

Vascular Access

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Arterial Lines

- Consider in any newly admitted infant who requires ventilation
- If this is not successful the consultant should be informed.
- Continued need for arterial line should be justified at least daily on the ward round

Peripheral Arterial Lines

Line insertion

- If an arterial blood gas is required soon after admission, attempt to insert a peripheral arterial line rather than doing an arterial puncture. Get a demonstration of how to do this before you attempt it yourself
- Peripheral arterial lines may be inserted into the radial or posterior tibial arteries. **Other arteries should not be used without senior staff approval**
- If cannulation is successful, in more mature infants, no further arterial access will be needed as their time on the ventilator is likely to be short. In less mature infants the line takes the pressure of time away from UAC insertion and provides an insurance policy in the rare event that UAC insertion is not successful
- Before you start, try to establish that palmar arch circulation is adequate. This may be impracticable in the smallest and sickest infants. Squeeze the hand and occlude the radial and ulnar arteries by fingertip pressure. Release the flow in the ulnar artery but not the radial artery and ensure that the whole hand should go pink
- If the arterial line insertion is not successful, the artery is usually punctured in the process and a gas sample can most often still be obtained as the cannula is removed. Further peripheral arterial punctures will not then be necessary unless UAC insertion is unsuccessful
- Always document in Badger which artery has been cannulated
- If an arterial line is removed because of concerns about the circulation distal to the insertion site, document this and highlight it to ensure that future attempts at cannulation avoid that site unless absolutely necessary

Peripheral Venous Lines

Indications

To provide access for intravenous fluids, parenteral nutrition and medications.

Equipment

- 24 gauge (yellow) cannula. Only use 26 gauge (purple) cannula if it is considered essential for successful cannulation
- Large alcohol wipes
- 70% Alcoholic 2% Chlorhexidine skin wipes

- Transparent sterile dressing for babies > 1000g; Sterile strips (6.4mm x 76mm) for babies ≤1000g
- Splint and tape (baby's own)
- 3 ml syringe, 10 ml 0.9% Sodium Chloride, 10cm extension line with needle-free valve, 19gauge (green) needle
- Dressing pack
- Oral sucrose and syringe / dummy
- Scissors (baby's own, thoroughly cleaned with a large alcohol wipe prior to use)

Method of Insertion

- Get a nurse or doctor to help you. IV cannula insertion should always be a **two-person process**. One person undertakes the procedure while the other holds and comforts the baby while administering the analgesia in the form of sucrose. See separate guideline for oral sucrose indications and contra-indications.
- Clean the top of the IV trolley with **detergent wipes** to remove particulate matter. Then wipe with large alcohol wipe to decontaminate. Wash your hands and put on a clean pair of gloves.
- Open the dressing pack on the top of trolley. Place IV cannula, 70% Alcohol 2% Chlorhexidine skin wipes, extension piece, 3 ml syringe, green needle and transparent sterile dressing or sterile strips onto the towel. Connect the needle and syringe and draw up 3ml of 0.9% Sodium Chloride; prime the extension set leaving the syringe attached to the luer-lock hub.
- Place the baby in a comfortable position, and keep the baby warm and calm because this will make it easier to cannulate successfully. Use an overhead light if you need it, but keep the baby's eyes covered.
- Identify a vein for the site of insertion. Wherever possible try to avoid sites for future long line insertion (i.e. don't use long saphenous and antecubital fossa veins). Place the sterile towel from the dressing pack under the intended site of cannulation.
- While the procedure is not a sterile one every effort should be made to keep your work area clean, and avoid touching key parts of the extension piece or contaminating the cannula site. Having laid out your equipment and located a vein wash and dry your hands again and put on a fresh pair of gloves.
- Ask the nurse looking after the baby to give oral sucrose and wait around two minutes before cannulating.
- Clean the identified cannula site gently but thoroughly with **70% Alcoholic 2% Chlorhexidine skin wipes** and **allow to dry (30-40 seconds)**. **Once dry, do not touch the site of cannula insertion.**
- Insert the cannula into the vein until you see a flashback, then advance the cannula sheath.
- Once advanced, attach the extension piece primed with 0.9% Sodium Chloride and flush the catheter slowly with 0.9% Sodium Chloride to ensure patency.
- Ask the nurse or doctor assisting you to help secure the cannula with transparent sterile dressing for babies > 1000g.
- Ask the nurse or doctor assisting you to tape the catheter to the skin with sterile strips for babies weighing ≤1000g. First place one half of a strip (sticky side down) directly over the hub of the cannula, immediately adjacent to where it enters the skin. Place a second strip (sticky side up) under the hub, then fold it over and diagonally across the hub. A second strip under the hub can be repeated, with the folds apposed to skin rather lying on top of the first strip.
- You must ensure neither sterile strip encircles the limb.
- You may wish to place a small piece of gauze under the hub and extension piece to protect the skin. Gently splint the cannula site using a 'foam' splint with Velcro straps,
- Place the extension line to the side of or underneath the splint.
- Flush the catheter again to ensure that it has not kinked during the taping process. Look particularly for any blanching of the surrounding skin, and confirm that the distal limb remains pink and perfused.
- Document the site of cannula insertion on Badger.

Notes

1. All cannula insertions are handling episodes, and all cannulas are potential sites of infection. Prior to inserting any cannula it's always worth confirming that it is still required. Is the line only for antibiotics and is the duration of use due for review? (eg, 48 hour culture result); is the baby increasing feeds rapidly and potentially able to cope without additional IV fluids?
2. Using a light for transillumination often helps in vein identification. If being used the light should be cleaned with detergent wipes before and after use. Please ensure you clean the whole cable and switch panel before and after use. Wrap in a glove during line insertion to minimise contamination of the tip with blood. While often referred to as a 'cold light' it is still a source of heat. Prolonged use can still damage and burn the skin both through pressure and through build-up of heat.
3. When cannulating the dorsum of the hand it may be helpful to place a folded piece of gauze in the palm of the hand to make the hand more manageable and to keep the baby's wrist straight.
4. Think carefully before taking blood samples from a newly-sited IV cannula. If there is any risk that the line might be lost while trying to collect blood this is clearly a false economy – veins are precious! Blood cultures need to be taken by a separate closed technique so should not be taken from the cannula.

Troubleshooting long line occlusions

- Check the pressure alarm setting on the pump and the actual pressure reached.
- Ensure that the line to the baby is not clamped or kinked and that the long line itself is not kinked because the limb is bent.
- As a last resort the line may be flushed by a member of the medical staff using a strict aseptic technique.
- Draw up some heparinised saline into a 5 ml syringe.
- Attach the syringe to a new interlink lock and flush the line.
- If flushing is unsuccessful remove the line.
- Smaller syringes generate higher pressures and should not be used to flush long lines as there is a risk of bursting the line.

Suspected infections

- When clinically significant infection is suspected, long lines are usually removed
- This decision should be taken by a Registrar or above
- Remember to send the long line tip for culture and arrange [blood cultures](#) and FBC.

Cardiac Tamponade

- This is a rare, life threatening complication of intravascular catheters
- Presentation may be gradual or one of acute circulatory collapse.
- Consider it a possibility in any infant who collapses where there is a central venous catheter or percutaneous long line
- The line tip may be in the pericardial space so use of the line to administer fluids or drugs during resuscitation may worsen matters.
- Rapid diagnosis may be possible using the ultrasound scanner.
- If full cardiopulmonary resuscitation measures are clearly failing, and there is no problem with lung inflation and there is a long line in situ, aspiration of the pericardial space should be considered.