

## TITLE OF GUIDELINE: MIDLINE CATHETERS

### See Also

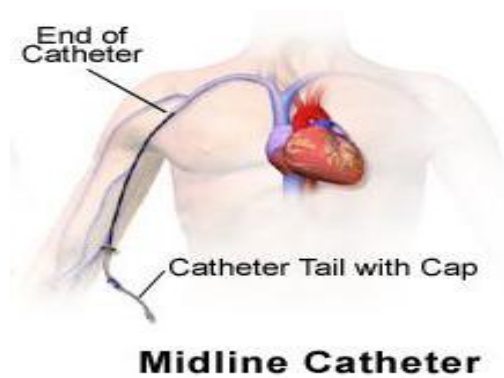
- Venous access recommendations for cystic fibrosis respiratory “tune ups” CPG
- Choosing an appropriate venous access device CPG
- CVAD insertion guidelines
- Venous access decision path diagram
- A procedural guide to midline insertion

### Definition

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.



### Background

Increasingly worldwide (notably in the USA) the ultrasound guided upper arm midline catheter has been introduced as an alternative to central venous access for intravenous antibiotic therapy lasting up to 30 days in adults.

**Advantages** of this type of catheter are less wait for definitive IV access, a quicker insertion time, less painful insertion, avoidance of x-ray, and avoiding cannulating central vessels.

Royal Children's Hospital Anaesthesia introduced the use of midlines in 2010 for cystic fibrosis respiratory “tune-ups” in children over 8yo after an extensive consultation process with RCH Respiratory Physicians, RCH Clinical Haematology, The Alfred Transplant Unit, children with Cystic Fibrosis and their parents. An ongoing audit of their use is being conducted.

## Indications

- Currently approved for use in RCH by Clinical Haematology for cystic fibrosis “tune-ups”.
- Antibiotic therapy lasting less than 2 weeks with antibiotics that are suitable for peripheral IV infusion (ideally pH 5-9 and osmolarity <500mOsm/L).
- Child >8yo
  - A midline is more likely to become dislodged than a PICC in children <8yo requiring reinsertion. Reinsertion in <8yo requires a second general anaesthetic and interruption of treatment
  - The vein lumen where the tip resides is exposed to 14 days of antibiotics. Larger higher flow (basilic and brachial) veins in a child >8yo are likely to cope with this better, and vein integrity is more likely to be preserved.
- Ultrasound prescan shows upper arm brachial or basilic veins are patent, and good calibre

## Relative contraindication

- General anaesthesia is required for the procedure.
- Recent RCH audit shows midlines have a 75-80% chance of lasting the duration of the tune up. Wait time for a second general anaesthetic and a vacancy on the emergency list will create interruption to the intravenous antibiotics for up to 24-48 hours.

## Contraindications

- Child with known poor veins or previous failed midlines may be better suited to a PICC to ensure the venous access device lasts the duration of the treatment. Ultrasound prescan of arms to ensure patent and large basilic or brachial veins is recommended if there is doubt over vein patency (refer to “**vein mapping referral**” document)
- Planned Hospital in the Home discharge – especially if home is more than an hour away. A PICC may be better choice to ensure it lasts the duration of the treatment
- Drugs not suitable for peripheral IV infusion (such as TPN or chemotherapy)
- No experienced inserter available (see below)

## Complications

- Line blockage: Recent RCH audit 2011 shows a 75-80% rate of the midline catheter lasting duration of treatment
- Thrombosis: higher rates of thrombosis occur in the cephalic veins or in veins where the catheter occupies more than 1/3 of the vein diameter without a tourniquet. Ultrasound guided mid arm insertion in the best brachial or basilic vein decreases this

## 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.

### Midline insertion: a step by step guide

- Refer to **a procedural guide to Midline insertion**

### 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: sterile dressing change of Securement device and large transparent dressing.
- 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
- Antibiotics need to be diluted as per peripheral IV infusion
- 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](http://www.rch.org.au/cvad/index.cfm?doc_id=1892)

### Who was involved / consulted in this guideline

- Dr Liz Prentice , Anaesthetist Royal Children’s Hospital
- Dr Paul Monagle , Clinical haematologist, Anaesthetist Royal Children’s Hospital
- Prof Greg Snell, Medial Head, Lung Transplant Service, Alfred Hospital
- Nurses and Physicians, Cystic Fibrosis Unit, Royal Children’s Hospital Melbourne
- Children and parents of children with cystic fibrosis

### Further reference:

Bridging the IV access gap with midline catheters, Kelli Rosenthal, Nursing Made Incredibly Easy May / June 2007