

Long line insertion (PIP)

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Key Amendments

Date	Amendment	Approved by
<i>9th Feb 24</i>	<i>No changes approved at Paediatric Guideline Review Day</i>	<i>Paediatric Guideline Review</i>

The following guidance is taken from the Partners In Paediatrics (PIP)

Long line insertion 2022–24

LONG LINE INSERTION

INDICATIONS

- Midlines for patients where proposed IV therapy is 5–14 days duration and not requiring central administration
- Peripherally inserted central catheter (PICC)
- for drugs that have to be given centrally (e.g. if they cause phlebitis)
- if risk of infection high (e.g. parenteral nutrition)
- for access >14 days

INSERTION SITES

- Commonly long saphenous at ankle or medial/lateral antecubital veins
- Where access is difficult, other large peripheral vein or scalp vein can be used

EQUIPMENT

- Assistant
- Midline:
- Leaderflex 22 G (2.5 F) line 6, 8 or 20 cm
- PICC:
- Vygon PICC 3, 4 or 4.5 F 60 cm Lifecath
- Vygon Nutriline 2, 3 or 4 F 30 cm
- Vygon Neocath or Epicutaneo-cave catheter 2 F (23 G) 15, 30 or 50 cm has different insertion technique, not recommended except neonates

DO NOT ATTEMPT INSERTION UNLESS YOU ARE FULLY TRAINED
Use whichever line you have been trained to use

- Flush solution: sodium chloride 0.9% 5 mL
- Single dressing pack
- Sterile gown, mask and hat for operator and assistant
- Sterile gloves
- Sterile scissors
- 2 extra sterile towels
- 5 mL syringe/green needle
- Tape measure
- Sterile clear dressing (e.g. Opsite®/Tegaderm®)
- 2 extra packs gauze swabs
- Single-use application of chlorhexidine 2% in isopropyl alcohol 70%
- if sensitivity use povidine-iodine
- 3 wide Steri-strips™ (optional to secure line)
- Sterile non-toothed forceps
- Needle holder
- Sutures
- Instrument checklist

PROCEDURE

Measure insertion distance

- Upper limb: measure from insertion site to upper sternum – line tip to be within the superior vena cava
- Lower limb: measure from insertion site to xiphisternum – line tip to be within inferior vena cava

PICC line preparation

- Check patient's notes for comments regarding previous line insertions. Some veins can be particularly difficult and patient can often provide guidance
- Assess whether patient will need sedation. Rarely, children with needle phobia or difficult vascular access issues will need the line inserted under general anaesthetic. Arrange appropriate person to administer sedation
- If necessary, remove hair from insertion site using clippers (single use disposable razor can be used if clippers unavailable) to allow dressing to be applied post insertion and avoid hair plucking when dressing removed
- If using topical local anaesthetic cream, specify exactly where you would like this sited. Apply anaesthetic cream to chosen veins (3 sites) ≥ 1 hr before starting procedure (depending on manufacture's recommendation)
- if ventilated additional sedation, analgesia or muscle relaxant may be required
- Use single patient use tourniquet
- Check whether blood samples required
- Gather all necessary equipment including spare line (unopened)

Consent

- Explain procedure and reassure patient and parent/carer
- Obtain and record consent

Premedication and position of patient

- Position patient seated in chair or lying with his/her arm or leg out-stretched and supported by table or bed (on a utility drape)
- ensure patient in position and comfortable, and lighting optimal

Surgical aseptic non-touch technique (ANTT)

- Always use ANTT
- Put on surgical mask and hat
- Wash hands with chlorhexidine, iodine or betadine and put on apron/gown and sterile gloves
- Clean patient's skin thoroughly with single-use application of chlorhexidine 2% in isopropyl alcohol 70% and allow to dry for ≥ 30 sec
- if patient has sensitivity use povidine-iodine (for neonate skin preparation see Neonatal guidelines)
- Drape sterile sheet to expose only chosen vein, and cover surrounding areas to provide working room and a flat surface on which to rest your line, forceps and flush
- if sterility compromised at any stage abandon procedure and restart with new equipment

Lifecath 3, 4 or 4.5 F

- Assemble line fully and flush with sodium chloride 0.9% 1 mL to ensure patency
- Insert using aseptic Seldinger technique
- Lifecath can be cut to desired length
- ensure stiffening wire within the Lifecath is withdrawn beyond site to be cut, to ensure that wire is not damaged/weakened (may lead to wire snapping within the patient)
- Place everything you will need onto sterile sheet within reach
- Ask assistant to apply tourniquet, but remain ready to release
- Check patient is ready for you to start
- Clean insertion area [see Surgical aseptic non-touch technique (ANTT)]
- Access vein with introducer supplied with line or cannula
- be careful: introducer for the PICC line is much stiffer than a standard cannula and more likely to perforate the entire vein
- Insert guidewire via cannula or introducer
- wire does not need to be fully inserted and may cause arrhythmias if inserted too far
- do not force the guidewire – this will damage the vessel and may weaken the wire causing it to bend or snap

- it is important that, at any time, operator is able to grasp directly either free end of wire or wire itself as it passes through skin, to ensure that it does not pass entirely into vein
- Remove cannula or introducer
- Insert dilator and peelable sheaf over guidewire until blood flowing freely (in some patients this will come quite quickly so have catheter ready)
- Release/ask assistant to release tourniquet to reduce blood flow

- Remove dilator and guidewire then insert PICC line via sheaf. At approximately 6–7 cm you will reach the tip of the sheaf line. If line passes easily beyond 6 cm, you have probably succeeded. Resistance at any point usually indicates failure to thread vein, or curling of line. Insert line to previously measured distance from site of insertion. Manipulation of the limb may be helpful if there is difficulty in advancing the line past a joint
- When tip of line judged to be in correct position, carefully withdraw sheath and remove from around line by pulling apart the 2 wings, then remove the stiffening wire from within the line
- Apply pressure on entry site (it may bleed for a few minutes). Aspirate then flush line with sodium chloride 0.9% 2 mL. Secure line with suture or Steri-strips™ (according to local policy). Once any bleeding has stopped, apply biopatch over entry site
- Cover entry site, connections and any exposed line with piece of clear dressing (e.g. Opsite®)
- X-ray line to check tip position if near heart or if no blood flushes back up line. Do not draw blood back up the line (this increases risk of line blockage). While waiting for X-ray confirmation of tip position infuse sodium chloride 0.9% 0.5–1 mL via each lumen of line to ensure continued line patency. Confirm removal of complete guide and stiffening wires with assistant
- Following confirmation of line position flush once more and line is then ready to use

Leaderflex lines

- Insert using surgical ANTT Seldinger technique
- **DO NOT** cut lines
- Cannulate target vein with either needle provided or a 24 G Jelco® cannula or blue cannula
- Feed guidewire into vein through cannula sheath and remove sheath leaving wire *in situ*
- Feed line over guidewire and into vein with a gentle twisting action. It is important that, at any time, operator is able to grasp directly either free end of wire or wire itself as it passes through skin, to ensure that it does not pass entirely into vein
- Remove guidewire and secure line in place
- Once any bleeding has stopped apply biopatch over the entry site (if local policy)
- Cover entry site, connections and any exposed line with piece of clear dressing (e.g. Opsite®)
- It is not necessary to verify position of 6 or 8 cm lines radiologically unless inserted into axillary vein

Nutriline PICC line

- Insert using surgical ANTT
- Assemble line fully and flush with sodium chloride 0.9% 1 mL to ensure patency
- Place everything you will need onto sterile sheet within reach
- Ask assistant to apply single patient use tourniquet but remain ready to release
- Check patient is ready for you to start
- Clean insertion area [see Surgical aseptic non-touch technique (ANTT)]
- Access vein with introducer supplied with line
- be careful: introducer for PICC line is **much stiffer** than standard cannula and more likely to perforate entire vein
- Remove needle leaving peelable sheaf *in situ* and insert line using forceps
- Release or ask assistant to release tourniquet to reduce blood flow
- At approximately 6 cm you will reach tip of sheaf. If line passes easily beyond 6 cm, you have probably succeeded. Resistance at any point usually indicates failure to thread vein, or curling of line. Insert line to previously measured distance from site of insertion. Manipulation of the limb may be helpful if difficulty advancing line past a joint
- When tip of line judged to be in correct position, carefully withdraw sheath and remove from around line by pulling apart the 2 wings
- Without releasing pressure on entry site (it may bleed for a few minutes) flush with sodium chloride 0.9% 2 mL using a 10 mL syringe (smaller syringes cause greater pressure and may rupture the line)
- With sterile scissors, cut rectangle of gauze (1 x 2 cm) to prevent hub of line rubbing skin

- Check all connections are firmly tightened. Coil any unused line next to insertion site and secure with Steri-strips™
- [Once any bleeding has stopped apply biopatch over the entry site \(if used locally\)](#)
- Cover entry site, connections and any exposed line with one piece of clear dressing (e.g. Opsite®)
- [X-ray line \[0.5 mL of contrast \(e.g. Omnipaque 240\) may be required to adequately see line tip position – use according to local guidelines\]](#) to check tip position if near heart or if no blood flushes back up line. Do not draw blood back up line (this increases risk of line blockage)

Use [standard ANTT](#) when accessing the system or for dressing changes

AFTERCARE

- [Confirm removal of all guidewires with assistant and document using instrument checklist](#)
- [Document insertion and all interventions in patient notes](#)
- Flush after each use with sodium chloride 0.9% 2 mL in 10 mL syringe (or bigger) using a pulsed, push-pause technique, and clamped whilst flushing to create positive pressure in the line
- [Ensure each lumen has continuous infusion of 0.5–1 mL/hr of IV fluid to maintain patency or use heparin 100 units/mL to line lock if line accessed less than every 7 days](#)
- [Decontaminate access port using chlorhexidine 2% in isopropyl alcohol 70% and allow to dry](#)
- [if patient has sensitivity use povidine- iodine in alcohol 70%](#)
- [Curoc caps are a needle free device for each port and alternative to wiping port](#)
- [require 1 min contact time to disinfect port](#)
- [single-use curoc caps to be placed on all ports, if port not accessed must be changed every 7 days](#)
- [Change dressings every 7 days \(or sooner if visibly soiled or coming away\)](#)
- [Cleaning of the access site should be carried out using single use chlorhexidine 2% in isopropyl alcohol 70%](#)
- [if patient has sensitivity use povidine-iodine in alcohol 70%](#)
- [Maintain \[standard ANTT\]\(#\) for accessing system and dressing changes. Before accessing system, disinfect hub and ports with disinfectant compatible with catheter \(e.g. alcohol or povidone-iodine\)](#)
- [Prescribe skin decontamination wash e.g. Octenisan® to reduce risk of line infection](#)
- [Assess site at least daily for any signs of infection and remove if signs of infection present](#)
- [Minimise number of times the longline is accessed](#)
- [Replace administration sets depending on what is being infused according to local policy. Routine catheter replacement is unnecessary](#)
- **Assess need for device daily and remove as soon as possible**
- [When removed document date of removal and reason for removal in notes](#)

COMPLICATIONS

- [Clinical deterioration of a patient with a central venous catheter should raise the question of catheter related complication](#)
- [Commonest complication is sepsis](#)
- [Extravasation of fluids into pleural, pericardial and subcutaneous compartments – seek immediate senior advice and follow local extravasation guidelines](#)
- [Suspect pericardial tamponade if:](#)
 - [acute or refractory hypotension](#)
 - [acute respiratory deterioration](#)
 - [arrhythmias](#)
 - [tachycardia](#)
 - [unexplained metabolic acidosis](#)
- [Confirm pericardial tamponade by X-ray or echocardiogram](#)
- [drain pericardial fluid to treat](#)
- [To reduce risk of damaged or snapped lines:](#)
 - [avoid using small syringes <2 mL for bolus injections – generate high pressures](#)
 - [avoid using alcohol/acetone to clean around catheter – may weaken line](#)
 - [do not exceed recommended pressure limits or flow rates \(found on product packaging\) for individual lines](#)
- [If forced on removal lines can snap](#)
- [If retained line/line fragments suspected, inform consultant – may require surgical removal](#)

REMOVAL

Indications

- Clinical use no longer justified
- Complication associated with indwelling line identified

Technique

- Use standard ANTT
- Carefully remove dressing
- Pull line gently in direction of vein
- Ensure line has been removed intact
- If sepsis suspected send line tip (length <4 cm) for culture
- Apply pressure over line site to prevent bleeding
- Document removal in notes