

A PROCEDURAL GUIDE TO MIDLINE CATHETER INSERTION

See Also

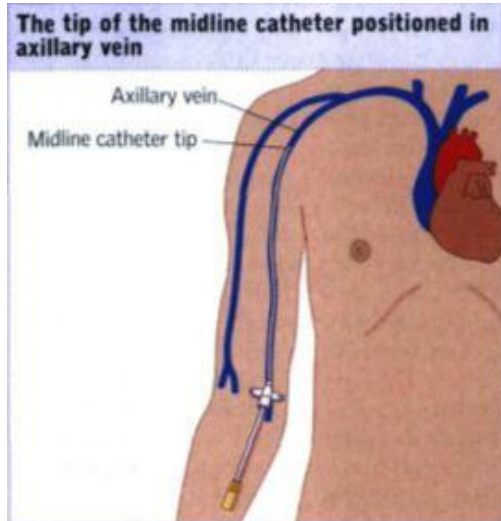
- **CPG midline catheters** for indications, contraindications and post insertion management

What is a midline

A midline catheter is an 8 - 12 cm catheter inserted in the upper arm with the tip located just below the axilla.

Insertion should be ultrasound guided by an experienced operator to ensure large calibre basilic or brachial veins are selected to avoid thrombosis.

Usual dwell time is 14 days, but a midline can last up to 30 days in certain circumstances



Who should insert the midline catheter

- Ultrasound guided venous access has a learning curve. It is suggested a minimum of 20 supervised insertions be undertaken prior to unsupervised insertion.
- Cystic Fibrosis [Standards of Care Australia](#) published in 2008 specify that venous access should be made available soon after admission, during working hours, and be performed only by experienced staff.
- Minimization of psychological (many CF patients have developed an extreme needle phobia) and physical damage and preservation of vein health for life in children requiring venous access lifelong means the learning curve of training inserters should be shifted away from these patients.
- At RCH the Anaesthetic or Interventional Radiology Departments are most suited to perform these procedures at the time of writing.

Where does the procedure take place

- Any location in the hospital where access to sterile equipment, nitrous oxide sedation and skilled help can be provided.
- Current suitable locations include: ward treatment rooms, day medical unit, operating theatre recovery room or anaesthetic rooms.

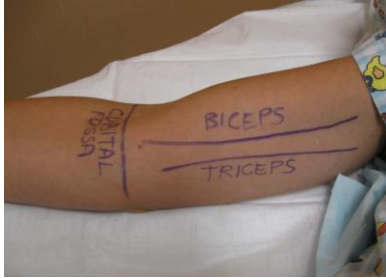
Equipment

- 8 or 12cm Arrow "red" line
- Suture-less securement device such as a Grip lock™
- Sterile insertion pack
- Ultrasound machine

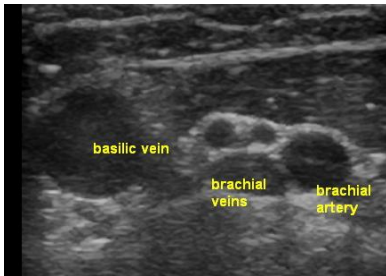
Position and attach monitoring

- Position with chosen arm outstretched on arm board
- Locate the ultrasound machine to ensure a good view of the screen
- Attach monitoring if sedation is being used

Perform a bilateral ultrasound arm scan identifying anatomy



- Apply the tourniquet
- Scan BOTH arms focussing on the region between biceps and triceps on the medial aspect of the upper arm where the structures of interest are located



- Identify the basilic vein, the brachial veins (usually paired and on either side of the brachial artery) and the median nerve on each arm. The artery will be pulsatile, and the veins easily compressible

Choose the best vein and insertion site

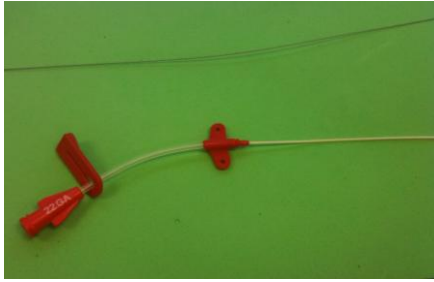
- Choose the largest vein, ensuring it is far enough from the brachial artery to avoid it. The best vein is usually the basilic vein.
- The basilic and brachial are preferred over the cephalic vein as their higher flow ensures lower complication rates.
- Avoid the cephalic vein as flow rate is usually lower, and it gets narrower proximally.
- Avoid the cubital fossa as catheters inserted here are associated with higher infection and thrombosis rates due to friction with movement
- The ideal insertion site is proximal enough to the elbow to ensure easy elbow flexion distal enough from the axilla to ensure a 8 or 12cm midline will not cross the axilla
- Release the tourniquet until the sterile set up on the chosen arm is undertaken

Barrier precautions



- as per RCH CVAD guidelines
- Sterile gown, and mask, one minute hand scrub sterile gloves are recommended for CVAD insertion. Midlines are by definition not a CVAD, but due to long dwell time RCH anaesthesia recommends a mask, one minute hand scrub sterile gloves.
- Prep the whole upper arm for 30 seconds with alcoholic chlorhexidine
- Apply large fenestrated drape covering arm and upper body
- Sterile ultrasound probe cover

Choose appropriate size midline catheter



- Approximate the distance between the axilla and the insertion site
- Choose either an 8 or 12cm Arrow 22g catheter to ensure the catheter ends below the axilla.
- Remove the wire from the catheter

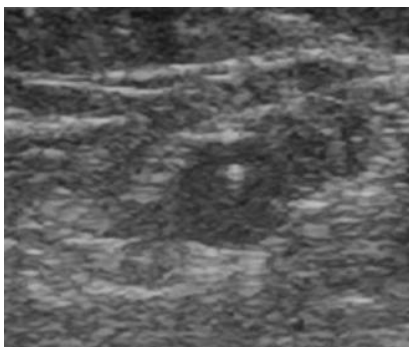
Perform real-time ultrasound guided venipuncture



- Apply the tourniquet
- With ultrasound guidance and the vein in a short axis view either
 - transfix the vein with a 22g cannula and withdraw the cannula until good blood flow back occurs
 - directly enter the vein with a 22g cannula or the needle in the kit



- Insert the short 0.018 wire from the midline kit through the cannula/ needle



- Rescan to ensure the wire and cannula are in the correct vein
- Scan all the way up the arm to the wire tip to ensure it is all in the vein

Exchange the cannula for the midline catheter over the wire



- Remove the cannula leaving the wire insitu
- Advance the midline catheter over the wire
- Withdrawn the wire

Confirm satisfactory position and trouble shooting

- Several mls of blood should easily be able to aspirate in a second. If blood aspiration is slow, impossible or blood is “dark” the tip may be positioned in a small vein and it is likely the midline will tissue early. Consider repositioning.
- If it takes more than 3 attempts or 5 minutes to get into the basilica vein, call for help or a second opinion
- If you unsure that the catheter has gone into the basilic vein, or the anatomy is difficult it may be necessary to
 - get a second opinion
 - use radiopaque dye to identify location
 - insert a 0.018 wire through the catheter under image intensifier guidance to ensure it passes easily into the subclavian vein
 - abandon for a PICC line

Bung and dressings



- Attach a smart site bung to the end
- Flush with heparin 10 IU/ML sliding the red the clamp closed at the end of the flush
- Apply suture-less dressing close to site
- Cover the area with a large Tegaderm™, reinforced with Hypafix™

Documentation

- Write on the top on the drug chart “midline catheter: all drugs to be diluted as per peripheral IV”
- Use a CVAD sticker in the Patient Progress notes

CVAD RECORD <input type="checkbox"/> PICC <input type="checkbox"/> Vascath CVC: <input type="checkbox"/> Percutaneous <input type="checkbox"/> Tunnelled <input type="checkbox"/> Midline (<i>dilute drugs as per peripheral IV</i>) Brand: _____ Size: _____ No. Lumens: _____ Site: _____ Length at skin: _____ cm Securement <input type="checkbox"/> suture <input type="checkbox"/> Grip/Statlock	Asepsis: <input type="checkbox"/> gloves <input type="checkbox"/> mask <input type="checkbox"/> gown <input type="checkbox"/> full drape <input type="checkbox"/> 30sec Alc-Chlorhex No. wires used ____ No. wires discarded ____ X-ray: <input type="checkbox"/> on table <input type="checkbox"/> recovery / ICU Tip position: _____ Heparin flush: <input type="checkbox"/> 10 u/ml <input type="checkbox"/> 100 u/ml Inserter : name _____ sign _____ Assistant: name _____ sign _____
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- If no CVAD sticker is available directly record all details including site, side, vein used, catheter used and length, sterile technique used, # of wires used and discarded, fixation method, heparin flush used
- Fill out the CVAD audit form

Midline management post insertion

- Heparin lock and flush as per PICC lines / CVADs
- Sterile no touch technique as per a CVAD device
- Weekly dressing changes as per CVAD guidelines
- Only infuse drugs suitable for peripheral IV infusion
 - osmolarity < 500mOsm/L
 - pH 5-9
 - not suitable for continuous vesicant chemotherapy or TPN with >10% dextrose or >5% protein
- Midline catheters are made of tough polyurethane (similar to a PICC or CVC) and therefore should be suitable for IV “drug pushes” without concerns of line fractures as long as a syringe of 10ml capacity or larger is used
- Refer to the RCH CVAD management website http://www.rch.org.au/cvad/index.cfm?doc_id=1892