

Arterial puncture for blood gas analysis and sampling in neonates

Procedure Responsibilities and Authorisation

Department Responsible for Procedure	NICU
Document Owner Name	David Bouchier
Document Owner Title	Clinical Director NICU
Sponsor Title	Neonatal Paediatrician
Sponsor Name	Phil Weston
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Procedure Review History

Version	Updated by	Date Updated	Description of Changes
2	David Bouchier	Sept 2016	Updating only. No changes.

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1. Overview

1.1 Purpose

To obtain a bubble-free sample of heparinised arterial blood for gas analysis. In some circumstances capillary sampling may be more appropriate.

Contraindications:

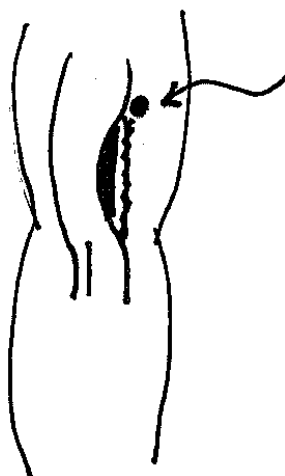
1. Coagulation defects
2. Circulatory compromise, in particular limbs
3. Local infection in sampling area
4. When cannulation of that vessel may be needed for frequent sampling, particularly radial and posterior tibial arteries.

Site:

The choice in order of preference are: -

- (a) Brachial artery
- (b) Radial artery and posterior tibial artery
- (c) Popliteal artery
- (d) Femoral artery
- (e) Ulnar artery and dorsalis pedis artery.

- (a.1) Brachial artery is first choice. It lies near the median nerve, and in the antecubital fossa they are both bound down together under the biceps insertion. Swelling here is probably what leads to median nerve palsy. It is better to move up to beside the middle of the lower third of biceps muscle. Here the nerve can easily move away from the needle and is not going to be compressed by swelling.



- (b.1) The radial artery and posterior tibial artery are valuable for insertion of in-dwelling peripheral arterial lines. For this reason they should not be used for routine puncture unless the brachial artery region is indurated or infant is unlikely to require long-term blood gas monitoring.
- (c.1) Popliteal artery is close to the tibial nerve making this puncture an unsuitable choice and is technically difficult.
- (d.1) The femoral artery is a "dirty area", it is easy to get a venous sample in error and there is risk of producing transient ischaemia in the leg. Use only in exceptional circumstances.
- (e.1) Dorsalis pedis and ulnar artery should not be used routinely because they will be the only supply to the foot and hand if a previous line has been in place in the radial or posterior tibial. If these are used ischaemia leading to gangrene is possible.

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Technique

1. Take a 1 ml syringe with a 26 gauge needle.
2. Swab the top of the heparin bottle with alcohol swab.
3. Heparinise the syringe by drawing up a small amount of heparin and push the plunger up until it rests against the end of the barrel expelling excess heparin. The dead-space of the syringe hub and needle are now filled with heparin to exclude air. Alternatively can use dry heparin 1 ml syringe.
4. Clean skin using an alcohol swab.
5. Ideally gloves should be worn.
6. Palpate the artery, insert the needle into the vessel. Transillumination may assist location if peripheral arteries being used.
7. Aspirate gently on the syringe. When the needle tip is in the lumen, blood should flow into the syringe.
8. Take 0.3 mL (if taking only for blood gas) and then cap syringe after removing any air bubbles and send for immediate measurement.
9. If analysis cannot be made immediately the sample should be kept in fridge or on ice (not ideal).
10. Maintain pressure on artery for several minutes until bleeding is controlled, using a wool swab not an alcohol swab. It is important to prevent bruising so that repeated sampling will be possible.
11. Check distal circulation after procedure.

Additional Information

- If circulation of arms appears to be compromised by the sampling (i.e. pallor or significantly and sustained duskiness occurs) - further sampling at that site should be avoided if possible.
- Arterial puncture may be used to acquire blood for sampling other than blood gases if venous or capillary sampling is difficult, i.e. blood cultures.
- Use fresh needle and repeat skin preparation if withdrawal from skin is necessary.