DESIRED OUTCOME/OBJECTIVE

To prevent unnecessary intervention by the analysis of fetal blood values intrapartum when the fetal heart rate is considered abnormal and further evaluation is required.

ALERT

All staff that perform or participate in fetal surveillance must have an understanding of the relevant maternal and fetal pathophysiology and demonstrate competence in the interpretation of fetal surveillance.

DEFINITIONS

Cardiotocograph (CTG): a means of recording the fetal heartbeat and uterine contractions during pregnancy and labour

Fetal blood sampling (FBS): is a technique developed to measure fetal metabolic acidosis by either
  • Determining fetal pH or
  • Measurement of lactate in whole blood

Lactate is a measurement of the circulating lactic acid. In abnormal conditions or poor perfusion and hypoxia, pyruvate is converted into a small amount of ATP, as well as lactic acid and hydrogen ions. Ongoing hypoxia and the subsequent slow clearance of these cause accumulation and results in metabolic acidosis and subsequent anaerobic metabolism which is highly inefficient and its by-products potentially damaging. Scalp lactate is easier to perform than pH measurement as it requires less sample volume and the hardware is more affordable and accessible

pH is the measurement of acid base balance to diagnose fetal distress

INDICATIONS

Non-reassuring CTG intrapartum to confirm the suspicion of fetal compromise and determine management or to provide the reassurance necessary to allow labour to continue
CONTRAINDICATIONS

Contraindications to FBS include:

- Clear evidence of serious fetal compromise (e.g. complete absence of reassuring features) and urgent preparation to expedite birth should be made
- Prolonged deceleration
- Mobile presenting part
- Unknown presentation
- Face presentation
- Un-dilated cervix
- Active second stage of labour
- Hereditary bleeding disorders (e.g. suspected fetal thrombocytopenia, haemophilia)
- Maternal infection (e.g. HIV, hepatitis, herpes simplex virus, suspected intrauterine sepsis)
- Prematurity (gestation < 34 weeks) as delayed birth due to the procedure may be associated with an increase in adverse outcomes because the small “at risk” fetus will have a lower threshold than a term infant for fetal compromise.

ISSUES TO CONSIDER

The on call consultant obstetrician must be notified of all attempts at FBS

Management is determined by the following results:

<table>
<thead>
<tr>
<th>pH</th>
<th>Lactate</th>
<th>Interpretation/action</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥7.25</td>
<td>≤4.1</td>
<td><strong>Normal fetal range</strong>&lt;br&gt;• If the CTG returns to normal there is no need to repeat the fetal scalp lactate&lt;br&gt;• If abnormalities continue the fetal scalp lactate should be repeated in 1 hour&lt;br&gt;• If abnormalities worsen then repeat sooner than an hour</td>
</tr>
<tr>
<td>7.21-7.24</td>
<td>4.2-4.8</td>
<td><strong>Pre-Acidotic range</strong>&lt;br&gt;• Repeat within 30 minutes to establish a trend in results or deliver if there is significant deterioration from the previous result</td>
</tr>
<tr>
<td>7.20</td>
<td>&gt;4.8</td>
<td><strong>Acidotic range</strong>&lt;br&gt;• The fetus should be delivered immediately either by instrumental delivery or urgent caesarean section&lt;br&gt;• Stop oxytocin infusion if in progress</td>
</tr>
</tbody>
</table>

CALL AN IMMEDIATE EMERGENCY CESEREAN SECTION IF LACTATE >4.8 mmol/L

* All fetal scalp lactate measurements should be interpreted taking into account:
  - Clinical history
  - Gestation
  - Parity
  - Onset of labour
  - Progress of the labour
  - Presence of meconium stained liquor
  - Number and type of CTG abnormalities
  - Previous scalp lactate measurement
When scalp lactate has been taken it is recommended that umbilical cord arterial and venous samples are taken following birth as it can provide feedback on the management pathway.

Group B Streptococcus carrier status does not preclude FBS.

**EQUIPMENT**

- Light source
- Equipment trolley
- Sterile fetal blood sampling tray which contains the equipment for the procedure
- For Lactate
  - lactate machine
  - lactate sensors
- For pH
  - adaptor for capillary tubes
  - iStat Machine
- Sterile gloves
- Gown
- Drapes
- Water based lubricant gel
- Chlorhexidine solution
- Protective glasses

**PROCEDURE**

<table>
<thead>
<tr>
<th>PROCESS STANDARDS:</th>
<th>KEYPOINTS:</th>
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</thead>
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<tr>
<td><strong>Preparation</strong></td>
<td></td>
</tr>
<tr>
<td>1. Medical officer to explain the procedure to the woman and obtain maternal consent</td>
<td>The procedure must be undertaken or supervised by medical staff who have been trained in the procedure</td>
</tr>
<tr>
<td>2. Ensure the lactate machine or blood gas analyzer is ready to receive the sample, calibrated and functioning</td>
<td>The left lateral position minimizes autocaval compression and subsequent reduced placental perfusion</td>
</tr>
<tr>
<td>3. Position the woman in the left lateral or lithotomy position</td>
<td>If the lithotomy position is used ensure a wedge is in place to assist tilt</td>
</tr>
<tr>
<td><strong>Procedure</strong></td>
<td></td>
</tr>
<tr>
<td>4. Perform a vaginal examination to assess cervical dilatation, presentation and station of the presenting part</td>
<td>The membranes must be ruptured and the cervix at least 3cm dilated for the procedure to be attempted</td>
</tr>
<tr>
<td>5. Pass the lubricated amniscope into the vagina and position against the presenting part</td>
<td>Check there is no maternal tissue trapped between the amniscope and the presenting part</td>
</tr>
<tr>
<td></td>
<td>The amniscope should be positioned away from the fontanelles and caput</td>
</tr>
</tbody>
</table>
6. Clean the scalp with dry cotton wool swabs

7. Apply a thin smear of wax over the scalp

8. Hold the fetal scalp blade (lancet) firmly between the fingers and apply firm pressure to the fetal scalp to make a small incision (2mm)

9. Allow droplet to form on the scalp, apply the capillary tube

- If hair is obscuring the view attempt to shave away a small area of hair with the fetal scalp blade
- Assists in droplet formation
- If no bleeding occurs check to ensure that you are not over a large area of caput and the pressure applied is constant
- Obtain the sample during a contraction if the head floats away when pressure is applied with the blade
- The blood column collected in the capillary tube should be 20-25 mm
- Fill the sample without bubbles and ensure the blood falls to the lower end of the tube

<table>
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<tbody>
<tr>
<td>10. Apply pressure over the puncture site for 3-5 minutes with a dry swab</td>
</tr>
<tr>
<td>11. Ensure a full explanation of findings and ongoing management is given to the woman</td>
</tr>
<tr>
<td>12. Ensure woman comfortable and discard sharps</td>
</tr>
<tr>
<td>13. Document results and management plan in medical record</td>
</tr>
<tr>
<td>14. Post birth ensure paired arterial and venous cord samples are collected and sent for blood gas analysis.</td>
</tr>
<tr>
<td>15. If delivery is not imminent after <strong>one hour</strong> the senior obstetricitian must be notified.</td>
</tr>
<tr>
<td>16. Postnatal examination of the baby should include examination of the sampling site.</td>
</tr>
</tbody>
</table>

- Observe the site until all bleeding has ceased. If bleeding significant the baby should be delivered
- Results must be reviewed and added to the clinical notes
- Complications are rare and include haemorrhage, infection and breakage of the blade.
RELATED DOCUMENTS

Internal
CPGF011 Fetal Surveillance - Intrapartum

REFERENCES


Reg. Authority: CGDWP
Review Responsibility: Clinical NUM Maternity
Original Author: Maternity Project Officer (2011)
Updated by: ----
Date Effective: Nov 2011
Date Revised: Nov 2014
Date for Review: Nov 2014