FETAL SCALP BLOOD SAMPLING
Keywords: fetal blood sample, FBS, fetal scalp, abnormal fetal heart rate, fetal compromise, fetal pH

AIM
- To prevent unnecessary intervention by analysis of pH and lactate values of fetal blood when there is suspicion of fetal compromise.

BACKGROUND INFORMATION
An abnormal fetal heart rate (FHR) shown by electronic fetal monitoring indicates suspected fetal acidosis, however fetal blood sampling will provide a reliable diagnostic tool to prove or disprove the case. Currently the two types of fetal scalp blood sampling (FBS) analysis used are pH and lactate levels. Fetal blood lactate samples are more likely to be successfully performed, have less scalp incisions, and require a smaller amount of blood for analysis. Comparing lactate and pH blood results show that there is no difference in newborn outcomes including low Apgars, low pH cord bloods or admissions to the neonatal intensive care nursery with use of either method of analysis. Lactate measurements can be analysed with a small amount of blood (5μl) whereas pH analysis can require 30-50μl of blood. A recent multicentre randomised controlled study found that significantly more fetal scalp blood sampling hospital protocols were not followed when collecting pH rather than lactate samples. This was mainly due to the increased unsuccessful attempts with pH sample collections. Prolonged collection time increases the risk of fetal blood reacting with air causing changes to the sample and making it more prone to clotting and blocking the analyser machine. Contamination with meconium and other fluids can effect pH measurements, so cleaning of the blood collection area is important to reduce this risk.

KEY POINTS
1. Fetal blood sampling (FBS) should not be performed if there is clear evidence of serious fetal compromise, or if there are any contra-indications to performing FBS.
2. Clinical management plans following a pH estimation should take into account previous measurements, progress of labour, and the current clinical situation.
3. Repeat the FBS:
   - in 1 hour if the FBS result is normal (pH > 7.25 or lactate < 4.2) but the FHR trace remains pathological, or earlier than 1 hour if further abnormalities of the trace occur.
   - in 30 minutes if the FBS result is borderline (pH between 7.20 and 7.25, or lactate between 4.2 and 4.8) and the FHR trace remains pathological, or
sooner if further abnormalities occur.  
- the time taken to obtain a sample should be taken into account

4. The use of the FBS lactate rather than pH measurement provides an easier and more affordable adjunct to external fetal monitoring.

5. If only a small scalp blood sample is able to be obtained a lactate measurement should be performed in preference to a pH analysis which requires more blood.

**CONTRA-INDICATIONS**

Contra-indications to FBS include:

- Clear evidence from continuous external fetal monitoring (EFM) of serious, continuous fetal compromise.
- Potential fetal bleeding disorders e.g. suspected fetal thrombocytopenia, haemophilia.
- Prematurity – gestation less than 34 weeks. Delayed delivery due to the procedure may be associated with an increased risk of adverse outcome. A small “at risk” fetus may sustain neurological damage earlier than a term fetus.
- Face presentation
- Maternal infection e.g. HIV, hepatitis viruses, herpes simplex virus, suspected intrauterine sepsis

**INTERPRETATION & MANAGEMENT OF INTRAPARTUM FBS RESULTS**

**pH SAMPLING RESULTS**

<table>
<thead>
<tr>
<th>pH result</th>
<th>ACTION</th>
</tr>
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<tbody>
<tr>
<td>≥ 7.25</td>
<td>Repeat the FBS in 1 hour if the cardiotocography (CTG) abnormality persists, or sooner if required.</td>
</tr>
<tr>
<td>7.21 – 7.24</td>
<td>Repeat the FBS in 30 minutes time, or consider delivery if a significant fall has occurred since the previous sample.</td>
</tr>
<tr>
<td>≤ 7.2</td>
<td>Delivery is indicated.</td>
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**LACTATE SAMPLING RESULTS**

<table>
<thead>
<tr>
<th>Lactate result</th>
<th>ACTION</th>
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<tbody>
<tr>
<td>&lt; 4.2 mmol/L</td>
<td>Normal. Repeat FBS in 1 hour if the cardiotocography (CTG) abnormality persists, or sooner if required</td>
</tr>
<tr>
<td>4.2 – 4.8 mmol/L</td>
<td>Pre-acidaemia. Repeat the FBS in 30 minutes time, or consider delivery if a significant rise has occurred since the previous sample.</td>
</tr>
<tr>
<td>4.8 mmol/L</td>
<td>Acidaemia. Delivery is indicated</td>
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**Note:** Values of cut-off action should be assessed according to individual meters.
MANAGEMENT OF SUSPECTED FETAL COMPROMISE

See Clinical Guideline, O&M: Intrapartum Care: Fetal Compromise (Acute): Management if Suspected

EQUIPMENT

- Pelvic pack
- Sterile gown
- Sterile gloves
- Adequate lighting source
- Cotton wool balls for external cleansing
- Sterile saline / water for cleansing
- Sponge holder forceps
- Lithotomy sheet
- White soft paraffin lubricant
- Vapo Coolant spray (skin freezing spray)
- Fetal scalp blood sampling blade
- Fetal scalp blood sampling blade holder
- Capillary tube holder
- Disposable heparinised capillary tubes
- Pelvic pack
- Amnioscope – the size is selected according to cervical dilatation and station of the fetal head.

1 Preparation
1.1 Explain the procedure and obtain maternal consent.

1.2 Ensure the blood gas analyser machine is ready to receive the sample.

1.3 Position the woman in the left lateral position.

1.4 Continuously monitor the fetal heart rate throughout the procedure.¹

2 Procedure
2.1 Scrub, gown and glove
Cleanse the woman’s external labia with the sterile saline, or water, and cotton wool balls.
Place the lithotomy sheet over the area
Perform a vaginal examination to

ADDITIONAL INFORMATION

The procedure must be supervised or performed by a credentialed doctor.
Document maternal consent.

The left lateral position minimises the risk of fetal compromise caused by aortocaval compression.¹
Should the lithotomy position be used, ensure the woman has a wedge in situ to assist tilt.

Performing FBS is a sterile procedure to minimise maternal and fetal infection

Allows selection of the correct sized amnioscope.
<table>
<thead>
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<th>PROCEDURE</th>
<th>ADDITIONAL INFORMATION</th>
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<tr>
<td></td>
<td><strong>PROCEDURE</strong></td>
</tr>
<tr>
<td></td>
<td>assess cervical dilatation, presentation, and station of the presenting part.</td>
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<tr>
<td>2.2</td>
<td>Pass the amnioscope into the vagina and position it against the fetal head.</td>
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<tr>
<td>2.3</td>
<td>Clean the fetal scalp with the jumbo swab sticks or dry cotton wool using sponge holding forceps. Produces hyperaemia. Inform the women prior using the spray.</td>
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<tr>
<td>2.4</td>
<td>An assistant sprays skin coolant down the amnioscope to the area where the blood sample is to be obtained for 3 seconds. Wait 30 seconds.</td>
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<tr>
<td>2.5</td>
<td>Apply a thin smear of soft paraffin over the scalp with a jumbo swab stick.</td>
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<tr>
<td>2.6</td>
<td>Hold the fetal scalp blade holder firmly between the fingers and thumb and apply firm pressure to the fetal scalp to make a small incision with the blade. If no bleeding occurs check to confirm that the position is not over a large area of caput, and that 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 tube should be 20 -25mm. Fill the sample without bubbles by ensuring the blood falls to the lower end of the tube.</td>
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<tr>
<td>2.7</td>
<td>Allow a droplet of blood to form on the scalp; apply the capillary tube and aim to collect 2 samples. Gently rock the capillary tube from side to side to heparinise the sample. If sufficient sample is available analysis of lactate and pH levels may both be done.</td>
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<tr>
<td>3</td>
<td><strong>Post procedure</strong></td>
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<tr>
<td>3.1</td>
<td>Apply pressure over the puncture site for 3-5 minutes.</td>
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<td>3.2</td>
<td>Check and ensure correct count of all swabs and instruments</td>
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3.3 Document the procedure and paste the analyser printout result on the MR 250 and record the result on the CTG trace.

3.4 Discuss the results and ongoing management plan with the woman.

REFERENCES (STANDARDS)


National Standards – 1 Care is Guided by Current Best practice
Legislation - Nil
Other related documents – Nil

RESPONSIBILITY

<table>
<thead>
<tr>
<th>Policy Sponsor</th>
<th>Medical Director OGCCU</th>
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<tbody>
<tr>
<td>Initial Endorsement</td>
<td>May 2008</td>
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<tr>
<td>Last Reviewed</td>
<td>September 2014</td>
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<tr>
<td>Last Amended</td>
<td>February 2015, April 2016</td>
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