MedComp®		Distal = 1.4mL Proximal = 1.5mL
PICCS			
Turbo-Ject Power Injectable Single Lumen 4Fr x 60cm	Cook Medical		0.75mls

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Turbo-Ject Power Injectable Double Lumen 5Fr x 60cm	Cook Medical		0.75mls both lumens
Tunneled Devices			
(Hickman) Leonard Catheter 10Fr Dual Lumen	Bard		1.3ml Labelled on device lumens
(Permacath) Split Cath III 14Fr x 32cm Dual Lumen Haem/Apheresis catheter	MedComp®		2ml 2ml
(Permacath) Split Cath III 14Fr x 28cm Dual Lumen Haem/Apheresis catheter	MedComp®		1.8ml 1.9ml Labelled on device lumens
Implanted Ports			
Single lumen Celsite Epoxy power injectable port with attachable 6.5Fr silicone catheter	Braun		1.4mL of alteplase
Single lumen Celsite Epoxy power injectable port with attachable 8.5Fr silicone catheter	Braun		1.4mL of alteplase
Single lumen Celsite Epoxy power injectable port with attachable 10Fr silicone catheter	Braun		1.4mL of alteplase
Smart Port Mini Vortex Low profile Port 6.6 Fr polyurethane catheter (MRI compatible)	Angiodynamics		1.4mL of alteplase
PowerFlo Apheresis Port 9.6Fr (CT compatible) Only to be used in Apheresis procedures & be accessed by Apheresis staff	Bard		2 ml Alteplase
Vortex LP Dual Lumen 11.4Fr Non Power injectable (used in Apheresis procedure) silicone	Angiodynamics		1ml port volume & gripper needle priming volume: 0.5ml

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catheter (MRI compatible)			2mls of Alteplase per port reservoir
Implanted Port Access Needles			
Deltec Safety Power Gripper Needle 20G 19mm straight with extension tubing	Smith Medical	21-3367-24	
Safety Gripper Plus Needle 20G x 25mm without Y-Site	Smith Medical	21-2762-24	
Safety Gripper Plus Needle 20G x 19mm without Y-Site	Smith Medical	21-2767-24	
Safety Gripper Plus Needle 22G x 16mm without Y-Site	Smith Medical	21-2770-24	
Safety Gripper Plus Needle 22G x 19mm with Y-Site	Smith Medical	21-2861-24	
Safety Gripper Plus Needle 20G x 19mm with Y-Site	Smith Medical	21-2865-24	
Safety Gripper Plus Needle 20G x 25mm with Y-Site	Smith Medical	21-2866-24	
Safety Gripper Plus Needle 20G x 32mm with Y-Site	Smith Medical	21-2867-24	
High Flow Needle Straight, non coring 16G x 1in (2.5cms) Only to be used in Apheresis procedures	Angiodynamics		
Insyte Autoguard 16G x 1.16IN (220ml/min) Only to be used when accessing Bard Power Flo Apheresis Ports	BD		
PowerLoc Max needles	Bard		

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DEFINITIONS

Scrub the Hub	<p>Application of a 2% chlorhexidine and alcohol swab to all access devices on hubs of CVAD lumens and lines. Scrubbing consists of a 180 degree back-and-forth twisting motion for 15 seconds. After disinfection the device must completely air dry before accessing (30 seconds)</p>
Aseptic technique	<p>A critical set of measures or practices which are designed to render and maintain objects or specific areas free from all microorganisms. It involves the activities of preparing, establishing and maintaining a sterile field, through hand hygiene, skin disinfection and the use of sterile items.</p>
Central venous access device (CVAD)	<p>A catheter inserted into the venous system, typically placed in a blood vessel in the upper body, with the tip positioned in the lower third of the superior vena cava (SVC). Catheters inserted into the femoral vein are positioned with the tip in the inferior vena cava (IVC). CVADs are used for administration of fluids, blood products, medications including Chemotherapy and Immunotherapy and total parenteral nutrition (TPN), central venous pressure (CVP) monitoring, blood sampling and apheresis procedures.</p>
Power-injectable CVAD	<p>A CVAD that can be used for CT contrast pressure injections. Only power-injectable devices can be used for CT contrast pressure injections. Contrast may only be injected at rate and PSI that is listed on the hub of the device. Power-injectable devices are identifiable by the marking 'CT' on the catheter hub. Insertion documentation should also be referred to when assessing if the device is power-injectable.</p>
Non-tunnelled CVAD Central Venous Catheter (CVC)	<p>CVADs commonly inserted into the jugular, subclavian or femoral veins, where the catheter exits the skin directly above the site at which it enters the vein.</p>
Permacath Tunneled haemodialysis central venous access device	<p>Radiology inserted CVADs, commonly inserted into the internal jugular, with a section of the catheter tunneled subcutaneously. The tunnel creates distance between the exit site (where the catheter exits the skin) and the puncture entry site (where the catheter enters the vein), reducing the risk of catheter-related blood stream infections. A small synthetic cuff attached to the catheter is positioned 3-5 cm inside the subcutaneous tunnel. Tissue growth into the cuff secures the catheter and prevents the migration of micro-organisms along the catheter. This type of catheter also has a large lumen width, enabling sufficient venous access for the collection of haematopoietic progenitor cells, other therapeutic apheresis procedures and haemodialysis. These devices are used for treatment required long term (months-years).</p>

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<p>Hickman</p> <p>Tunneled central venous access device</p>	<p>Radiology inserted CVADs, commonly inserted into the subclavian vein, with a section of the catheter tunneled subcutaneously. The tunnel creates distance between the exit site (where the catheter exits the skin) and the puncture entry site (where the catheter enters the vein), reducing the risk of catheter-related blood stream infections. A small synthetic cuff attached to the catheter is positioned 3-5 cm inside the subcutaneous tunnel. Tissue growth into the cuff secures the catheter and prevents the migration of micro-organisms along the catheter. These devices can be used for treatment required long term (months-years).</p>
<p>Implanted port</p>	<p>A surgically inserted central venous access device (CVAD) consisting of a self-sealing silicone injection housed in a body of inert material, connected to a silicone catheter The catheter is inserted into the venous system, typically placed with the tip positioned in the superior vena cava (SVC). The device is used for administration of fluids, blood products and medications and blood sampling. Implanted ports may be single or double lumen. These devices can be used for treatment required long term (months-years).</p>
<p>Vortex LP Implanted Port</p>	<p>A single or double lumen central venous access device which is commonly used for Apheresis procedures. It consists of a titanium reservoir and a silicone catheter. The vortex design of the septum assists to hyper cleanse the entire reservoir, preventing sludge build up, and reducing occlusions and infections. The device is used for administration of fluids, blood products and medications and blood sampling. It is not a power injectable device and should not be used for CT contrast injections but is MRI compatible</p>
<p>PowerFlow™ Apheresis Port</p>	<p>A single lumen Apheresis port consisting of a titanium funnel and a silicone base. For the use during therapeutic apheresis procedures only and is accessed using the BD Insyte Autoguard needle</p>
<p>Peripherally inserted central catheter (PICC)</p>	<p>A catheter usually inserted percutaneously into the basilic or cephalic vein and threaded up the arm so that the catheter tip is positioned in the superior vena cava (SVC). These devices are used for treatment required for medium term (weeks-months).</p>
<p>Neutron</p> <p>Needle free Neutral Displacement Catheter Patency Device</p>	<p>A Neutron is a neutral displacement device that is attached to the hub end of a CVAD lumen that can be directly accessed with a syringe or infusion line. The device has a bi-directional silicone seal which forms a swabable barrier to prevent bacterial ingress. The device can be used to either infuse or aspirate via the CVAD. In the absence of flow or forward pressure into the Neutron the valve will automatically close and prevent all types of reflux into the CVAD lumen which prevents thrombotic occlusion of the CVAD.</p>

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Clave Needle-free Connector	A Clave is a needle free connector for an access device used on all peripheral intravenous catheters. It can be directly accessed with a syringe or infusion line. Claves are used on tunneled haemodialysis lines to distinguish it as a device that requires heparin.
Securement device	A commercially produced device, usually adhesive, designed to secure a CVAD to the skin to prevent catheter migration, eliminating the need to secure the catheter by sutures.
Transparent semi-permeable membrane (TSM) dressing	Sterile, transparent polyurethane dressing that allows moisture evaporation from underneath the dressing but provides a barrier from extrinsic moisture and microorganisms.
Biopatch	A disc shaped hydrophilic polyurethane absorptive foam dressing infused with 7 day time-released chlorhexidine gluconate. The foam material absorbs excess fluid from the site whilst the chlorhexidine gluconate inhibits bacterial growth under the dressing.

LEGISLATION/REFERENCES/SUPPORTING DOCUMENTS

- Adams, S., Barrett, L., Brooks, S. et al 2007 "Central Venous Access Devices: Principles for Nursing Practice and Education". Cancer Nurses Society of Australia
- Cancer Nurses Society of Australia. (2007). Central Venous Access Devices: Principles for Nursing Practice and Education [CD-ROM]. Australia: Author.
- Centre for Disease Control (2011). Guidelines for the Prevention of Intravascular Catheter Related Infections.
- Dougherty, L. (2000). Central venous access devices. *Nursing Standard*, 14(43), 45-50. Guerin, K., Wagner, J., Rains, K., Bessesen, M. (2010). Reduction in central line-associated bloodstream infections by implementation of a post insertion care bundle, *American Journal of Infection Control*, 38, 430-433.
- ICU Medical (2015). *Current Life shield Neutron literature* [On-line]. <http://www.icumed.com/products/infusion-therapy/needlefree-iv-connectors/neutron.aspx>
- Masoorli, S & Angeles, T (2002). Getting a line on central venous access devices. *Nursing* 2002, 32(4), 36- 43.
- Moran, A. B. & Camp-Sorrell, D. (2002). Maintenance of venous access devices in patients with neutropenia. *Clinical Journal of Oncology Nursing*, 6(3), 126-130.
- National Health and Medical Research Council, Australian Guidelines for the Prevention and Control of Infection in Healthcare (2010). Part B- Standard and Transmission Based Precautions, B.4.2.2 Intravascular Access Devices.
- National Kidney Foundation Guidelines: National Kidney Foundation Kidney Disease outcomes quality Initiative, Vascular access Update (2006). Guideline 3- Cannulation of

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Fistulae and Grafts and Accession of Haemodialysis Catheters and Port Catheter systems.
Available from:

http://www.kidney.org/professionals/kdoqui/guidelines_upHD_PD_Va/va_guide3.htm

- Nakazawa, N. 2010. "Infectious and thrombotic complications of central venous catheters." *Semin Oncol Nurs* 26(2):121-131
- NSW Cancer Institute eviQ Cancer Treatments Online Clinical Resource Section "Central Venous Access Devices" <https://www.eviq.org.au/clinical-resources/central-venous-access-devices-cvads>
- O'Grady, N., Alexander, M., Dellinger, E., Gerberding, J., Heard, S., Maki, D., et al. (2002). Guidelines for the prevention of intravascular catheter-related infections. *Centers for Disease Control Morbidity and Mortality Weekly Report. Recommendations and Reports*, 51(RR-10), 1-29.
- Rickard, C., Ray-Barruel, G (2009). Systematic Review of Infection Control Literature Relating to Intravascular Devices, Griffith University.
- Royal College of Nursing (2010). Standards for Infusion Therapy
- Silvia Munoz-Price, L., Dezfulian, C., Wyckoff, M., Lenchus, J., Rosalsky, M., Birnbach, D., Arheart, K.(2012). Effectiveness of stepwise interventions targeted to decrease central catheter-associated bloodstream infections. *Critical Care Medicine*, 40, 1464-1469.
- Venetec International (2004). *StatLock PICC Plus* [On-line]. <http://www.venetec.com/products.html>
- World Health Organization. 2005. WHO World Alliance for Patient safety - Practice Guidelines. Part of the WHO Consultation on hand Hygiene in Health care Global Patient safety Challenge, 2005-2006: "Clean Care is Safe care"
- Zitella, L. (2003). Central venous catheter site care for blood and marrow transplant recipients. *Clinical Journal of Oncology Nursing*, 7(3), 289-298.

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