VENOUS ACCESS RECOMMENDATIONS FOR CYSTIC FIBROSIS RESPIRATORY "TUNE-UPS" AT RCH MELBOURNE CPG

Related documents and policies

- **"Choosing an appropriate Venous access device "CPG**
- **"Booking venous access for cystic fibrosis "tune-ups" at RCH Melbourne"**
- **Midline Catheters CPG**
- **"A procedural guide to Midline Insertion"**
- **"Venous access decision path" diagram**

Background

Patients with Cystic Fibrosis experience respiratory exacerbations or infections, which require 10 to 14 days of intensive intravenous antibiotic therapy, in association with chest physiotherapy.

Venous access lasting the duration of this treatment is required. It is recommended that if venous access is required for more than 7 days, definitive central venous access is required

Recommendations from Cystic Fibrosis Standards of Care Australia 2008

- The hospital needs to be able to provide an IV service which includes anaesthetists, radiologists, surgeons and medical imaging
- Centres should have staff, and facilities to provide a service for insertion of temporary peripheral or central venous lines as well as implantable vascular access devices (IVADs) such as a venous port.
- Venous access should performed only by experienced staff with expertise in CF and IV access
- A plan for IV access for each person based on knowledge of their history of IV access.
- Options for IV access should be discussed with patients at each admission
- Needle phobia is an important problem to consider; sedation or general anaesthesia may be needed.
- Initial access can be to use an IVAD if available or peripheral IV line.
- A peripherally inserted intravenous central catheter (PICC) line or a central venous catheter (CVC) will usually be arranged during working hours.

Objectives for planning and booking CF venous access

Plan and book the line prior to admission: Elective / semi elective lines are ideally planned a week ahead. At RCH this is by a discussion between the CF coordinator nurse and the in charge anaesthetist (or vascular access coordinator anaesthetist)

Avoid emergency list and after hours insertions: Elective / semi elective tune up lines are better not done on an emergency list, as these are associated with prolonged fasting, unknown timing of access and out of hours insertions. This causes undue stress and uncertainty around the admission (and when the antibiotics can start) for the child and parents.

Objectives for line choice for CF tune-ups

Appropriate line choice: Line is carefully chosen to ensure it lasts the duration of the tune up, is suitable for the patient's age and weight, and complications such as thrombosis and infection are minimized. See guidelines below.

Aim for first line to be the definitive line: Aim for the definitive IV access which will last the duration of the tune up to be inserted within hours of admission by an experienced inserter

Experienced line inserters only: CF patients are recurrent patients requiring multiple IV access over a lifetime. Excessive child and parental distress, needle phobia, and damage to precious veins due to multiple attempts by inexperienced inserters should be avoided. Avoid peripheral IV access or "long line" insertion in ward treatment rooms by inexperienced inserters. Experienced inserters include anaesthetic consultants or fellows, radiologists, or someone with several years of experience including ultrasound training.

Line choice considerations

As detailed elsewhere in this document the aim is for the first line inserted to be the definitive line, the only exception being a urgent / semi urgent admission, where venous access has been unplanned, and a peripheral IV may be inserted (by an experienced inserter) until the definite line can be booked in an appropriate location with an experienced inserter. Refer to the **Venous Access Decision Path** diagram.

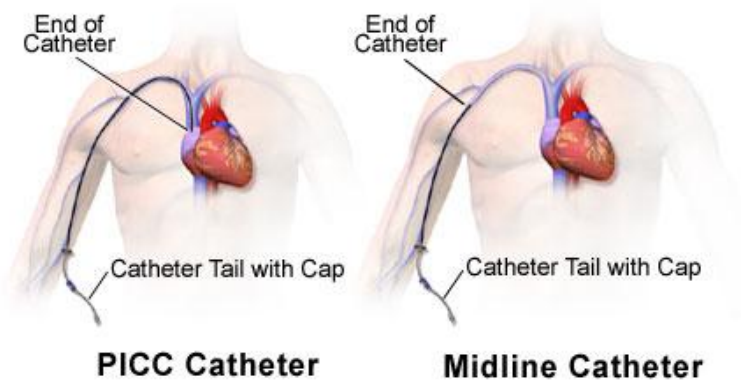
1. **Duration of the treatment (usually 10-14 days):** Usually any IV therapy lasting >7 days would indicate a CVAD (CVC or PICC) as the preferred device. With the increasing use of the "midline catheter" worldwide for antibiotic therapy <30 days, RCH introduced the use of midlines in 2010 for older CF patients if certain criteria are met. This was after extensive collaboration with Haematology, CF unit, parents, children, and the transplant team at The Alfred Hospital. Refer to the CPG on Midline Catheters (hyperlink)
2. **Infusate:** Most CF antibiotics can be diluted to strength suitable for peripheral IV infusion if required, however 10-14 days of antibiotics can be veno-irritant, and therefore central venous access, or access in the high flow basilic or brachial veins of the upper arm is preferred to ensure vein preservation for life.

3. **Vein status**: if arm veins are small, thrombosed, or have extensive collateral development, a plan for a permanent tunnelled access such as a port may be appropriate.
4. **Frequency of tune ups:** If respiratory disease is more advanced, requiring tune ups every month or so, permanent access such as a port may be appropriate.
5. **Age:** PICCS in children <2yo are difficult and a percutaneous CVC is often a more practical solution. If a child requires a general anaesthetic for access, a secure line such as a PICC is preferred. Once <8yo the child will look after the line better, a midline may suffice.

Line Recommendations at RCH for CF venous access

After extensive audit of what lines were most straightforward to insert, and lasted longest in which patient groups at RCH we have elected to choose an appropriate line for a tune up mainly based on age and weight.

- **Age <2yo: CVC**
    - PICC insertion will have a very high failure rate, often take multiple attempts, and result in and anaesthetic time over 45 minutes, as veins the will be small. PICC needs to be <1/3 vessel diameter to avoid thrombosis. Audit has shown smaller PICCs used often block prematurely. 14 day dwell time does not justify prolonged and multiple attempts.
    - A simple ultrasound guided CVC is inserted in 10 minutes, and lasts 14 days.
- **Age 2-8yo: PICC**
    - Ultrasound guided PICC in the mid upper arm basilic or brachial veins, avoiding the cubital fossa.
    - Tip is positioned in the lower SVC.
    - If child is <20kg an arm PICC may be difficult to insert and CVC is a better option.
- **Age >8yo choose a midline if**
    - None of criteria for >8yo PICC are present
    - Tune up <14 days
    - Known good basilic or brachial arm veins suitable for a midline
    - Patient request for midline based on previous lines
    - A midline is a 8 or 12 cm ultrasound guided line into the mid upper arm basilic or brachial veins, with the tip positioned at or short of the axilla
    - Procedure can be done awake +/- nitrous oxide (N2O) sedation
    - If being discharged home lives less than an hour away by car (midlines have slightly higher malfunction and fallout rates than PICCs)
- **Age >8yo choose a PICC if:**
    - General anaesthesia is required for the procedure.
    - Child with known poor veins or previous failed midlines
        - Planned Hospital in the Home discharge – especially if home is more than an hour away.



Midlines and PICCS are inserted in the same position and veins. The PICC catheter tip is positioned in the in the lower superior vena cava, whereas the midline stops short of the axilla

Booking Process at RCH

Refer to **"booking venous access for cystic fibrosis "tune-ups" at RCH Melbourne"**

Objectives for line audit for CF tune-ups

This is important to ensure venous access is lasting the duration of the treatment, and no complications are ensuing. Audit also enables the flagging of individuals with difficult access who need a change in venous access plan. Lines are audited by the anaesthetic department at RCH for success and complications.

Who was involved / consulted in this guideline

- Dr Liz Prentice, Anaesthetist Royal Children's Hospital
- Dr Ian Smith and Dr Billy Browne, Anaesthetists Royal Children's Hospital
- Dr Paul Monagle, Clinical Haematologist, Anaesthetist Royal Children's Hospital
- Prof Greg Snell, Medial Head, Lung Transplant Service, Alfred Hospital
- CF nurse coordinators and Physicians, Cystic Fibrosis Unit, Royal Children's Hospital
- Children and parents of children with cystic fibrosis