

Long Lines - Paediatric Full Clinical Guideline - Joint Derby and Burton

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1. Introduction

Central venous lines (long line) are an important and common part of neonatal intensive care. Parents should be informed in advance in the impending procedure and written consent obtained.

Indications and Usage of Long line:

1. Extremely growth retarded infants at high risk of NEC.
2. Infants requiring intravenous parenteral nutrition or high doses of inotropic agents.
3. Infants anticipated to need long term venous access (e.g drug or fluids).

Long lines should not routinely be used:

For intravenous antibiotics (unless peripheral venous access is impossible) If a Long line infection is suspected.

Blood product (or blood) should not be infused through a central line. Types of long line:

1. Vygon Premicath 28G
2. Vygon Nutriline PIC line

2.0 Technique of insertion

1. Carefully inspect infant for most suitable site and measure approximate length of catheter required using a tape measure (from insertion point to xiphisternum for lines inserted in lower limb and to the sternal angle for upper limbs)
2. Gown and glove up and using full aseptic technique and prepare equipment. Flush the catheter with normal saline and keep the syringe attached to the end.
3. Clean skin carefully with a sterile sachet of 0.5% aqueous Chlorhexidine solution and wait for it to dry before using sterile drapes/towels. Identify insertion point and clean again.
4. Occlude vein proximal to insertion point and advance needle briskly into vein. If the peelable cannula is used cannulate the vein and then remove the needle.
5. Once a good backflow of blood is seen use non-toothed forceps to introduce catheter while keeping position and angulation of needle steady.
6. Advance the catheter about 1cm at a time using the forceps until the resistance point at entry into the vein is overcome.
7. Continue to feed the catheter through the needle /cannula aiming for the tip to be sited in a major vein just outside the heart. Check the length inserted using the markings on the catheter. Check that blood can be aspirated and line can be flushed.
8. Withdraw the introducer needle or peelable cannula until it is outside of the skin, taking care not to alter the line position. Peel the cannula or unscrew and remove the

butterfly as necessary. Apply gentle pressure during this procedure to the insertion site using a clean gauze.

9. Flush line again and continue to apply gentle direct pressure on the insertion point until bleeding ceases. This may take up to 30 minutes on some occasions and patience is definitely required!
10. Coil the spare catheter length on the skin and secure in place with Steri-Strip prior to covering with a neonatal size Tegaderm. The infusions can be connected providing an X-ray is requested immediately to check the location of the catheter tip.
11. Aim to locate the catheter tip the SVC or upper IVC just outside of the heart.

3.0 Principles for checking and altering the position of a Long Line

The position of the catheter tip must be confirmed using the imaging guidelines below. A contrast study is undertaken initially for all percutaneous long lines. The verification of the catheter tip must be confirmed by a neonatal SpR or Consultant or radiologist before the line is used.

If a percutaneous long line does not pass satisfactorily into a major vessel such as the IVC or SVC then it should only be used temporarily until a better placed line can be achieved. Such "short lines" are rarely useful for more than 24 hours and inevitably lead to local inflammation and swelling.

Imaging percutaneous Long Lines

Aim to define the position of tip using contrast-a satisfactory exposure is one where the tip is opacified and some contrast is seen the vessel.

1. Position baby so that tip is in position of maximum insertion before exposure i.e. upper limb-abduct arm at 90 to torso, lower limb –hip fully extended.
2. Have ready 1ml of water soluble contrast. Contrast to use OMNIPAQUE 300(1ml diluted with 1ml of sterile water and then inject 1ml of that solution)-this is isotonic with blood. DO NOT USE any other contrast-if Omnipaque is not available you MUST contact one of the consultant radiologists for advice.
3. Have ready 1ml of sterile water as flush.
4. Connect contrast to longline with flush ready.
5. Expose film immediately injection of 1ml contrast is completed.
6. After the X-ray flush the longline immediately.
7. Examine film taken to identify tip position-if in doubt ask a consultant to review.
8. If tip is visible but incorrectly sited, reposition the line and repeat a plain film. Do not use the line until you are certain that the catheter tip is correctly located.

4.0 Complication and Indications for Removal

1. Local inflammation and swelling, especially for "short lines".
2. Sepsis. The decision to remove a long line for sepsis may be difficult and vary with individual circumstances. If clinical need for central venous access is low then reinsertion should be deferred for at least 48 hours where possible.
3. The "importance" will depend on availability of other veins for peripheral cannulation, the need for TPN or inotropes and the ability of the infant to withstand handling. In most cases of confirmed sepsis however, the infant will not improve, even with appropriate antibiotic therapy, until the line is removed. Scalp veins may be a useful adjunct to peripheral venous access.
4. Catheter related endocarditis or Candidal or Gram Negative septicaemia is an absolute

indication for line removal. This should be undertaken promptly once peripheral venous access is obtained.

5. If re-insertion is deemed to be critical a period of 48-72 hours should ideally occur with optimal antibiotic therapy before this is performed.
6. Migration into other sites. The catheter should be withdrawn or removed if local complications have occurred.
7. Perforation and leakage. The line should be removed and replaced if necessary.
8. Blocked or Non-functioning line. The line should be observed for local inflammation and swelling and then flushed with normal saline using aseptic technique and a 5ml syringe. Care should not be taken not to use excessive force or too small a syringe.
9. Air embolism
10. Pleural effusion. Clinical suspicion should prompt cessation of fluids through the line until radiographic confirmation has occurred. Since these cases present less acutely than cardiac tamponade, blind thoracocentesis is usually not required.
11. Arrhythmias and SVT. An urgent plain X-ray should be taken if an infant has a percutaneous long line in situ, as this can occasionally be caused by catheter migration into the right atrium.
12. Cardiac tamponade. This complication is unlikely unless a line has been placed or migrated into right atrium. If this complication is suspected, no further fluids should be infused through the line and if time permits X-ray or echocardiographic confirmation should be sought. Emergency pericardiocentesis is only indicated for severe cardiovascular compromise. However resuscitation should not be completed for a baby with a central line failing to respond to CPR until the pericardiocentesis is performed.

5.0 Technique for Removal

Remove percutaneous long line as soon as possible after infusion has been stopped to reduce the risk of thrombosis.

A percutaneous central line may be removed by first gently peeling the occlusive dressing from the skin. The surrounding skin should be cleaned to prevent microbiological contamination. Gentle steady withdrawal of the catheter is usually possible until the tip is estimated to be a short distance from the entry site. At this stage the entry site may be occluded by a sterile gauze with light pressure while the line is completely removed.

The catheter tip should be cut off into a sterile container using sterile scissors and sent for culture (if required).

In cases where the catheter will not easily withdraw, gentle steady traction can be applied (if necessary twisting the line around a thin object and every few minutes slightly increasing the traction by rotating the object. One can also gently rub the vein above the entry point which enables a stuck line to be removed.

If these measures do not succeed or if the catheter snaps during withdrawal then the line should be clamped and senior advice should be sought immediately.

6.0 Documentation Controls

Development of Guideline:	Dr M Ahmed
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7.0 Appendices

See links on record home page:

Appendix 1: Right Long Lines for the Right Neonate

Appendix 2: Neonatal Catheter Selection Matrix VY6065