MCN for Neonatology
West of Scotland
Neonatal Guideline

Capillary Blood Sampling

This Guideline is applicable to all medical and nursing staff working in neonatal units in The West of Scotland.

Introduction

A capillary sample is a blood sample collected by pricking the skin. Capillaries are tiny blood vessels which are near the skin surface (1).

In the neonate it is generally performed by heel puncture/stick. This is a minimally invasive and easily accessible method of obtaining capillary blood samples for a variety of tests. Heel puncture/stick sampling can also help preserve venous access for future intravenous lines (2).

The procedure is quick and easy to learn, however if it is carried out incorrectly it can cause excessive pain, tissue damage and inaccurate test results. It is therefore the healthcare professional's responsibility to ensure they have achieved competency in the procedure. The medical/nursing/midwifery staff caring for the patient must ensure the appropriateness of the procedure and follow up the results; the procedure may be delegated providing competency has been ascertained.

Capillary sampling can be used to take small volume specimens for monitoring:

- Blood glucose levels
- Blood gases
- Full blood counts
- Serum Bilirubin
- Urea and electrolytes
- Drug levels
- Newborn Bloodspot Screening Tests

Capillary blood sampling should not be used to obtain samples for the following investigations as these can be inaccurate via this method:

- Blood cultures.
- Haematocrit estimation.
- Coagulation studies.
- Measurement of critical potassium or calcium level.

Good technique is important to avoid the following problems

Sample Problems

- Inadequate sample volume – requiring a repeat specimen
- Clotted sample – giving false +ve for thrombocytopenia or requiring a repeat specimen
- Sample from poorly perfused heel – overestimation of degree of acidosis and hypercarbia
- Haemolysed specimen – giving abnormal parameters such as high K+ or no result

NB – Consideration should be given to repeating a specimen, possibly using a venous sample, if the result is out of keeping with the baby's condition or previous results. (3)

Morbidity for the baby

- Increased pain
- Local trauma
- Infection
- Damage to nerves, blood vessels and bones
- Excessive blood loss

The Use of external Heat Sources before neonatal blood sampling

A **Safety Alert** was issued by BAMP (May 2025) advising that **gloves filled with hot water** should **not be applied** to the skin prior to blood sampling due to the risk of burns. In the community setting **hot water bottles** to warm the skin should also **not be used** due to the risk of injury.

BAPM also advise that **infant heel warmers** should be used with **extreme caution** due to the risk of injury.

The use of a warm glove or gel pack has not been shown to improve sample quality or reduce patient discomfort and is not recommended (4).

Preparation

Timing of the Procedure

Prior to carrying out any procedure on a baby the practitioner must be familiar with the infant's plan of care. In order to provide developmentally supportive care an effort should be made to co-ordinate any blood samples required to prevent multiple sampling as well as trying to time the sampling around the baby's cares as far as possible.

Check patient ID

Ensure positive identification of baby and that name bands, blood forms and bottles all correlate. Double check CHI number in case of twins to ensure right test, for right baby and labelled appropriately.

Consent

If required, consent should be sought from parents prior to the procedure being carried out e.g. Newborn bloodspot screening. However, where possible any procedures and blood tests should be explained to family/carers in advance of being carried out.

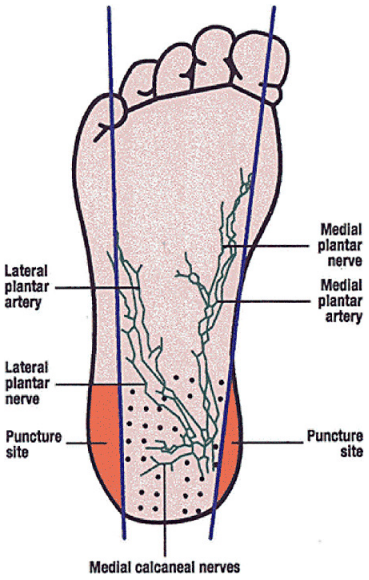
Ensure a Safe Environment.

Ensure the baby is appropriately positioned/contained/swaddled.

Analgesia

Whenever possible, involve parents in the procedure, using skin to skin contact, breastfeeding or non-nutritive sucking. For some procedures expressed breast milk or oral sucrose may be used – *see WoS guideline for pain management in neonates* - Neonatal-Pain-Guideline_WoS.pdf (5, 6, 7)

Diagram 1: Identifying an appropriate site



The shaded areas on the lateral aspects of the heel are the preferred sites as this avoids the main nerves.

The area should be examined for previous, recent, puncture sites and the chosen site rotated if frequent sampling is required.

Procedure

Requirements

- Non-sterile gloves
- Cotton wool or gauze
- Capillary tube and/or blood bottles
- Appropriate blood lancet for puncturing the skin
- Clean tray to hold equipment
- Sharps disposal box
- Alcohol Wipe (refer to local skin antisepsis protocol)
- Soft Paraffin – *this may not be required for small specimens such as a simple blood gas analysis. It may prove useful for larger specimens.*
    - *For NICU / SCBU babies – each baby to have an individual tube*
    - *For OPD or PNW settings a small quantity may be squeezed onto the edge of the procedure tray before the procedure commences*

Procedure for obtaining the sample

This is not a sterile procedure however a clinical hand wash should be performed or alcohol gel applied (*See antisepsis guidelines)* before donning gloves.

To obtain the blood sample:

- Adhere to Infection control Policy for handling of bodily fluids.
- Ensure appropriate support and developmental care to the infant during and after. The procedure to minimise pain and discomfort. Use of soothers such as expressed breast milk/sucrose, pacifier/sucking, containment holding and skin to skin.
- Consider parental involvement as above
- Ensure baby is lying in a safe and secure position
- Use positive touch techniques to prepare the infant for the procedure.
- Ensure the heel is warm and well perfused
- Hold the baby's heel with the non-dominant hand
- Hold the ankle with index and middle finger
- Use other fingers to steady the baby’s leg
- Partly encircle the baby’s heel with thumb
- Identify an appropriate puncture site (Diagram 1)
- Clean the proposed puncture site with an alcohol wipe (refer to local skin antisepsis protocol) and allow to dry for 30 seconds
- Gently compress the heel and hold the skin under tension
- Puncture the skin in a steady and intentional manner (8)
- Relax tension and wipe away initial blood flow with cotton wool or gauze
- Whilst maintaining grip hold the heel so that blood is allowed to hang
- Gently but firmly compress the baby’s heel to form a large droplet of blood

- Do not apply excessive pressure or squeeze the heel as this can lead to spurious results and bruising.
- Allow the heel to hang down to assist blood flow
- Hold the capillary tube or blood bottle to the blood droplet
- Momentarily release pressure to collect subsequent blood then reapply pressure, allowing the blood to flow
- Continue until sufficient blood has been obtained.
- If blood flow stops, clean site of old blood allow time for capillary refill, reposition hand and reapply pressure. If blood does not flow choose another site and repeat procedure.

Completing the Procedure

Once the sample has been obtained:

- Apply pressure to the site with gauze
- Maintain pressure until bleeding has stopped
- It is not essential to apply a plaster, and these are best avoided in the hospital setting. If there is minor oozing then a spot plaster or a gauze ball and hypoallergenic tape may be applied for a few minutes. These should be removed when oozing has ceased
- The baby should be left comfortable.
- Equipment should be disposed of according to Hospital Waste Policy.
- The person performing the skin puncture should wash their hands.
- The sample should be sent for analysis as soon as possible

References

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Implementation / Review Dates

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