BROVIAC LINE INSERTION

INDICATIONS

- Long-term central venous access necessary (over 3–4 weeks) and all peripheral sites for central catheters (PICC) have been exhausted
- Referring neonatologist must balance risks of procedure/transfer against benefits
- All permanent cuffed central lines (Broviac lines) are inserted at Birmingham Children's Hospital (BCH) by a consultant member of the vascular access team

CONTRAINDICATIONS

- Pyrexial or septic baby. Remove any other lines e.g. PICC and administer antibiotics until apyrexial for ≥48 hr before insertion of Broviac line

CONSENT AND COMMUNICATION WITH PARENTS

- Before transferring to surgical centre, explain procedure to parents and discuss risks including:
- infection
- bleeding/bruising
- damage to heart, pneumothorax, haemothorax (extremely rare)
- damage to lungs, cardiac tamponade or arrhythmias (very rare)
- line block (thrombus, fibrin sheath, or dislodgement)
- break (either externally or internally)
- fallout
- wound problems
- Inform parents a surgical team member will meet with them before the procedure to discuss their concerns and complete a formal consent form
- if parents unable to attend surgical centre on day of procedure, formal 'delegated consent' must be gained by local neonatal team and completed consent form must accompany baby to surgical centre. File a copy in baby's healthcare record. This should be discussed with the surgical team
- Document all discussions with parents in baby's healthcare record

COMPLICATIONS

- On insertion:
- pneumothorax
- haemothorax
- bleeding/haematoma
- cardiac tamponade
- malposition
- extravasation
- venous occlusion
- In established lines:
- infection
  - line
  - skin
  - cuff
  - endocarditis
- breakage
- blockage
- displacement
- thrombus on tip
- venous occlusion
- Causes of line blockage and difficulty with aspiration and flushing:

- tip of line in wrong place
- lumen blocked
  - blood clot
  - PN/drug concretion
- fibrin sheath over end of line
- thrombus at tip of line
  - blood clot or vegetations
- line tip pressed against
  - vessel wall
  - heart valve
  - atrial wall
- line partially pulled out, tip no longer in vessel
- tip eroded through lumen and lying outside vessel
- damage to line or lumen

INSERTION

- Inserted using an ultrasound guided percutaneous approach under general anaesthetic at a paediatric surgical centre
- BCH consultant from vascular access team will insert the line
- preferred line tip position, high right atrium
  - check position with contrast under fluoroscopy guidance
- Blood transfusions due to bleeding as a complication of surgery are very rarely required and usually occur due to an underlying condition

Referral

- Refer to the lines service at planned place of surgery. Arrangements will be made on an individual basis depending on degree of urgency and clinical need
- Once procedure date set, liaise with transport team
- Ensure transfer letter is ready to accompany baby, together with recent FBC, clotting screen and U&E
- Prepare baby for transfer. Follow pre-operative fasting instructions from surgical team

Post-operative care

- Lines will be imaged in theatre
- Line will be looped on the chest under an IV3000 dressing +/- a biopatch
- biopatch used for babies >26 weeks and aged >7 days
- avoid excessive pressure over the patch (risk of skin necrosis)
- Change dressing weekly for 3 weeks
- 2.7 Fr line – sodium chloride 0.9% at ≥1 mL/hr continuous infusion to prevent blockage
- 4.2 Fr line – when not in use:
- heplock twice weekly with heparin 0.4 mL (10 units/mL)
- use aseptic technique
- Clamp catheter immediately following instillation of heparin
- To use a heplocked line, aspirate the lumen until blood is first withdrawn and discard the aspirated solution

REMOVAL

Neonatal consultant will decide when line to be removed, often following discussion with surgeons

Indications

- Line no longer needed
- Line blocked or damaged
- Cuff dislodged so that it is visible outside the skin
- Central line infection, not controlled by antibiotics
- Evidence of sepsis with no obvious cause, not controlled by antibiotics

- Repeated (>2) episodes of Broviac line related sepsis

Preparation for removal
- Discuss with surgical team or surgical outreach nurse
- Discuss procedure, benefits and risks with parents and document discussion in baby's healthcare record
- Most Broviac line removals are performed at the neonatal surgical centre on an elective basis according to the degree of urgency and other clinical needs (occasionally consultant surgeon may perform the procedure on NNU)
- Once date agreed, inform transport team
- Ensure transfer letter is ready to accompany baby, together with results of recent FBC, clotting screen and U&E
- Prepare baby for transfer. Follow pre-operative fasting instructions from the surgical team

Equipment required if surgeon removing line on NNU
- Surgical consent form
- Trolley
- Sterile dressings pack
- Cut-down pack (e.g. insertion of UVC or chest drain)
- Local anaesthetic (e.g. lidocaine 1%)
- Sterile pot to send tip to microbiology
- Sterile gauze
- Cleaning fluid i.e. chlorhexidine etc.
- Steri-Strips™
- Mepore® dressing

Potential complications of line removal
- Bleeding – usually oozes from exit site that will settle with pressure
- pressure may need to be applied to neck, just above clavicle (venous puncture site)
- Infection
- Line breaking during removal (embolisation) – very rare but line tip may require removal
- Wound problems

Embolised fractured line
- If line stops working and simple techniques do not manage to unblock it, perform chest X-ray to rule out fracture
- Very rare but occasionally line will break causing the tip to embolise into the right atrium or pulmonary artery. This is not a reason to panic or alarm the parents as removal is relatively straightforward
- Requires retrieval by interventional cardiologist at paediatric surgical centre. Liaise with either on-call paediatric surgeon, cardiologist, or vascular access team (line service) at planned place of surgery

USEFUL INFORMATION
- http://www.e-lfh.org.uk/programmes/paediatric-surgery/