

LONG LINES (PERIPHERALLY SITED)

Central venous catheters allow administration of infusions that, if given peripherally, may either cause damage to the vein and surrounding skin, or be less effective. These benefits must be weighed against the risks of line sepsis, thrombosis, embolism, and pleural and pericardial effusion

INDICATIONS

- Total/partial parenteral nutrition
- Concentrated (>10%) glucose infusions
- Inotrope infusions
- Prolonged antibiotic administration (rarely)

CONTRAINDICATIONS

- Infection at [insertion](#) site
- Systemic sepsis: defer until sepsis treatment commenced and blood cultures negative

EQUIPMENT

- Sterile gown and gloves
- Aqueous chlorhexidine [0.05%](#)
- Dressing pack with swabs and plastic dish
- Sterile towels/sheets
- Non-toothed forceps
- Neonatal long line
- 5-10 mL syringe
- Heparinised saline 1 unit in 1 mL
- Steristrips
- Gauze
- Clear dressing (e.g. [Tegaderm/Opsite](#))
- Contrast [solution](#) (e.g. Hypaque or Omnipaque) solution if lines cannot be seen on X-ray or inverted X-ray (see local policy)

PROCEDURE

This procedure must be performed or directly supervised by an individual competent in the insertion of these devices

Consent and preparation

- Inform parents and obtain verbal consent as recommended by BAPM
- Identify site
 - long saphenous at ankle
 - medial/[lateral](#) antecubital vein at elbow
 - scalp veins anterior to ear as last resort
- Measure distance, aiming to insert tip of catheter into superior or inferior vena cava (to xiphisternum for lower limb insertion, to upper sternum for upper limb insertion)

Aseptic insertion

- Maintain strict asepsis throughout
- Clean site with [aqueous](#) chlorhexidine and allow to dry
- Puncture site with needle in pack and follow instructions for that catheter
- When blood flows back through needle insert line using non-toothed forceps
- The line will pass easily beyond the tip of the needle if appropriately placed
- There may be some resistance when the line passes joints, such as knee, and gentle repositioning of the baby's limb may help

- When in place, withdraw needle as stated in catheter instructions

Securing catheter in correct position

- When haemostasis achieved, fix with Steristrips. Place gauze piece under blue hub, and cover with Tegaderm, making sure that all dressing and site is covered, but not encircling the limb tightly
- X-ray to determine position if necessary using 0.2-0.5 mL Hypaque/Omnipaque solution flushed through catheter simultaneously. As with all contrast dyes there is a small risk of allergic reactions
 - if upper limb, ensure arm is at 90° angle to thorax during X-ray
- Determine position satisfactory
- Catheter tip should preferably be in superior or inferior vena cava just outside right atrium, but not in heart
- Catheter tips in axillary, cephalic and femoral veins acceptable if benefit outweighs increased risks
- If catheter tip beyond desired location, withdraw catheter the measured distance, and confirm new position by X-ray

Catheter tip must not lie within heart (risk of perforation and tamponade)

Failure of Insertion

- If second operator is required following an unsuccessful attempt at placement, use fresh dressing pack, forceps and catheter

DOCUMENTATION

- Record in case notes:
 - date of insertion
 - success of insertion and number of attempts
 - type and gauge of catheter
 - site and length of insertion
 - X-ray position and alterations
- Document line position on X-ray in notes, any changes made to line position and if re-X-rayed

AFTERCARE

Dressings and site care

- Routine dressing changes unnecessary
- Replace aseptically only if dressings lift or catheter visibly kinked or becomes insecure
- Observe site every shift for bleeding, leaking of infusate and signs of infection (redness, swelling)

Medication administration

- Plan these and infusion changes to minimise the number of line violations
- Lines should only be broken into **only** once daily and intermittent medications given via this route in extreme circumstances
- When breaking into the line observe hand hygiene, wear sterile gloves and swab connection with 0.05% aqueous chlorhexidine **0.05%** and allow to dry
- Change giving sets every 24 hr
- Change tubing used to give blood products immediately after transfusion (use to give blood product **only** if it is difficult to **insert** alternative IV line)

Position maintenance

- If catheter still required 7 days after placement, note tip position on subsequent X-ray to exclude line-tip migration and take appropriate action as necessary **and document in notes**
- Never routinely resite a line
- Review continued need on daily ward rounds

COMPLICATIONS

Prevention

- Do not give blood products routinely through long line
- Use only 5 or 10 mL syringes. Never use 1 or 2 mL syringes as catheter can rupture
- Limit line violations as above

Catheter-related sepsis

- Commonest complication
- Most common organism is coagulase-negative staphylococcus (CoNS)
- Morbidity includes end-organ damage: osteomyelitis, organ abscess, endocarditis and meningitis
- [After taking a peripheral blood culture, treat](#) any suspected sepsis with antibiotics covering Gram-negative organisms and CoNS (see **local antibiotic guideline**)
- If baby stable, leave line in situ whilst awaiting blood culture results
- If blood culture confirms CoNS and baby stable, discuss continued need for long line with senior colleague
- If line left in situ, repeat blood culture and continue appropriate antibiotic therapy. If second culture remains positive for CoNS, re-discuss long line removal
- If there are ever any signs of complications (end-organ damage, hypotension, progressive platelet consumption/coagulopathy), remove line without waiting for a positive blood culture

If blood cultures grow candida, Staphylococcus aureus or Gram negative organisms, remove line immediately

Suspected/proven pericardial tamponade

- Suspect if any of following symptoms:
 - acute or refractory hypotension
 - acute respiratory deterioration
 - arrhythmias
 - tachycardia
 - unexplained metabolic acidosis
- Confirm by X-ray (widened mediastinum, enlarged cardiac shadow) or by presence of pericardial fluid on echocardiogram
- Drain pericardial fluid and remove catheter

Extravasation of fluids

- Into pleural, peritoneal, pericardial (above) and subcutaneous compartments
- Seek immediate advice from senior colleagues [and follow Extravasation injury guideline](#)

Embolisation of catheter fragments

- Lines can snap if anchored within a thrombus
- If undue resistance encountered during removal, do not force
- Inform your consultant: if accessible it may need surgical removal

REMOVAL

Indications

- Clinical use is no longer justified
- Remove 24 hr after stopping T/PN to ensure tolerance to full enteral feeds, running sodium chloride 0.9% through line at 0.5 mL/hr to maintain patency
- Complications ([see above](#))

Technique

- Remove using aseptic technique:
 - remove adhesive dressing very carefully
 - pull line out slowly, using gentle traction in the direction of the vein, grasping line not hub

Long lines 2009-11

- ensure catheter complete
- if clinical suspicion of line infection, send tip for culture and sensitivity
- apply pressure to achieve haemostasis
- [apply](#) occlusive dressing and remove within 24 hr
- document removal in notes