



GUIDELINE

Peripheral Arterial Catheter Insertion and Removal

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this [disclaimer](#)

Aim

This guideline aims to describe the procedure for peripheral arterial line insertion, maintenance and removal.

Risk

Improper insertion/ maintenance/ removal of a peripheral arterial catheter may cause vascular compromise to the limb.

Insertion

To gain peripheral arterial access for:

- Blood sampling and isovolaemic exchange transfusion.
- Monitoring of blood gases and invasive blood pressure monitoring.

Key Points

- Only an artery with collateral circulation should be cannulated e.g. radial artery and posterior tibial artery. For radial arterial lines assess collateral circulation using the Allen test: Elevate the arm and simultaneously occlude the radial and ulnar arteries at the wrist, then rub the palm to cause blanching. Release pressure on the ulnar artery. If normal colour returns to the palm in <10 seconds, adequate ulnar circulation is present. Document Allen test undertaken in progress notes.
- If an artery has recently been used for an arterial line, it is expected that the artery will remain occluded for at least a month. If another arterial line is required, discuss placement with NCCU consultant.

- Only heparinised saline should be infused through a peripheral arterial line. Never use glucose solutions.

Occasionally, an infant's condition may require arterial access via one of the following:

- Femoral artery.
- Brachial artery.

It should be noted that complication rates of arterial access in these vessels are greater, specifically peripheral ischaemia and gangrene (10% published rate). The brachial artery, in particular, has very limited collateral circulation.

Cannulation or sampling of these arteries is only to take place after discussion with NICU consultant.

Ulnar artery cannulation should not be attempted if the radial artery has already been cannulated and vice versa.

Cannulation or sampling of axillary or superficial temporal arteries is not to be performed at all.

Equipment

- Dressing pack
- 1% Chlorhexidine and 70% Alcohol swab >27 weeks gestation or
 - Povidone-iodine 10% solution <27 weeks gestation
- Normal saline
- 1 mL syringe filled with normal saline
- 24G Intravenous cannula
- Luer lock monitoring extension set attached to 3mL syringe filled with normal saline and flushed
- Splint and leukostrips and occlusive (Tegaderm) dressing
- Cut tapes or large leukostrips (preterm infants)
- Transducer set and cable
- 50mL syringe of:
 - 0.45% saline + 0.5 units/mL heparin for preterm infants ≤27 weeks
 - 0.9% saline + 0.5 units/mL heparin for infants >27 weeks
- Syringe Pump
- Transilluminator (particularly useful for preterm infants).

Procedure (Standard Aseptic Technique)

Refer to [Aseptic Technique in the Neonatal Unit](#) and [Infection Control Aseptic Technique](#)

There are two methods for insertion of a peripheral arterial catheter

Insertion Procedure	Additional Information
1. Check correct patient for procedure.	
2. Prime monitoring extension set.	
3. Clean skin and allow skin prep to dry before proceeding with the procedure	<ul style="list-style-type: none"> • 1% Chlorhexidine and 70% Alcohol swab >27 weeks gestation (wait 30 seconds) • Povidone-iodine 10% solution <27 weeks gestation (wait 60 seconds)
1 st Method	
Puncture the anterior wall of the artery until blood return is seen.	At this point the cannula should be in the lumen of the artery
Advance the cannula into the artery while simultaneously withdrawing the stylet.	Blood should be flowing freely from the cannula if the cannula is properly positioned.
Advance the cannula, attach the 1mL syringe and then flush the cannula	
Secure cannula with leukostrips and/or occlusive dressing and attach primed monitoring extension set.	Immediately commence infusion.
2nd Method	
Puncture both the anterior and posterior wall of the artery at a 30 degree angle.	
Remove the stylet.	There should be little or no back flow of blood
Pull the cannula back slowly until blood is seen	This signifies that the arterial lumen has been entered
Advance the cannula to the hub and then attach the 1mL syringe and flush the cannula.	Blood should be flowing freely from the cannula if the cannula is properly positioned.
Secure cannula with leukostrips and/or occlusive dressing and attach primed monitoring extension set.	Immediately commence infusion.

NOTE: The arterial line should bleed back and flush easily.

Securing the Arterial Line and commencement of Fluids	
1. Place armboard in correct position, ensuring the cannula and extension set is well stabilised.	The board should extend beyond the end of the hand/ ankle enough to stabilise the line onto a specimen container top.
2. Commence infusion and calibrate transducer.	There should be an arterial waveform trace.
3. Observe for adequate patency of artery, pink, warm, well-perfused digits and/or limbs distal to the cannulation.	
4. Document the number of attempts, sites accessed and final placement in progress notes.	
5. Document on the observation chart when and where the arterial line was inserted.	
6. Heparinised saline infusion at a rate of 0.5-1 mL/hr should be used.	See above for solution to use.
7. The site and peripheral limb should be monitored hourly and recorded on the observation chart.	

Nursing Considerations

- Care must be taken during sampling and flushing to avoid trauma and spasm.
- If there is other than transient blanching when the arterial line is flushed, it should be reviewed for removal by medical staff.
- Over-vigorous flushing of the arterial line has a risk of the dispersal of emboli to the peripheral limb
- If the limb is not pink and well perfused or there is no arterial waveform on the monitor or if the line does not bleed back and flush easily the line should be reviewed by medical staff.
- Lines which cause ongoing limb colour change despite being flushed or having dressing altered usually need to be removed on instruction from medical staff.

Complications of Arterial Lines

- Peripheral ischaemia and gangrene.
- Spasm of the artery may occur PROXIMAL to cannulation site with more extensive gangrene (e.g. whole forearm).

- Ischaemic skin loss.
- Median nerve palsy.
- Carpal tunnel syndrome.
- Tendon damage.

If ischaemia occurs, consideration should be given to use of topical [Glyceryl Trinitrate 0.2%](#) ointment to minimise tissue loss.

Removal of a Peripheral Arterial Catheter

Can be removed by a RN deemed competent in this procedure.

Procedure

1. Cease infusion.
2. Remove all tapes with adhesive remover.
3. Apply pressure over the insertion site with gauze and withdraw catheter whilst maintaining pressure over the insertion site.
4. Continue to apply pressure for a minimum of 5 minutes or until bleeding has ceased.
5. Document removal of catheter on observation chart and progress notes, noting perfusion of peripheries after removal.

Related CAHS internal policies, procedures and guideline



[Aseptic Technique in the Neonatal Unit](#)
[Infection Control Aseptic Technique](#)

References and related external legislation, policies, and guideline

[WNHS Infection Prevention Manual - Aseptic Technique](#)
[Glyceryl Trinitrate 0.2%](#)

1. Baserga M C, Puri A, Sola A. The use of topical nitroglycerine ointment to treat peripheral tissue ischemia secondary to arterial line complications in neonates. *J Perinatol* 2002; 22(5): 416-9.
2. Chalmers E A. Neonatal thrombosis. *J of Clin Path.* 2000;. 53:419-23.
3. Ramasetu J. Complications of vascular catheters in the NICU. *Clin Perinatol.* 2008; 35:199-222.
4. Vasquez P, Burd A, Mehta R, et al. Resolution of peripheral artery catheter induced ischemic injury following prolonged treatment with topical nitroglycerine ointment in a newborn: a case report. *J Perinatol.* 2003; 23(4):348-50.
5. Wong A F, McCulloch L M, Sola A. Treatment of peripheral tissue ischaemia with topical nitroglycerine ointment in neonates. *J Pediatr.* 1992; 121(6):980-3

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