Long line insertion guideline

Contents

Indications for long line

- Secure central access
- Infusion of medications that need to be delivered centrally
    - Eg, inotropes, high concentration glucose

Which babies should have a long line inserted?

Babies that should have a long line	Consider a long line
• All babies <25 weeks gestation to replace the UVC • Infants with NEC • Infants with abdominal wall defects • Infants with congenital diaphragmatic hernia	• In an infant with a high glucose load • In a baby on long term antibiotic therapy (duration > 2 weeks) • Infants with challenging IV access and a need for ongoing intravenous therapy/drugs/nutrition

Relative Contraindications to long lines

- Very immature skin or skin condition making it impossible to use tegaderm
- Active sepsis*

** a long line may be necessary in sepsis because of the need for central access to deliver inotropes. The risk of line colonisation is balanced with managing the acute sepsis episode and the decision under these circumstances is consultant led.*

Types of long line:
The default long line is a 2F nutriline (highlighted in yellow in the table). These come in 2 lengths, but mostly a 15cm line will be sufficient for all gestations, especially if sited in the arm.

Double lumen long lines:
These lines should be used in infants requiring nutrition and medications or prolonged antibiotics. Suitable for extremely preterm infants who are requiring additional venous access for medication or ill babies with NEC who need nutrition, inotropes and antibiotics. They should only be used after discussion with consultant.

A double lumen long line needs to have a continuous infusion of at least 0.5ml/hr of fluid running through each lumen at all times. This can be 5% glucose or 0.9% sodium chloride, depending on the clinical situation.

Catheter size (F)	Length (cm)	Lumens	Priming volume (per lumen) (ml)	Max flow rate (ml/min)	Visible on Xray
Nutriline 2F	**15**	**single**	**0.06**	**9**	**Yes**
Nutriline 2F	30	single	0.12	5	Yes
Premicath 1F	20	single	0.09	0.7	In most circumstances*
Nutriline twinflo	30	double	0.2	1.45 (each lumen)	Yes

*Please use graphics on PACS (the light and dark/invert colour function). If the tip is still not visible, escalate to the consultant. In some circumstances, omnipaque dye needs to be instilled to visualise the tip.

Preparation for long line insertion:

- **Equipment needed**
  - Appropriate cleaning solution
  - Sterile gown, hat, mask, gloves (x2)

- Vygon PICC line insertion pack (see below for contents)

1. Gallipot (pink)*
2. Gauze
3. Clear plastic drape with small hole in
4. Larger blue drapes
5. Clamp for drapes
6. curved iris forceps
7. Small steristrips
8. Small tegaderm x2

**there is also a clear gallipot. Use pink one for cleaning solution and the clear one for sterile water to wash off the cleaning solution*

  - *Alternatively, a sterile dressing pack, steri strips, a clear tegaderm and sterile scissors can be used if there are no PICC line insertion packs available*

- Long line (usually 2F nutriline)
- Microwire pack
- Yellow canula
- Blue bung
- Surgicel
- 0.9% sodium chloride

- **Organising the equipment:**
  - Measure the desired insertion length of the long line with a tape measure BEFORE you scrub up for the procedure
    - Upper limb: measure from planned insertion point → sternal notch
    - Lower limb: measure from planned insertion point → xiphisternum
  - Open PICC line insertion pack and arrange equipment on the trolley in an organised fashion. It can be helpful to arrange the equipment in the order with which it will be used (ie, swabs and cleaning, drapes, instruments, line etc)
    - Apply blue bungs to the end of the line
    - Prime lumen with 0.9% sodium chloride
    - Ensure lumen is clamped off after priming with saline
    - Place the long line in the plastic container [red arrow] as this enables the line to stay protected when being moved into the incubator
    - Take the microwire out of the plastic ring, discard the needle that comes as part of the microwire kit (red circle on the diagram) and remove the peelable dilator from the small plastic bag

- **Environment**
  - Attention to thermoregulation during the procedure is important (see procedural thermal bundle)
  - This procedure is performed with the incubator side down to minimise risk of accidental contamination of equipment on the incubator / doors etc, so this poses a risk of the temperature dropping
  - Pre-empt this by:
    - increasing incubator temperature in advance of starting
    - using a plastic bag to keep the baby warm
    - have all equipment set up prior to starting to minimise the time the incubator side is open
  - These measures should minimise the time the incubator side is open and hence minimising the risk of procedural hypothermia

- **Parents**

Parents should be told in advance of long line insertion and the reason for this and this should be documented in the medical records.

Insertion of a long line using the seldinger technique

Insertion of any central line is a 2-person procedure (inserter and assistant) and should be performed using the aseptic non touch technique (ANTT). It is advocated that you wear 2 pairs of sterile gloves and remove one pair once the skin has been cleaned, as this is a common time for gloves to become contaminated.

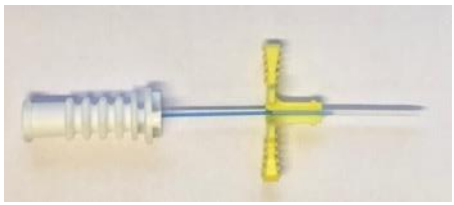
1. Apply hat and mask then scrub up and don sterile gown and two pairs of gloves
2. Familiarise yourself with the longline you are inserting, particularly the markings on the line and the intended length of insertion
3. Assistant to pour appropriate cleansing agent into a galipot [1] and clean chosen site appropriately. If the baby is preterm, use a cleaning solution without alcohol (0.05% chlorhexidine in aqueous solution) and wash off with water. See skin asepsis guidelines.

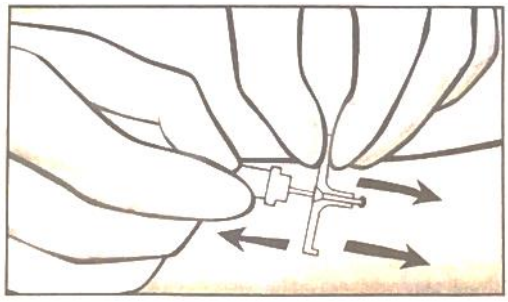
If the baby is near term or term, use standard 2% chlorhexidine with 70% alcohol, and let it evaporate off the skin with no need to wash this off.

4. Apply the transparent drape to the limb/site which has been cleaned [3]. You can also have a drape that is placed slightly under one side of the baby, as this helps to absorb any cleaning fluid that may drip down the side of the baby [4].
5. Remove one pair of gloves at this stage.
6. Insert yellow canula (24G) into desired vein, and wait for venous blood flow back into the hub
7. Insert microwire until it is beyond the end of the canula– it should insert smoothly and not 'stick'
8. Hold the wire in place and carefully remove the canula, leaving wire in situ
    - Having a small piece of gauze over the insertion site in helpful as it often bleeds.
9. Thread the peelable dilator over the wire
    - This may need 2 people as it is very fiddley
    - With one smooth movement, insert the dilator through the skin

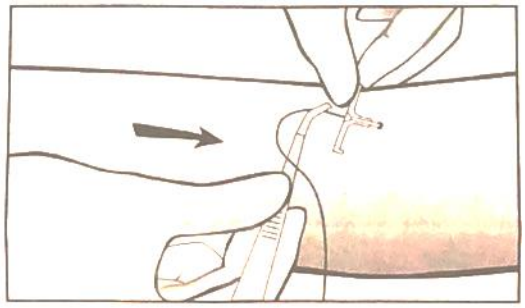
(Tip: Before inserting through the skin, it can help by pulling the skin slightly taut)

10. Remove the wire
11. Remove white hub
12. *There is usually blood flow visible at this stage*

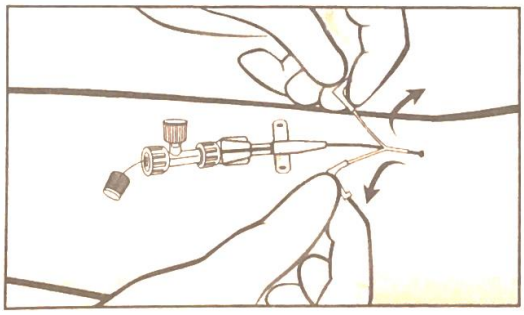




13. Advance the long line using forceps (curved or straight iris forceps without teeth are the easiest, [6]) to the pre-measured length



14. Remove the peelable dilator, ensuring the line stays at the desired length

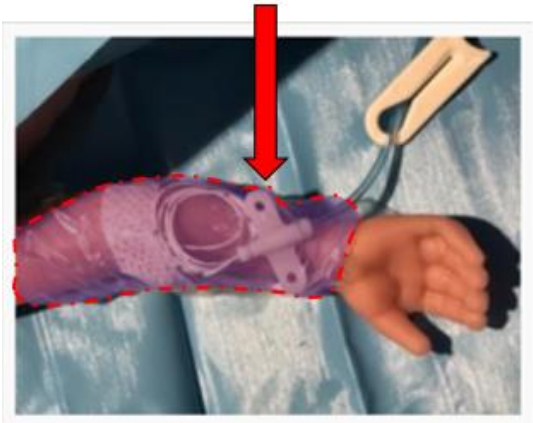


15. Once the dilator has been removed, apply pressure at the skin insertion site to achieve haemostasis
16. Once haemostatsis is achieved, peel the yellow canula to split it and discard
17. Fix the line with steristrips [7] and tegaderm [8]
18. Order an **X-ray** to confirm line tip position

**Drawn images courtesy of Vygon as part of their insertion leaflet.*

Fixation of long lines

- **<u>Long lines should not be fixed until haemostasis has occurred</u>**. There is usually a modest amount of oozing from the insertion site, and it is not uncommon to need 5-10 minutes of gentle pressure (+/- surgicel) to achieve haemostasis.
- Do not secure a line which is still actively oozing, as this is both an infection risk because the blood soaked dressing can breach, and also a displacement risk.
- Lines should be coiled and secured with steristrips (which need to be cut to the desired length)
- A clear tegaderm dressing MUST cover the coiled line AND the wings (red arrow) (See dotted red line), otherwise the line is at risk of snapping and increased risk of infection.
- The tegaderm dressing should not be applied to the whole circumference of the limb, as compartment



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Implementation date: 16 6 20 Review Date: 16 6 30

syndrome can rarely occur. This can be challenging in very small babies, whose limbs are very small. The tegarderm may need to be trimmed to avoid this potential complication.

Long line tip position on X-ray:
The optimal long line tip position depends on the insertion site.

Long line insertion site	Optimal tip position
Arm or scalp	Within the SVC but above the level of T4 vertebrae AND Not within the cardiac shadow (Ideally) not at the shoulder joint*
Leg	Within the IVC but below T9 AND Lie to the right side of the spinal column (Ideally) not at the hip joint*

**The reason for avoiding line tips around major joints is because in a small number of cases the tip of the line may be embedded in the wall of the vessel or it may have entered a small tributary vessel and such tributary vessels are commonest around the large joints such as the hip or shoulder. Long lines in these locations may be more prone to thrombosis and extravasation and may cause local injury if this occurs.*

Any long line tip that is within the cardiac shadow needs to be withdrawn. The length to withdraw the line by should be measured on PACS and repositioned under aseptic conditions. A repeat X-ray is required to ensure the line is in a satisfactory position.

Any long line inserted into the left leg must be seen to **cross the midline**, ascend without any wiggles and should be situated to the right of the spine at the level of the diaphragm.

For upper limb long lines: The line tip position will move depending on the position of a baby's arm therefore the line tip position should be interpreted in the context of the arm position in X-ray. The arm up near the head will move the line further into the baby (ie, towards the heart) and the line down by the baby's side will retract the line (ie, away from the heart).

Post long line insertion

- Aim to obtain an X-ray as soon as possible after insertion.
- If there is likely to be a delay, commencing clear fluids at 0.5ml/hr through each lumen of the long line is acceptable
- Drugs and parenteral nutrition should not be infused until the X-ray has confirmed the tip position is acceptable
- Any long line inserted into the lower limb whose tip lies within the pelvis should be reviewed by a consultant prior to using, as there is the possibility that the line is in with ascending lumbar veins. Extravasation of lines in this position causes spinal cord injury and paraplegia.

Documentation of long line insertion

Documentation needs to be completed (1) on Badgernet (2) Central line insertion bundle

1. Badgernet under 'Procedures' and then 'Line insertion'.

This note should include:

- the line type (eg 2F nutriline 150mm)
- the limb inserted, ideally the vein inserted (ie, right brachial vein)
- the number of attempts
- the technique (ANTT and seldinger)
- the distance secured (secured at 11cm at skin with steristrips)
- **the position of the line** tip (eg, projected over medial end of the clavicle, presumed in subclavian vein)
- Any difficulties during insertion (ie, any resistance during catheter advancement)
- If the line is secured shorter than the intended length this must also be clearly documented

2. The paper central line insertion documentation also needs to be completed, followed by the central line maintenance bundle, which is completed by the nurse looking after the baby every day that the central line is *in situ*, eery 12 hour shift.

Complications of long lines

- Infection
    - Strict aseptic technique as per ANTT must be adhered to during insertion
- Extravasation
    - Cardiac tamponade poses a real risk if the line is situated within the right atrium, and the reason that we withdraw any line situated within the cardiac shadow
    - Extravasation within the lumbar veins is also reported in left sided lower limb long lines and can result in spinal cord injury and paralysis. Any left lower limb long line that does not follow the intended course must be removed or pulled back beyond the hip joint to be used as a 'short' long line.
- Displacement
- Blockage –This is uncommon if there are continuous infusions running via both lumens.

Removal of long lines

- The continued need for a long line should be justified at least daily on the ward round
- The removal of a long line should be documented in the same input form on Badgernet as the line insertion is documented
- We do not routinely send line tips to microbiology