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.[1] 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.[2] Lactate measurements can be analysed with a small amount of blood (5µl) whereas pH analysis can require 30-50µl of blood.[3] 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.[4]

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.[5]

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.[6]
2. Clinical management plans following a pH estimation should take into account previous measurements, progress of labour, and the current clinical situation.[6]
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.[7]
    - 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.[7]

- the time taken to obtain a sample should be taken into account[7]

4. The use of the FBS lactate rather than pH measurement provides an easier and more affordable adjunct to external fetal monitoring.[6]
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.[6]
- Potential fetal bleeding disorders e.g. suspected fetal thrombocytopenia[6], haemophilia[1, 7]
- 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.[1, 6, 7]
- Face presentation[6]
- Maternal infection e.g. HIV, hepatitis viruses, herpes simplex virus[1, 6, 7], suspected intrauterine sepsis[6]

INTERPRETATION & MANAGEMENT OF INTRAPARTUM FBS RESULTS

pH SAMPLING RESULTS[1]

pH result	ACTION
≥ 7.25	Repeat the FBS in 1 hour if the cardiotocography (CTG) abnormality persists, or sooner if required.[7]
7.21 – 7.24	Repeat the FBS in 30 minutes time, or consider delivery if a significant fall has occurred since the previous sample.[7]
≤ 7.2	Delivery is indicated.

LACTATE SAMPLING RESULTS[4]

Lactate result	ACTION
< 4.2 mmol/L	Normal. Repeat FBS in 1 hour if the cardiotocography (CTG) abnormality persists, or sooner if required
4.2 – 4.8 mmol/L	Pre-acidaemia. Repeat the FBS in 30 minutes time, or consider delivery if a significant rise has occurred since the previous sample.
4.8 mmol/L	Acidaemia. Delivery is indicated

Note: Values of cut-off action should be assessed according to individual meters.[2]

MANAGEMENT OF SUSPECTED FETAL COMPROMISE

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

EQUIPMENT

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

	PROCEDURE	ADDITIONAL INFORMATION
1	**Preparation**	
1.1	Explain the procedure and obtain maternal consent.	The procedure must be supervised or performed by a credentialed doctor. Document 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.	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.
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	Performing FBS is a sterile procedure to minimise maternal and fetal infection Allows selection of the correct sized amnioscope.

	PROCEDURE	ADDITIONAL INFORMATION
	assess cervical dilatation, presentation, and station of the presenting part.	
2.2	Pass the amnioscope into the vagina and position it against the fetal head.	Check to ensure there is no maternal tissue trapped between the amnioscope and the fetal head.[1] The amnioscope should be positioned away from caput or the fontanelles.[1]
2.3	Clean the fetal scalp with the jumbo swab sticks or dry cotton wool using sponge holding forceps.[1]	
2.4	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.[1]	Produces hyperaemia. Inform the women prior using the spray.
2.5	Apply a thin smear of soft paraffin over the scalp with a jumbo swab stick.	Assists in droplet formation.
2.6	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.[1] Obtain the sample during a contraction if the head floats away when pressure is applied with the blade.[1]
2.7	Allow a droplet of blood to form on the scalp; apply the capillary tube and aim to collect 2 samples.[1] 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.	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.
3	**Post procedure**	
3.1	Apply pressure over the puncture site for 3-5 minutes.[1]	Ensures haemostasis. Complications following FBS are uncommon, however in the presence of persistent scalp bleeding risk of coagulopathies may be suspected.[9]
3.2	Check and ensure correct count of all swabs and instruments	

PROCEDURE	ADDITIONAL INFORMATION
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)

1. Whitworth MK, Bricker L. How to perform intrapartum fetal blood sampling. **British Journal of Hospital Medicine**. 2006;67(9):M162-4.
2. East CE, Leader LR, Sheehan P, et al. Intrapartum fetal scalp lactate sampling for fetal assessment in the presence of a non-reassuring fetal heart rate trace. **The Cochrane Database of Systematic reviews**. 2010(3).
3. Neilson JP. Fetal scalp sampling in labour. Lactate measurements has benefits over pH estimation. **BJM**. 2008;336:1257-8.
4. Wiberg-Itzel E, Lipponer C, Norman M, et al. Determination of pH or lactate in fetal scalp blood in management of intrapartum fetal distress: randomised controlled multicentre trial. **BMJ**. 2008;336(7656):1284-7.
5. Roberts P. Measuring up to the challenges of fetal blood sampling. **British Journal of Midwifery**. 2006;14(5):283-6.
6. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. **Intrapartum Fetal Surveillance. Clinical Guideline.** 258. 2nd ed. Melbourne: RANZCOG; 2006.
7. National Collaborating Centre for Women's and Children's Health. **Intrapartum Care. Care of healthy women and their babies during childbirth** 260. London: National Institute for Health and Clinical Excellence; 2007.
8. Annappa R, Campbell DJ, Simpson NAB. Fetal blood sampling in labour and the decision to delivery interval. **European Journal of Obstetrics & Gynecology and Reproductive Biology**. 2008;141:10-2.
9. Sabir H, Stanigel H, Schwarz A, et al. Perinatal Hemorrhagic Shock After Fetal Scalp Blood Sampling. **Obstetrics & Gynecology**. 2010;115(2):419-20.

National Standards – 1 Care is Guided by Current Best practice
Legislation - Nil
Related Policies – KEMH Clinical Guidelines: O&M: Intrapartum Care: Fetal Compromise (Acute): Management if Suspected
Other related documents – Nil

RESPONSIBILITY	
Policy Sponsor	**Medical Director OGCCU**
Initial Endorsement	May 2008
Last Reviewed	September 2014
Last Amended	February 2015, April 2016
Review date	September 2017

Do not keep printed versions of guidelines as currency of information cannot be guaranteed. Access the current version from the WNHS website.