CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE

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References

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CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE  cont’d

Introduction and educational information - Central Venous Access Device Management Guideline 2009

A Central Venous Access Device (CVAD) is a commonly used access device inserted in unwell patients. Although CVADs enable the administration of life supporting medications and therapies, the presence of these catheters place patients at risk of catheter-related blood stream infections or central line associated bactereamia (CLAB), which can be fatal. Methods and techniques used during CVAD insertion by medical staff and management by nurses are critically important to preventing CLABs (2009 executive summary NSW Health guidelines).

This guideline has been developed to assist in the nursing management of CVADs to prevent CLAB and complications associated with their care.

1. Central Venous Access Devices (CVAD)

Short and long term CVADs which include:
- Central Venous Catheters
- Central tunneled catheters: Hickman®
- Peripherally inserted central catheter: PICC
- Implantable devices: Portacaths or Passports

2. Patient

- All inpatient and out patients with a CVAD

3. Staff

- RN / RM who has completed competency assessments for all interventions related to management of a CVAD
- RN / RM who has completed the IV drug administration assessment to perform intravenous medication administration

4. Indications for Insertion

- Venous access for monitoring of Central Venous Pressure (CVP)
- Hypertonic medication/fluid therapy e.g. Chemotherapy, concentrated potassium chloride infusions, Total Parenteral Nutrition (TPN)
- Reduced peripheral venous access
- Long term therapy

5. Insertion

- The CVAD/PICC is inserted in the operating theatre by an anaesthetist as this ensures an optimally sterile insertion
- In emergencies insertion of a CVAD may take place in Acute Care
- The Hickman catheter and implantable devices must be inserted and removed under general anaesthetic in the operating theatre or radiology
- The Anaesthetist performing a CVAD insertion must wear sterile gown and gloves and personal protective equipment (PPE)

6. Sites of Insertion

- Subclavian veins
- External or internal jugular veins.
- Basilic vein (PICC lines)
- Femoral veins

cont’d ..../3
7. General considerations

- The subclavian vein is the most suitable long-term site and the preferred route due to lower infection risk.
- When choosing a CVAD consider catheter type, number of lumens, length of therapy, site of insertion, risk of complications including infection, and patient factors.
- The minimum number of lumens, connectors and ports should be used.
- Medical need for CVAD must be assessed daily; remove CVAD when no longer required.
- CVADs carry a significantly greater risk of infection than peripheral venous catheters.
- Risk of local or systemic complications. Strict adherence to this policy is essential. Section 5 of the RHW Infection control manual.

8. Cross References

- Safe manual handling techniques and Safe work practices
- Infection control and occupation health and Safety guidelines

9. Definitions

Closed system is a catheter that has an add-on device connected. The add-on device can be a cap, needleless injection port or an IV line, protecting the hub from the environment. To reduce catheter related infection, maintenance and care of a closed system can be carried out using handwashing and “no-touch” technique.

Open system is a catheter hub exposed to the environment. This occurs during cap or needless injection port changes, or IV line changes. To reduce catheter related infection, maintenance and care of an open system should be performed using an aseptic technique that includes the use of sterile gloves.

Routine/Basic hand wash 10-15 seconds using plain liquid soap

Procedural handwash 60 seconds using an antiseptic liquid soap and water, when an aseptic technique is required

Parts of a Central Venous Catheter

- Injection cap changed to needleless bung on insertion
- Lumens- two size 18g and one size 16g
- Lumen slide clamp
- Catheter junction hub
CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE  cont’d

Part 2
Management of Central Venous Access Devices (CVAD)

Observations
Patients with a CVAD require 4 hourly observations including temperature, pulse, BP and respiratory rate.

Documentation
- Complete the “CVAD Review form” every shift and document in the integrated notes
- Insertion date and time by using an Intravenous device sticker
- X-ray confirmation of correct catheter placement viewed and signed by a Medical Officer
- The appearance of the insertion site each shift or every eight hours. If signs of infection are present, refer to Infection (Part 3, section 3.2) of this policy or the Infection Control Manual section 5.2 for intervention
- Attendance of CVAD dressing, line change or heparin locking in the clinical notes
- CVAD removal in the clinical notes

Administration and management Guidelines
- All IV infusions are delivered via an electronic infusion device into the CVAD
- A 10ml syringe or larger should be used when injecting into a lumen. Smaller syringes increase the intra-luminal pressure and risks rupturing or damaging the catheter
- Care must be taken to maintain patency by using a pulsatile positive pressure flush method and by maintaining positive pressure while removing the syringe at the end of flushing in order to avoid reflux of blood. Refer to procedure for flushing a CVAD
- Flush CVAD with 10mls 0.9% Sodium Chloride, before and after every access, and in-between all incompatible medications and solutions
- Flush CVAD immediately after replacement, prior to and after each infusion or injection, after drawing blood
- Do not use metal clamps, artery forceps or scissors on or near the CVAD catheter as this may break or traumatise the line
- Any particulate matter on the luer connector of the catheter lumens should be cleaned with alcoholic chlorhexidine prior to connection of new bungs or lines
- Intravenous lines attached to the CVAD should be secured to the pt to avoid tension applied to the catheter or sutures
- Catheter lumens and sampling ports (including needless injection sites) must be wiped with an alcohol swab before and after use
- Unused CVAD lumens must be clamped when not in use to prevent air emboli and backflow of blood
- Ensure adequate lighting when setting up new lines so air in lines can be seen.
- 2% chlorhexidine in alcohol 70% solution is the preferred antiseptic for insertion and dressing of CVCs. Once it is applied air drying for 2 minutes is required
- IV 3000® - a sterile transparent dressing is used on all CVADs
- Position the dressing so the catheter insertion site is central. Cover the catheter from the insertion site to the hub of a CVC ensuring a complete seal
3.1 Air Embolism
The potential for air emboli exists may occur at the time of catheter insertion or any time the catheter or tubing become disconnected and are therefore open to air. If a catheter is open to room air, the negative intrathoracic pressure created by breathing inwards draws air into the vein resulting in air embolism. Air may then travel through the heart and enter the pulmonary circulation. Clinical manifestations include cyanosis, tachypnoea, coughing, tachycardia, hypotension, loss of consciousness and cardiopulmonary arrest.

Immediate treatment for air embolism involves positioning the patient head down, on their left side, deliver 100% oxygen and initiate Basic Life Support.

Preventative measures include:
- Ensuring all lumens have a smartsite needle free bung attached
- Ensuring slide clamps on lumens are closed during necessary interruptions of the system.
- Change smartsite needle free bung only when they become contaminated or as indicated
- Using Valsalva’s maneuver or having patient expire on removal of line
- Using electronic infusion devices for any infusion delivered via a CVAD
- All air and bubbles are removed from lines or syringes before delivery of fluids or medications
- Ensure adequate lighting when setting up new lines so that air in lines can be seen
- An experienced anaesthetist inserts the CVAD

3.2 Infection
All CVADs are a potential source for local and systemic infection. Central line associated bloodstream infections (CLABIs) can occur during insertion due to a poor sterile technique, infection of the exit site, migration of the pathogen along the external catheter surface, contamination of the catheter through the catheter bungs, or catheter colonization from a distant foci. Infection can also occur from contaminated hands, tubing, burettes, pressure transducers, or from IV fluids or flush solutions. Any disruption of the closed system and manipulation of infusion fluids may introduce microorganisms into the system.

Gynaecological oncology patients, receiving radiotherapy or chemotherapy are especially at risk due to their immunocompromised state after chemotherapy treatment. Patients with other infectious sites may be at risk e.g. infected LSCS wound.

All patients with CVADs must be carefully monitored for signs or symptoms associated with infections: Raised or low grade temperature, rigors, hypothermia, increased white cell count (WCC), localised redness, swelling, heat, purulent discharge or pain at the insertion site.

Preventative measures include:
- Washing of hands with antimicrobial liquid soap and water and donning gloves before and after assessing, or dressing a CVAD or PICC line. Handwashing is one of the most important measures for preventing and controlling catheter related infection. It is important that strict and correct hand hygiene is adhered to before and after all CVAD manipulation
- Visual inspection of the site each shift and documentation of its appearance on the CVAD form and in the integrated notes
CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE  cont’d

- Mandatory sterile technique during insertion and dressing and line changes. Dressing and line changes are performed according to policy. Dressings are changed when site is contaminated with blood; dressing has lifted or becomes wet. 80-90% of short term CLBSI come from patient’s skin (Maki, 2009)
- Observing site after the patient has showered, ensuring the site has remained dry. If not change dressing ASAP
- Decontaminate bungs and ports thoroughly using alcohol wipes and allow to dry, prior to administration of drugs
- Blood is a primary medium for bacteria, thoroughly clean or replace injection cap after drawing blood
- Discard unused lines or extensions when not in use
- Any part of the line suspected of being contaminated must be replaced.
- CVADs are not left in longer than required
- A non-touch, clean technique is used during withdrawal of blood, flushing the catheter, administering medications and changing fluid bags
- Lines are anchored and stabilised to prevent rubbing of lines and trauma to the entry site. A traumatised site is more susceptible to infection due to the insertion hole being larger and the area moist, enabling microbial migration down the catheter tract
- Lines should only be disconnected for routine line changes or if contamination of the line is suspected. Do not disconnect lines for the patient to shower or for ease of mobilisation

Management
- If catheter related infection occurs the catheter must be removed, the catheter tip sent to pathology for culture and sensitivity studies and the medical officer notified.
- When removing the catheter, care must be taken not to accidentally contaminate the tip on removal. Use sterile scissors to cut off the tip of the catheter.
- Site will need to be dressed daily if a local site infection occurs.
- Obtain simultaneous peripheral and central blood cultures. If the same bacterial or fungal contaminant is isolated from the catheter segment and in peripheral blood a catheter related bloodstream infection (CLAB) is diagnosed or suspected. Complete an eICAT Form; send to Infection Control and notify the infection control CNC.
- A positive culture from both peripheral and central specimens within two hours is suggestive of a CLBSI.

3.3 Thromboembolic Complications
No flow through the catheter can predispose the patient to occlusion of the catheter lumen by a blood clot.
This is caused by poor blood flow around the catheter combined with continued endothelial trauma, fibrin accumulation around catheter, or hypercoagulability.
Signs:
Decreased flow rate, oedema in areas distal to the clot, leaking from the site, shoulder, jaw or chest pain, resistance when flushing, ear pain.

Preventative measures include:
- Maintain flow rates by the use of an electronic infusion device.
- Obtain medical order for heparin lock for unused lumens.
- Do not use force when flushing a lumen as a clot could be dislodged and result in an emboli.
Label the lumen blocked, inform the Medical Officer and document this on the CVAD review form and in the integrated notes.
Management
- Stop the infusion if currently in progress
- Notify medical officer
- Document on CVAD review form

3.4 Phlebitis - PICC Lines
This occurs when the lining of the vein is irritated. Mechanical irritation from the catheter is the most common cause of vein wall trauma.

Signs:
Pain associated with continuous or intermittent red streak over the catheter path, the area may be warm to touch and raised.

Preventative measures include:
- Minimise trauma to the vein, assess the patient frequently, educate the patient about early signs

Management
- Encourage the patient to limit the use of the arm and apply warm soaks
- Notify medical officer
- Document in CVAD review form

3.5 Pneumothorax
This may occur during the insertion of a CVC. The pleura of the lung is inadvertently perforated when locating the subclavian veins.

Signs and symptoms of a pneumothorax include:
- Shortness of breath
- Decreased O2 saturations
- Chest movements may be abnormal

Diagnosis of pneumothorax is confirmed by CXR. Treatment is evacuation of air from the pleural cavity by insertion of a chest tube.

3.6 Arrhythmias
- Caused by migration of the catheter into the atrium
- Occurs during insertion if the catheter is fed in too far. The arrhythmia will be seen on the ECG monitor and corrected by pulling the catheter back
- A medical officer should be informed if the stitch holding the catheter in place falls out, as the catheter may dislodge
Part 4
Procedures- (Central Venous Access Device Management guideline)

4.1 Assisting with the insertion of a CVAD

Outcomes
The CVAD is inserted without complication in the Operating Theatre. Maximal sterile barrier precautions are essential during CVAD placement to reduce the risk of CLAB.

Accredited Personnel
RN / RM to assist anaesthetist

Guidelines
Ensure X-ray and documentation of correct placement is completed by an anaesthetist prior to pt transfer to the ward.

Equipment
Large trolley
Large sterile drape to cover patient
Sterile dressing tray
Sterile gown
Sterile gloves
Mask
Hat
Central venous catheter
Smartsite Needle free bungs
23 G needle and syringe for local anaesthetic
1% Xylocaine x 2mls
2 x 10ml ampoule normal saline
2% chlorhexidine in alcohol 70% solution
Opsite IV3000
IV sticker completed for integrated notes
Independent observer form
CVC checklist

Procedure
Explain procedure and sterility precautions to patient
Attach ECG leads and O2 saturation monitor and set alarm limits
Record baseline observations
Wash hands
Open basic dressing tray and add sterile equipment maintaining sterility
Place patient in the trendelenburg position. If this position predisposes the patient to cardiac or respiratory distress, another position will be arranged with the anaesthetist e.g. supine
Stay with the patient and give reassurance during the procedure
Confirm bungs are attached to all lumens and the Opsite IV3000 dressing secures the catheter
Apply anchoring type tape to shoulder and tie to lumens to prevent dragging lines exorciating entry site or accidental removal
Ensure lumens have been primed prior to use
Discard equipment appropriately
CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE  cont’d

4.2 Central Venous Catheter (CVC)- Dressing

Outcomes
To prevent infection, to visualise the site and to secure the catheter

Frequency
Weekly (Monday) and PRN. Dressing should be changed if it becomes moist, loosened or soiled

Accredited Personnel
RN / RM who is accredited to attend a CVC dressing

Equipment
- Dressing Pack
- Sterile Gloves
- Gauze swabs x 2
- 2% Chlorhexidine in alcohol 70% solution
- Opsite IV3000
- PPE

Procedure
- Explain procedure and rational to patient
- Obtain equipment and place on trolley cleaned with neutral detergent
- Place patient in the supine position
- Routine hand wash
- Open dressing pack and add required equipment without contamination
- Wearing non sterile gloves carefully remove and discard previous dressing, observing for signs of inflammation or catheter damage
- Attend 2 minute aseptic handwash, don sterile gloves
- Drape sterile towel from dressing pack, at the CVC site
- Clean exudate from insertion site with solution in a circular motion, from insertion site outwards (Approximately 10cm)
- Antiseptic solution must be allowed to dry to allow maximum effect, which takes 2 minutes
- Write date and time on occlusive dressing
- Wash hands
- Document in the patient’s CVAD review form and integrated notes

4.2.2 Dressing change for PICC line

Equipment
- Clean work area e.g. trolley with waste disposal bag
- Protective mask and glasses or visor if risk of splashing exists
- Protective sheeting
- Dressing pack
- 2% Chlorhexidine in Alcohol 70% solution
- Sterile gloves
Central Venous Access Device (CVAD) Management Guideline cont’d

Appropriate dressing e.g. IV3000®
If required:
- Non-sterile hypoallergenic, water-resistant tape (required for framed TSM e.g. Tegaderm® and cotton dressings)
- Sterile surgical tape for unsutured, non-cuffed CVC
- Sterile securing device e.g. StatLock® for unsutured PICC (StatLocks® must be changed with dressing changes)
- Sterile swab stick

Procedure - Conventional Flat Dressing
For use on PICC, Hickman catheters and other non-sutured central venous catheters

Carry out general preparation (Refer to Procedure 2B of this manual)
- Perform basic handwash and don non-sterile gloves
- Remove existing dressing by stretching plastic adhesive (See 7.4 for removing and attaching StatLock®)
- Perform Procedural / Aseptic handwash and don sterile gloves
- Clean catheter exit site 3 times with antiseptic solution commencing at the exit site, using a circular motion ensuring that the area cleaned is larger than the dressing to be applied

Holding one end of the dressing peel away the film half way
Centralise the catheter exit site and apply the dressing loosely over the catheter

Peel away the backing on the remaining half and mould dressing around catheter to minimise bubbling

Tear the plastic strips with paper tabs off the side of the dressing & place around non-reinforced edges of the dressing perimeter

Secure the catheter and intravenous administration set if attached to the patient in a manner that will prevent accidental dislodgment or kinking of the catheter

4.3 Changing of Intravenous administration sets

Outcomes
The administration sets and lines connected to the central venous catheter are changed using aseptic technique to minimise the risk of infection.

Frequency
Continuous Infusions:
- Administration sets are changed on a Monday and Thursday or at any time where the lines have been contaminated or compromised.
- Blood, blood components or TPN require the administration set to be changed every 24 hours.
Intermittent Infusions:
- Infusion sets, burettes and extensions are to be replaced every 24 hours or if suspicion that the line has become contaminated.
- On insertion of a new CVAD
- If line is to be used within 24 hours the ends must be kept sterile.

Accredited personnel
RN / RM who is accredited to attend line changes

4.3.1 Changing of administration sets - closed system
Catheter manipulations should be limited, ideally no more than once per day to reduce introduction of organisms and catheter related sepsis. All procedures should be coordinated to minimise the number of manipulations.

Equipment
- Clean work area e.g. trolley with waste disposal bag and sharps container
- Appropriate new administration set/s and attachments
- Appropriate intravenous solution as ordered by Medical Officer
- Non-Sterile gloves
- Protective mask and glasses or visor if risk of splashing exists
- Appropriate anchor to secure lines

Procedure
- Connect and prime all giving sets and tubing, ensuring there is no air in tubing
- Perform basic handwash
- Cease flow rates through old tubing / pumps
- Clamp the central venous catheter near the port
- Don non-sterile gloves
- Disconnect tubing at catheter and attach new tubing firmly, using no touch technique
- Set flow rate as per medical order
- Anchor tubing
- Check that all connections are secure
- Dispose of equipment appropriately
- Wash hands
- Document line change in the patient’s continuation / progress notes

4.3.2 Changing of administration sets - open system

Equipment
- Clean work area e.g. trolley with waste disposal bag
- Dressing pack
- Protective sheet
- 2% Chlorhexidine in Alcohol 70% solution
- Needleless injection port (1 for each lumen of Catheter)
- Gauze squares (3 for each lumen of Catheter)
- Sterile gloves
CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE cont’d

Procedure
Carry out applicable general preparation as per section 2B of this manual
Place protective sheet underneath clamped catheter hubs

Ensure all lumens of catheter are clamped
Perform procedural / aseptic handwash and don sterile gloves
Place sterile towel under lumens
Hold lumen with clean gauze near to hub using non-dominant hand
Clean the hub at connection with solution soaked gauze
Repeat this a second time, removing the existing cap using the gauze
Clean a third time around hub of catheter ensuring all grooves are clean and free of debris
Replace with new cap
Repeat steps for each lumen of the catheter
Flush and re heparin lock device after cap change as per procedure 13 of this standard

Guidelines
- Bungs should be changed weekly (Monday)
- IV fluids bags running through the administration sets are changed per 24 hours

Equipment
Dressing pack
2% Chlorhexidine in alcohol 70% solution
Sterile administration set(s)
Appropriate intravenous fluids as ordered by the medical officer
Smartsite bungs (if required)
Labels (to date the lines)
Sterile gloves
Protective mask and goggles if risk of a splash exists

Procedure
Explain procedure and rational to patient
Obtain equipment
Routine handwash
Open dressing pack and add relevant equipment
Place TPN bag and fluids beside or on an IV pole close to the opened dressing pack
Clamp fluid lines presently being used and switch off infusions. Also clamp the “slide clamps” on the CVC catheter.
Aseptic handwash and put on surgical gloves
Organise equipment on sterile field
Holding gauze swabs soaked in chlorhexidine solution in each hand, break the seal of the fluids and spike the bag ready to prime
Prime line(s), keeping the majority of the line on the field with the rest falling freely from the bag(s), not touching anything else. Lines must be primed to the end opening.
Drape patient with sterile towel from dressing pack
Clean the connection point of the line(s) (covering approximately 6cm)
Prior to changing the lines, ensure a second time that the slide clamps of the CVAD are closed
Loosen the line connection, holding both ends of the line with chlorhexidine/alcohol soaked gauze
Connect new lines, ensuring secure connection using the luer lock caps
Unclamp line(s) and recommence infusions at prescribed rates
Label lines with date and time the line was changed
Dispose of equipment appropriately
Wash hands
Document change of line(s) in the patient’s integrated notes and on their clinical pathway
CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE  cont’d

4.4. Accessing and deaccessing an implantable device

4.4.1 Needle access of a venous port

Equipment

- Dressing pack
- Sterile Gloves
- 2% chlorhexidine in Alcohol 70%™
- Right angled non-coring needle (e.g. Gripper needle™)
- Needless injection port (2 for Gripper needle)
- 3 x 10ml luer-lock syringes
- Transparent Semi-permeable polyurethane dressing (e.g. Opsite IV 3000 or tegaderm)
- 1 x 10ml ampoule normal saline
- 1 x 5ml heparinised saline (50Units/5ml)
- 1 x 18g blunt needle

Procedure

Locate port and assess site for appropriateness of procedure and size of non-coring needle that is required
Position patient as appropriate
Check injectate solutions with another Registered Nurse, Medical Officer or qualified Enrolled Nurse
Perform procedural / aseptic handwash and don sterile gloves
Clean port site with antiseptic solution 3 times in an increasing circular motion using friction. Cover an area larger than the approximate size of the dressing to be used
Draw up injectate solutions in 2 x 10ml syringes
Prepare and prime needle and tubing
GRIPPER NEEDLE: Attach needless injection ports to both entry ports of the gripper needle extension tubing, prime and clamp
Fold the sterile drape in quarters and tear a hole in the centre to create a fenestrated drape
Place the sterile towel over the port with the port visible through the hole
Stabilise port with your index finger and thumb

Insert needle at a 90° angle to the skin and push until the needle touches the base (Caution: Do not push too firmly into the base, as this will damage the needle causing it to bend)

Connect an empty 10ml syringe and aspirate withdrawing 3-5mls of blood
Disconnect the syringe with blood and discard
Connect the 10ml syringe with saline and flush the port using a pulsatile motion

Remove the plastic clip for holding
Fold the fenestrated towel downward to expose the area around the port
Place the TSM dressing loosely over the port in the same manner as applying TSM to other CVAD’s ensuring the port is at the centre of the dressing

Mold the dressing around the port and onto the skin, to remove as much air pocket as possible

Remove plastic tabs and place around non-reinforced edges of the dressing to create a window frame

If the port is to be used immediately connect a new IV line and fluids as per procedure
If the port is not to be used immediately heparin lock as per procedure
Terminate encounter and document procedure in medical records

4.4.2 Removal of needle from venous access port

Equipment
Gauze
Bandaids
Sharps bin
2 x 10ml syringe
10ml ampoule normal saline
5ml heparinised saline (50 Units/5ml)
Non-sterile gloves

Procedure
Carry out applicable general preparation as per section 2B. of this manual
Perform basic handwash and don non-sterile gloves
Flush and heparin lock device as per procedure 12
Remove dressing
Stabilise port reservoir between thumb and forefinger

Pull lever to remove needle out vertically away from skin until it clicks into place

Retract the needle hub away from the skin and place directly into the sharps bin

Cover site with a Bandaid and instruct patient that this can be removed after 2 hours)
Terminate procedure as per 2C of this manual and document in the medical records

4.4.3 Trouble shooting and special notes on a venous port

- To be an accredited RN / RM you must have
  - Attended a relevant teaching session
  - Attempted 3 accesses, and 1 de-access, supervised by the CNC or another accredited staff member
  - Been deemed competent by the assessor

- Always use aseptic technique when attending to any 'port' procedures

- Never use a syringe size smaller than 10mls to avoid extreme pressure and prevent catheter rupture

- Always use positive pressure when heparin locking and de-accessing the ports i.e. clamp off extension set as you are injecting the last ml of flush to prevent reflux of blood into the catheter

- Never take blood peripherally from the arm with a p.a.s port insitu

See following page for trouble shooting flowchart
TROUBLESHOOTING FLOWCHART

HIGH RESISTANCE OR INABILITY TO WITHDRAW

Possible causes

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needle not advanced completely through septum</td>
<td>Reposition needle or check correct needle length</td>
</tr>
<tr>
<td>Catheter occluded</td>
<td>Notify CNC or Med Onc registrar</td>
</tr>
<tr>
<td>Catheter obstructed</td>
<td>Change patient position</td>
</tr>
</tbody>
</table>

If flushing with heparin or saline does not clear the catheter it may be necessary to use another fibrinolytic agent such as streptokinase.

Check for obstruction

Flush to check patency

Notify CNC or Med Onc Registrar

Adapted from protocol devised by the Haematology/Oncology Departments
Prince of Wales Hospital Randwick

4.5. Central Venous Access Devices – Flushing

4.5.1 Flushing a CVAD

Outcomes
To prevent mixing of incompatible medications or solutions
To maintain complication free central venous access

Frequency
Prior to and after administering medications or fluids via the CVC
Suspected occlusion in the CVC

Accredited personnel
RN / RM
Guidelines

- 10ml syringes or larger may be used to flush the CVC (Smaller syringes increase the intra-lumenal pressure, risking rupture or damage of the catheter)
- Positive pressure flushing involves using a push-pause/pulsating method (i.e. 1ml at a time), clamp lumen whilst instilling the last 0.5mls of solution to ensure positive pressure is applied to the line. By creating a positive pressure in the catheter it prevents a back flow of blood into the tip of the catheter and subsequent clot formation

Equipment

1 x 10ml syringe (per lumen)
1 x 10ml ampoule normal saline (per lumen)
1 x alcohol wipe (per lumen)
1 clean kidney dish
Non sterile gloves

Procedure

Explain procedure and rational to patient
Obtain equipment
Routine handwash
Draw up normal saline
Connect syringe cannula to syringe using “no touch” technique and place in kidney dish. Do not contaminate end of syringe
Routine handwash
Don non sterile gloves
Swab interlink bung thoroughly with alcohol wipe and allow to dry
Release slide clamp on lumen, injecting normal saline into bung
If resistance is met: stop immediately and reclamp the lumen. Label the lumen “blocked” and inform the medical team
If no resistance: Clamp catheter as last 1ml is injected, maintaining positive pressure
Do not unclamp catheter at end of procedure

4.5.2 Heparin Locking the CVAD

Outcomes

To maintain the patency of the central venous catheter whilst maintaining asepsis

Frequency

Weekly for capped (unused) lumens
After withdrawing or administering blood or blood products (normal saline flush first)
After administration of medication, if the lumen is to be capped (Normal saline flush first)

Accredited Personnel

RN / RM accredited to attend

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Guidelines

- As heparin precipitates with many medications, flush the line with normal saline before and after the medication and prior to heparin lock
  E.g. normal saline – medication – normal saline – heparinised saline

- After administration or withdrawal of blood/blood products, flush the lumen with 10mls normal saline before the heparinised saline lock

- Amount of heparinised saline required to lock the lumen:
  Central line – 2mls per lumen
  PICC – 3mls per lumen
  Hickman – 5mls per lumen

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>HEPARIN CONCENTRATION</th>
<th>SCHEDULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripherally inserted central catheter (PICC)</td>
<td>Heparinised Saline</td>
<td>At completion of each infusion/injection or weekly if lumen is not being used</td>
</tr>
<tr>
<td></td>
<td>50 units/5mls per lumen</td>
<td></td>
</tr>
<tr>
<td>Central Venous catheter (e.g. subclavian/femoral line)</td>
<td>Heparinised Saline</td>
<td>At completion of each infusion/injection or weekly if lumen is not being used</td>
</tr>
<tr>
<td></td>
<td>50 units/5mls per lumen</td>
<td></td>
</tr>
<tr>
<td>Renal Dialysis or plasmapheresis catheter (e.g. Vas Cath®)</td>
<td>Heparin 5,000 units/ml ampoule</td>
<td>After each infusion/injection or weekly if lumen is not being used</td>
</tr>
<tr>
<td></td>
<td>Volume of heparin required is indicated on each lumen</td>
<td>Use 5ml syringe to draw up &amp; instill heparin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aspirate &amp; discard heparin from lumen prior to use, flush with 0.9% Sodium chloride 10ml</td>
</tr>
<tr>
<td>Tunneled Catheter (e.g. Hickman®) Single/Double/Triple lumen</td>
<td>Heparinised Saline</td>
<td>After each infusion/injection or weekly if the lumen is not being used</td>
</tr>
<tr>
<td></td>
<td>50 units/5mls per lumen</td>
<td></td>
</tr>
<tr>
<td>Venous Access Port (e.g. Port-a-Cath™ Pas Port™)</td>
<td>Heparinised Saline</td>
<td>After each infusion/injection or monthly if the lumen is not being used</td>
</tr>
<tr>
<td></td>
<td>50 units/5mls</td>
<td></td>
</tr>
</tbody>
</table>

- Heparinised saline is not a nurse-initiated drug. A written order from a medical officer is required to lock the lumen.
- If the CVC is being accessed more than twice a day, a continuous infusion of fluids should be commenced.

Equipment

Heparinised saline 50 units in 5mls
1 x 10ml normal saline (per lumen)
2 x 10ml syringe (per lumen)
Alcohol swabs
Clean kidney dish
Non sterile gloves
Central Venous Access Device (CVAD) Management Guideline  cont’d

Procedure
Explain procedure and rational to patient
Routine hand wash
Prepare equipment – draw up heparinised saline and saline using a non-touch technique (see required amount in notes)
Wash hands and put on non-sterile gloves
Clean access bung thoroughly with alcohol and allow to dry
Connect 10ml syringe containing normal saline, unclamp CVAD and inject saline into catheter. If the catheter will not flush, attempt to aspirate and then flush again. If the line is blocked, label the line “blocked” and inform medical officer
If patency is determined, once the saline is injected, clamp the CVAD and remove syringe
Connect syringe containing the heparinised saline
Unclamp the CVAD and inject solution
Clamp the CVAD as the last 0.5mls is being injected (Positive pressure to prevent blood flow into the distal end of the lumen)
Remove syringe
Dispose of equipment appropriately
Document in the patient’s integrated notes and on the clinical pathway

4.6 Blood Withdrawal from a CVAD
- The greater the manipulations of CVAD lumens the greater the risk of infecting the CVAD. Therefore blood specimens are only to be withdrawn from lumens if peripheral access is unobtainable.
- This is not a sterile procedure but requires thorough hand washing and a non-touch technique when accessing the bung to prevent catheter contamination and bloodstream infection.

Accredited personnel
RN / RM accredited to attend

Outcomes
To safely obtain the required blood specimens

Equipment
1 x Blood transfer device
10 ml syringe (number dependant on blood tests required- 5mls for each tube)
2 x 10ml ampoule normal saline
Alcohol wipes
Required blood tubes plus one extra tube for discarding (the plain red blood tube is the most cost effective to discard)
Clean kidney dish
Non sterile gloves
+/– Equipment for heparinised saline lock, if the lumen is capped (10ml syringe x 1 heparinised saline ampoule)

Procedure:
Explain the procedure and position the patient supine with the head slightly raised
Obtain equipment
Perform routine hand wash and assemble equipment using aseptic technique
Pause all infusions except those that will compromise patient’s condition
Draw up normal saline 10mls x 2
Perform hand wash
Don non-sterile gloves
Clean bung thoroughly and allow to dry
Reclamp lumens when removing and changing tubing to prevent entry of air
Unclamp lumen and flush lumen with 5mls normal saline – discard syringe
Attach 10ml syringe to the bung and withdraw 5mls to discard in contaminated waste
Clean bung thoroughly and allow to dry
Withdraw the appropriate amount of blood, allowing 5 mls for each blood tube
Clean bung thoroughly and allow to dry
Flush lumen with a minimum of 10mls normal saline and re-clamp lumen under positive pressure.
Use blood transfer device, connect device to the end of the syringe, connect transfer device to blood
tubes and allow to fill one at a time. Do not use a needle
Discard transfer device into sharps container
Dispose of equipment appropriately and leave patient comfortable
Send labeled blood tubes with order form in specimen bag to pathology via internal chute
Document procedure in the patient’s integrated notes

Note:
Blood cultures can be obtained using a vacutainer designed for blood cultures and a luer adaptor.
The RHW recommended order of draw for blood specimens:
1. Blood cultures
2. Citrate tubes (blue tube)
3. Other blood specimens may follow in any order

4.7 Removal of a CVC
Outcomes
The central venous catheter is removed under aseptic conditions
The catheter is removed without complications and at the appropriate time

Accredited Personnel
RN / RM accredited in removal of CVADs

Guidelines
• This standard applies to central venous catheters which have not been tunneled under the skin
• The medical officer must document the request to remove the CVC in the patient’s integrated
  notes
• Valsalva’s manoeuvre is performed to minimise the risk of air embolism. Practice this procedure
  with the patient prior to removal of catheter
• The tip of the CVAD should be sent for micro culture if any of the following apply:
  • Inflammation/pain at insertion site
  • Fever of unknown origin
  • The CVC is removed because of micro organisms being cultured in the blood

Equipment
A cleaned dressing trolley with waste disposal bag and sharps container
Dressing pack
2% Chlorhexidine in alcohol 70% solution
Sterile occlusive dressing (Opsite IV3000)
Stitch cutter (if the CVC is secured with a suture)
Sterile specimen jar (if catheter tip collection is required)
Sterile scissors (if catheter tip is required)
Swabs for swabbing the insertion site (if infection is suspected)
Sterile gloves
PPE
CENTRAL VENOUS ACCESS DEVICE (CVAD) MANAGEMENT GUIDELINE  cont’d

Procedure
Ensure the medical officer has documented the removal of the catheter
Explain procedure to patient
Obtain equipment
Place patient in supine position (or as flat as is clinically indicated by the patient)
Turn off all infusions and clamp lumens
Routine hand wash
Open work field and add required equipment
Don non-sterile gloves
Disconnect lines and carefully remove existing dressing observing the site for inflammation (If infection is suspected, swab site and send for culture)
Aseptic handwash
Don sterile gloves
Clean insertion site with chlorhexidine and alcohol solution – cleaning from the centre outwards
Cut and remove suture
Ask patient to perform Valsalva’s manoeuvre (the patient holds their breath and gently bears down)
With your non dominant hand, hold a piece of gauze at the insertion site. With your dominant hand slowly remove the catheter
Hold gauze firmly in place and simultaneously apply a sterile occlusive dressing to the site, leaving in situ for 48 hours
Inspect catheter, ensuring tip is intact
If infection is suspected, using the sterile scissors cut the last 2-3 cm of the catheter and place in sterile specimen jar. Label appropriately and send to microbiology for culture.
Dispose of equipment appropriately
Document in patient’s clinical pathway and integrated not

References

NSW Health Department Infection Control Program Quality Monitoring Indicators Users manual.
Central Venous Catheter Insertion Checklist.
Safety Alert 002/08 Peripherally Inserted Central Catheter (PICC Line) Released

Replaced Central Venous Catheter Management – Adult
Approved Quality Council 16/10/06
Approved quality Council 17/5/04, reviewed October 2006