Aim
To collect cord blood samples at birth that will enable the detection of respiratory and metabolic acidosis if present following birth.

Key Points
1. Umbilical cord blood gas sampling is the most objective determinant of fetal metabolic condition at the moment of birth.¹
2. AT KEMH collection of arterial and venous cord blood samples are taken for all births whenever possible.¹,²
3. It is preferable to obtain both arterial and venous umbilical cord blood samples for analysis. If only one sample is taken it is preferable that it is the arterial sample.
4. A cord blood sample in a heparinised syringe is stable for up to 60 minutes at room temperature.

Equipment Required
- Gloves
- Heparinised syringes x 2
- Needles 21g x 2
- Face shield
- 5 clamps
- Optional ice and water

1 Immediately after birth while the placenta is still in situ and ideally before the baby’s first breath, place four (4) Howard Kelly forceps on the cord to isolate a 20cm segment in the middle.

2 Cut between the two sets of clamps so that the isolated segment is independent, and both the baby and the placenta still have a clamp in place.

Delayed umbilical cord clamping may result in significant decreases in arterial blood pH, and increases in arterial blood pCO2 and base excess.
3 Continue usual post birth care of the baby.

4 Collect cord blood (from the placental end of the cord) into a red / pink-topped bottle (EDTA tube).
When collecting the blood:

- use heparinised blood gas syringes (pre packed if available)

The order of analysis must be:

1. Arterial sample
2. Venous sample

This will allow identification of different sample types based on time order of collection.

If it is a twin delivery the order of analysis must be:

- Twin 1 Arterial
- Twin 1 Venous
- Twin 2 Arterial
- Twin 2 Venous

- Withdraw a minimum of 0.2mL of blood from the artery first

- Discard the needle into the sharps container and expel any air from the syringe before capping with the stopper provided.

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

**Note:** ensure the syringe is upright and the safe cap is insitu prior to doing this.
When identifying the CORD blood:
The samples are labelled with the mothers URMN or Unique Number as
the results are part of the maternal obstetric history and the results are
reported as CORD blood of the mother. The CORD blood samples
are a maternal sample and are always collected in the order of
Arterial and Venous and Twin 1 and the twin 2.

Analyse the samples as soon as possible after their collection.
If there is likely to be a delay in analysing the specimens, place the
syringes in a “slurry” of crushed ice and water.

Arterial and venous blood stored in a
doubly clamped segment of cord at
room temperature is stable for ph and
blood gas assessment for up to 60
minutes at room temperature.³
Placing the syringes on ice may
minimise changes from continued
metabolism.³
Blood sampling for lactate
concentration in arterial and venous
umbilical cord blood may become
unreliable if not analysed within 20
minutes of birth.
Fetal carbon dioxide is removed from
the arterial blood in the placenta,
therefore the umbilical venous blood
should have a slightly higher pH and
a lower carbon dioxide level than the
umbilical arterial blood.

Check the results are compatible with
one arterial and one venous sample
by ensuring that the:
Arterial pH is < the venous pH (by at
least a difference of 0.022 units) and
Arterial pCO2 is > the venous pCO2
(by at least a difference of 5.3 mm
Hg).

If the sample does not meet the
criteria of point 8, repeat the blood
collection from the second segment
of isolated cord.
Record the results.
Normal Cord Blood Gas and pH (during and post labour)

<table>
<thead>
<tr>
<th>At term</th>
<th>pH</th>
<th>Base Excess mmol/L</th>
<th>pO₂ mm Hg</th>
<th>pCO₂ mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>UA</td>
<td>7.10 – 7.38</td>
<td>-9.0 – 1.8</td>
<td>4.1 – 31.7</td>
<td>39.1 – 73.5</td>
</tr>
<tr>
<td>UV</td>
<td>7.20 – 7.44</td>
<td>-7.7 – 1.9</td>
<td>30.4 – 57.2</td>
<td>14.1 – 43.3</td>
</tr>
</tbody>
</table>

normal Arterial cord blood lactate

= < 6.1mmol/L

References


Keywords:
cord blood, umbilical arterial pH, venous umbilical cord blood, metabolic acidosis at birth, respiratory acidosis

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