Clinical Guideline
South Australian Perinatal Practice Guidelines – Umbilical cord blood gas sampling

Policy developed by: SA Maternal & Neonatal Clinical Network
Approved SA Health Safety & Quality Strategic Governance Committee on: 11 February 2014
Next review due: 11 February 2016

Summary Guideline for umbilical cord blood gas sampling.

Keywords umbilical cord blood gas, cord blood gas sampling, fetal acid base status, newborn acid base status, umbilical cord artery, umbilical cord, umbilical cord venous, umbilical sampling, venous cord blood, arterial cord blood, cord base excess, encephalopathy, arterial base deficit, paired umbilical arterial and venous cord blood samples, apgar, cord blood gases, Perinatal Practice Guidelines, Umbilical cord blood gas sampling, clinical guideline

Policy history Is this a new policy? Y
Does this policy amend or update an existing policy? N
Does this policy replace an existing policy? N
If so, which policies?

Applies to All SA Health Portfolio
All Department for Health and Ageing Divisions
All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS
Other

Staff impact All Clinical, Medical, Nursing, Allied Health, Emergency, Dental, Mental Health, Pathology

PDS reference CG122

Version control and change history

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Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient’s medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements.
Introduction

> Umbilical cord blood gas sampling is the most objective determinant of fetal metabolic condition at the moment of birth\(^1\)
> Values from the umbilical cord artery provide the most accurate information regarding fetal and newborn acid-base status\(^1\)
> Venous cord blood reflects a combination of maternal acid-base status and placental function\(^2\)
> A cord base excess of 12 to 16 mmol/L is associated with encephalopathy in 10% of neonates, and the rate increases to 40% in neonates who have an umbilical arterial base deficit greater than 16 mmol/L\(^1\)

Indications\(^1,2,4\)

> Where facilities are available, paired umbilical arterial and venous cord blood gas samples should be taken after birth in the following:
  > Preterm gestation
  > Meconium stained liquor
  > Assisted emergency delivery (i.e. Ventouse, instrumental, emergency caesarean section)
  > Vaginal breech delivery
  > Shoulder dystocia
  > Intrapartum fever (≥ 38°C)
  > Maternal thyroid disease
  > Multiple pregnancy
  > Small for gestational age baby
  > Intrapartum haemorrhage
  > Intrapartum fetal scalp pH performed
  > Any significant intrapartum cardiotocography abnormality
  > Apgar ≤ 6 at 5 minutes\(^4\)
  > Planned neonatal nursery admission
  > Paediatrician present at birth
Technique for obtaining umbilical cord blood gases

➢ If the baby is born in poor condition (the Apgar score at 1 minute is 5 or less), the cord should be double-clamped to allow paired cord blood gases to be taken.\(^5\) If the Apgar is ≤ 6 at 5 minutes, take paired cord blood gases

➢ A clamped segment of cord is stable for pH and blood gas assessment for at least 30 minutes\(^6\)

➢ It is important to label the samples as either arterial or venous

Process

➢ After the birth of the baby, clamp and cut the umbilical cord to separate baby from the placenta as in normal vaginal birth. If the Apgar is less than 5 at one minute, clamp and cut the cord immediately

➢ Umbilical cord blood gases may then be obtained in either of the following ways:

  1. Double clamp a 10 cm segment of the umbilical cord attached to the undelivered placenta and obtain paired arterial and venous samples at the bedside

  2. Double clamp to isolate a 10 cm segment of the umbilical cord from the undelivered placenta and attach another clamp above the isolated segment. Detach clamped segment and place into holder to obtain paired arterial and venous samples

➢ Use heparinised blood gas syringes (pre-packed if available) or attach a 21 g (green) needle to each syringe

➢ Withdraw a minimum of 0.2 mL blood from the artery first (the artery has a smaller lumen, thicker wall and contains less blood than the umbilical vein), then discard needle into sharps container and expel any air from the syringe before capping with stopper provided

➢ Label the syringe with neonatal details (unit record number, date, time and initials) and identify as arterial

➢ If unable to obtain arterial blood from the umbilical cord, a sample obtained from an artery on the chorionic surface of the placenta will provide accurate results. These arteries are relatively easy to identify because they cross over the veins\(^1\)

➢ Obtain venous sample with the second syringe, then discard needle into sharps container, expel any air and cap the syringe with the stopper provided

➢ Label the syringe with neonatal details (unit record number, date, time and initials) and identify as venous

➢ Facilitate analysis of cord blood gases according to individual hospital policy

➢ Once available, the results should be documented in the baby’s case notes
References

Abbreviations

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<tr>
<td>ACOG</td>
<td>American College of Obstetricians and Gynecologists</td>
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<tr>
<td>C</td>
<td>Celsius</td>
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<tr>
<td>g</td>
<td>Gauge</td>
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<tr>
<td>KEMH</td>
<td>King Edward Memorial Hospital</td>
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<tr>
<td>mmol/L</td>
<td>Millimols per litre</td>
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<td>mL</td>
<td>Millilitre(s)</td>
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<tr>
<td>pCO₂</td>
<td>Carbon dioxide partial pressure</td>
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**PDS reference**: OCE use only

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