

1 ANTEPARTUM CARE

1.7 ANTEPARTUM PROCEDURES - FETAL

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1.7.2 Antepartum Fetal Heart Rate Monitoring
Section B
Clinical Guidelines
King Edward Memorial Hospital
Perth Western Australia

1.7.2 ANTEPARTUM FETAL HEART RATE MONITORING

AIMS

- To confirm fetal well being in the antenatal period.
- To exclude fetal hypoxia.

INDICATIONS FOR ANTEPARTUM FETAL HEART RATE MONITORING

The following list is presented as a guide only. The relevant guideline for individual conditions should be accessed to provide further information.

- Hypertensive disorders in pregnancy – pre-eclampsia and hypertension
- Diabetes Mellitus
- Prolonged pregnancy (more than 41 plus 3 weeks gestation)¹
- Intra uterine growth restriction¹
- Poor obstetric history e.g. stillbirth, intra uterine growth restriction, hypertension disorders²
- Decreased fetal movements
- Antepartum haemorrhage¹
- Abdominal trauma e.g. motor vehicle accident, falls.
- Severe maternal disease e.g. systemic lupus erthematosus, cyanotic heart disease, pulmonary disease, severe anaemia, vascular disease, renal disease, hyperthyroid.
- Multiple pregnancy¹
- Rhesus isoimmunisation
- Abruption²
- Undiagnosed abdominal pain
- Threatened premature labour
- Fetal heart rate abnormality noted on auscultation
- Maternal anxiety – a relative indication that should be managed on its merits
- Pre term premature rupture of the membranes²
- Prolonged rupture of membranes (more than 24 hours)¹
- Suspected or confirmed oligohydramnios/polyhydramnios^{1, 2}
- Abnormal Doppler umbilical artery velocimetry¹
- Known fetal abnormality which requires monitoring¹

KEY POINTS

GENERAL

1. Manual fetal manipulation has not been shown to reduce the incidence of non-reactive cardiotocograph (CTG). Therefore, because of the lack of demonstrated benefit and the potential for trauma to the woman and the fetus, this practice is currently not recommended³ (Level I).
2. There is currently insufficient evidence from randomised trials on which to base a recommendation regarding the use of maternal glucose to reduce the incidence of non-reactive CTGs. Current evidence suggests that it is unlikely to achieve this aim⁴ (Level I).
3. Fetal vibroacoustic stimulation (FAS) decreases the incidences of non-reactive CTG and reduces the testing time.
4. Fetal heart monitoring is only part of the antenatal assessment for fetal wellbeing and may be used in collaboration with ultrasound biophysical profile, amniotic fluid index and umbilical artery and Doppler studies

COMPETENCY REQUIREMENTS

- All medical and midwifery staff working with pregnant women at KEMH are required to have attended and passed a theoretical course recognised by KEMH.
- Obstetric registrars must attend and pass an 'Advanced Fetal Assessment Course' recognised by KEMH prior to commencing rotation in MFAU or the Labour and Birth Suite.

MIDWIFERY COMPETENCY REQUIREMENTS

- Complete the 'Fetal Monitoring Introduction and Initial Clinical Competency' course within 3 months of employment at KEMH.
- Complete the K2 package within 12 months of employment at KEMH.
- Midwifery staff must attend and pass the 'Advanced Fetal Assessment Course' within 2 years of commencing employment in or rotation through Maternal Fetal Assessment Unit (MFAU), or the Labour and Birth Suite.
- To maintain competency in the interpretation of fetal heart rate patterns, all midwifery staff employed in or rotating through the Labour and Birth Suite or MFAU are required to:
 - Attend and pass the 'Advanced Fetal Assessment Course' every 5 years.
 - Attend at least one session in Labour and Birth Suite annually on 'Fetal assessment and Clinical competency'.
 - Complete five K2 trace interpretations annually.
- To maintain competency in the interpretation of fetal heart rate (FHR) patterns, all midwives working on the Obstetric Wards and Antenatal Clinics are required to complete five complete K2 trace interpretations annually.

REVIEW OF ANTENATAL CTGS

Antenatal CTGs may only be reviewed, interpreted and signed off by the following categories of staff:

- Two midwives who have passed an Advanced Fetal Assessment Course recognised by KEMH.

OR

- An obstetric registrar who has passed the Advanced Fetal Assessment Course

OR

- An obstetric resident and midwife who have passed the Advanced Fetal Assessment Course

OR

- A Consultant Obstetrician

Note: All private patients or overseas visitors must have their fetal heart trace interpreted and signed by the consultant obstetrician.

PROCEDURE	ADDITIONAL INFORMATION
<p>1 Preparation</p> <p>Explain the procedure to the woman and ensure privacy.</p> <p>Encourage the woman to empty her bladder.</p>	
<p>1.1. Determine the position of the fetus by gentle palpation unless contra-indicated e.g. TPL, APH, abruption</p>	<p>To determine the fetal presentation and position and therefore locate the site where the fetal heart rate is heard at maximum intensity.⁶</p>
<p>1.2. Ensure the woman is in a well supported upright or left lateral position.²</p>	<p>Supine or recumbent maternal positioning reduces uterine blood flow and placental perfusion through compression of the vena cava and aorta. This compress produces hypoxic changes to the fetus, which are reflected in alterations to the fetal heart. Correct maternal positioning excludes this as a cause of hypoxia and abnormal traces.^{7,8}</p>
<p>1.3. Place two elastic belts around the abdomen securing transducers.</p>	<p>Prevents displacement of transducers and allows continued transmission of the clearest signals.⁸</p>
<p>1.4. Position the tocotransducer (pressure transducer) firmly on the maternal abdomen over the fundus.</p>	<p>The fundus is the area of greatest contractility.⁹</p>
<p>1.5. Set the tocotransducer at a uterine resting tone baseline level of 10 to 20 mm of mercury.</p>	<p>This level varies with the CTG machine being used:</p> <ul style="list-style-type: none"> • Corometrics: 10mm Hg • Hewlett Packard: 20mm Hg • Phillips: 20mm Hg

PROCEDURE	ADDITIONAL INFORMATION
<p>1.6 Apply the coupling gel to the ultrasound (cardiac) transducer. Attach firmly on the maternal abdomen over the location of the fetal heart.</p>	<p>Coupling gel is used to maintain contact with the woman's abdomen. The ultrasonic beam is directed toward the fetal heart. Firm contact is necessary to maintain a steady tracing.⁹</p>
<p>1.7 Check the paper speed is set a recording time of 3 cm per minute.</p>	<p>There is no evidence that any particular paper speed is preferable.¹ Currently KEMH traces antenatally are run at 3 cm per minute and intrapartum run the paper at 1 cm per minute.¹⁰</p>
<p>1.8 Place an addressograph label on the trace and record the woman's:</p> <ul style="list-style-type: none"> • Current pulse and blood pressure • Clinic / obstetrician • Gestation, gravity and parity • Date and time of the CTG (check to validate the time and date is set correctly on the fetal monitoring machine)¹ • Person requesting the trace • Reason for the trace • Person performing the trace 	<p>Maternal pulse should be palpated simultaneously with FHR auscultation in order to differentiate between maternal and fetal heart rates.⁷</p> <p>In the event of the maternal pulse being > 100bpm, additional means should be used to confirm that the trace is fetal and not maternal.</p>
<p>2 Procedure</p> <p>Record on the trace anything which may influence the fetal heart rate or uterine activity:</p> <ul style="list-style-type: none"> • Maternal medications • Maternal movement / changes in position • Fetal movements (recorded by the mother) • Contractions / Braxton Hicks contractions • Drinks / food ingested • Use of FAS 	<p>Changes in FHR patterns are of clinical significance in determining the fetal health status. Therefore possible causes need to be documented.</p> <p>Examples of medications that may effect the FHR include depressant drugs², narcotics², beta blockers, and corticosteroids may have some transient effect on FHR variability and rate of accelerations¹¹ for up to two days²</p> <p>Smoking reduces fetal movements temporarily by increasing carboxyhemoglobin levels and reducing blood flow.²</p>
<p>2.1 Criteria for a reactive CTG include¹⁰:</p> <ul style="list-style-type: none"> • Two episodes of FHR accelerations of 15 beats per minute (BPM) or more • Of a least 15 seconds duration • Occurring in a 20 minutes period • With a baseline in normal limits • And normal variability 5 – 25 bpm 	

PROCEDURE	ADDITIONAL INFORMATION	
2.2	<p>If after monitoring for 10 minutes the fetus is not active, an attempt to stimulate the fetus may be made by changing the mother's position or offering her a cold drink.</p>	Administration of glucose to antenatal women has not been shown to reduce non-reactive cardiotocography. ^{2, 12}
2.3	<p>If the maternal condition is stable and there has been one period of acceleration of 15 bpm lasting 15 seconds within 30 minutes, continue to monitor for another 20 minutes after this acceleration.</p> <p>Consider the use of FAS.</p>	Fetuses are known to have sleep cycles lasting 20 to 40 minutes ² in which there is reduced fetal heart variability and reactivity.
2.4	<p>Discontinue the trace and notify the medical officer if the criteria for a reactive CTG are not met after 30 minutes.</p>	A NON-REACTIVE CTG is the absence of two accelerations in 20 minutes.
2.5	<p>Record the maternal pulse and blood pressure at the completion of the trace</p>	The maternal pulse must be continuously recorded onto the CTG if a fetal baseline bradycardia is noted.
3	<p>Fetal Acoustic Stimulation (FAS)</p> <p>This is a battery operated hand device that produces a vibratory sound effect at 74 decibels.</p>	FAS is used to interrupt the fetal sleep cycle. It reduces testing time and the incidence of non-reactive CTGs secondary to sleep states. ¹³
3.1	<p>Contra-indications to use</p> <ul style="list-style-type: none"> • Major placenta praevia • Antepartum haemorrhage within the past 7 days • Baseline FHR of >160 bpm before FAS use • Minimal / nil liquor (i.e. Amniotic fluid volume <3) • During a contraction or tightening 	
3.2	<p>Procedure</p> <p>The FAS should be placed on the maternal thigh and depressed for 3½ seconds (it will automatically 'cut out' after this time).</p> <p>Document the use of the FAS on the trace.</p> <p>A maximum of three applications only with a least a one-minute interval between each application.</p> <p>Following a FAS response of 15 bpm for a period of 15 seconds a spontaneous acceleration of 15 bpm for a period of 15 seconds must be obtained before the tracing can be classified as reactive.</p>	There is insufficient evidence to guarantee safety of repeated or major use on outcomes related to fetal hearing impairment, impairment of neurological development, maternal satisfaction and anxiety and perinatal mortality. ⁵

PROCEDURE	ADDITIONAL INFORMATION
<p>Continue monitoring until pre FAS FHR is achieved.</p> <p>If FHR accelerations only occur in response to FAS the CTG needs to be repeated as per regime following non-reactive CTG where there is satisfactory baseline variability and no sinister features, i.e. Repeat CTG within 24 hours.</p> <p>4 Review of the CTGs</p> <p>Note: CTGs may only be interpreted by the categories of staff outlined in the key points at the beginning of this guideline.</p> <p>4.1 Reactive CTGs</p> <p>Where a CTG is interpreted as reactive the clinician/s reviewing of the trace are to:</p> <ul style="list-style-type: none"> • Record the result on the trace • Sign the trace • Record in the woman's medical record that a reactive CTG was obtained • The trace is stored in ObitraceVue disc in MFAU or archived. <p>4.2 Non-Reactive CTG</p> <p>All non-reactive CTG traces are to be reviewed by an Obstetric Consultant / Senior Registrar (SR) as follows:</p> <ul style="list-style-type: none"> • Traces performed during the day in: <ul style="list-style-type: none"> ➢ The Labour and Birth Suite are to be reviewed by the Labour and Birth Suite Obstetric Consultant / SR as appropriate ➢ The MFAU or the obstetric wards are to be reviewed by the Team Obstetric Consultant / SR or the Labour and Birth Suite Obstetric Consultant / SR as appropriate. • Traces performed after-hours (regardless of the department) are to be reviewed by the highest level obstetric doctor (consultant, senior registrar or registrar) present in the hospital. 	<p>Following a reactive CTG the woman's medical team determines the frequency or necessity of performing a repeat CTG according to maternal and fetal condition.</p> <p>Reasons for a non-reactive CTG include:</p> <ul style="list-style-type: none"> • Immaturity where the fetus is less than 30 weeks gestation • A sleeping fetus • A sedated fetus. When the mother is taking medication e.g. Sedatives, or hypotensive agents, variability may be decreased. • Fetal compromise. Where placental reserves are reduced fetal hypoxia and acidosis may be present. • Unrecognised supine hypotension, if the mother is monitored lying on her back. • Small for gestational age • Mother who is a tobacco smoker • Suspicion of a fetal anomaly • Sepsis

PROCEDURE

ADDITIONAL INFORMATION

5 Management of non reactive CTGS

A non-reactive CTG must not be ignored.

If there are no adverse features on the non-reactive trace another CTG should be repeated within a few hours or the next day depending on the clinical picture.

If the woman has a trace with suspicious features or has persistent non-reactive CTGs ultrasound assessment of fetal wellbeing should be considered including:

- Biophysical profile
- Amniotic fluid index
- Umbilical artery and Doppler studies

Kleihauer should be performed **urgently** in this situation if the ultrasound shows a quiet fetus.

The significance of a non-reactive CTG should be further evaluated because the CTG has a high false positive rate.¹⁴

Persistent non-reactive CTGs refer to two or more non-reactive traces.

With additional testing using the biophysical profile, most fetuses will show reassuring signs and then a repeat CTG can be scheduled when appropriate for the clinical situation.¹⁴

REFERENCES

1. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. **Intrapartum Fetal Surveillance Clinical Guidelines**. 2nd ed. Melbourne; 2006.
2. The Society of Obstetricians and Gynecologists of Canada. Fetal Health Surveillance Antepartum and Intrapartum Guideline. **Journal of Obstetrics and Gynaecology Canada**. 2007;29(9).
3. Tan KH, Sabapathy A. Fetal manipulation for facilitating tests of fetal wellbeing. **The Cochrane Database of Systematic Reviews**. 2001(4).
4. Tan KH, Sabapathy A. Maternal glucose administration for facilitating tests of fetal wellbeing. **The Cochrane Database of Systematic Reviews**. 2001(4).
5. Tan KH, Smyth R. Fetal vibroacoustic stimulation for facilitation of tests of fetal wellbeing. **The Cochrane Database of Systematic Reviews**. 2001(1).
6. Johnson R, Taylor W. **Skills for Midwifery Practice**. London: Churchill Livingstone; 2000.
7. Royal College of Obstetricians and Gynaecologists. The use and interpretation of cardiotocography in intrapartum fetal surveillance. Evidence-based Clinical Guideline Number 8. **The Use of Electronic Fetal Monitoring**: RCOG Press; 2001.
8. Tucker SM, Miller LA, Miller DA. **Fetal Monitoring A Multidisciplinary Approach**. 6th ed. St Louis: Mosby; 2009.
9. Olds SB, London ML, Weiland Ladewig P, Davidson MR. **Maternal-Newborn Nursing and Women's Health Care**. New Jersey: Pearson Prentice Hall; 2004.
10. Department of Nursing and Midwifery Education and Research - Women and Newborn Health Service - King Edward Hospital. **Introduction to Fetal Monitoring and Assessment**. Perth: Department Health Western Australia; 2007.
11. The American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 106 Intrapartum Fetal Heart Rate Monitoring: Nomenclature, Interpretation, and General Management Principles. **Obstetrics & Gynecology**. 2009;114(1).

12. Tan KH, Sabapathy A. Maternal glucose administration for facilitating tests of fetal wellbeing. **The Cochrane Database of Systematic Reviews**. 2001(4).
13. Parer JT. Fetal heart rate. In: Creasy RK, Resnik R, editors. **Maternal-Fetal Medicine**. Sydney: WB Saunders Company; 1999. p. 270-99.
14. Tucker SM. **Pocket Guide to Fetal Monitoring and Assessment**. 5th ed. Philadelphia: Elsevier; 2004.