ANTEPARTUM CARE

ANTEPARTUM PROCEDURES - FETAL

Key words: antepartum, fetal heart rate monitoring, cardiotocography, fetal surveillance, CTG

ANTEPARTUM FETAL HEART RATE MONITORING

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AIM

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

KEY POINTS

1. There is no clear evidence that antenatal CTG monitoring improves perinatal outcome', however it is only part of the antenatal assessment and may be used in collaboration with ultrasound biophysical profile, amniotic fluid index, umbilical artery and Doppler studies.
2. Manual fetal manipulation has not been shown to reduce the incidence of a non-reactive (NR) CTG. Therefore, this practice is not recommended.
3. Antenatal maternal glucose administration has not been shown to reduce non-reactive CTG.[2]
4. Fetal vibroacoustic stimulation (FAS) offers benefit by decreasing the incidence of non-reactive CTG and reducing the testing time.[3]
5. A non-reactive CTG trace shall be repeated within a few hours or the following day depending on the clinical picture. A decision to perform a repeat CTG the following day should be made in liaison with the Obstetric Consultant or the Senior Registrar.
6. When midwives are reviewing and interpreting a trace, outpatient women shall not be discharged until the trace has been reviewed and interpreted by 2 appropriate clinical staff members (as outlined on page 7).
COMPETENCY REQUIREMENTS FOR KEMH STAFF CONDUCTING FHR MONITORING

1. All medical and midwifery staff providing care for antepartum and intrapartum women are required to attend and successfully complete a theoretical course “Introduction to Fetal Monitoring and Assessment” related to Fetal Surveillance, recognised by KEMH.

2. Obstetric registrars must attend and pass an ‘Advanced Fetal Assessment Course’ recognised by KEMH prior to commencing rotation through the Maternal Fetal Assessment Unit (MFAU), or Labour and Birth Suite.

3. Midwives to check competency requirements at the DNAMER website

INDICATIONS FOR PERFORMING A C.T.G.

Note: 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 requiring medication
- Prolonged pregnancy (more than 41 plus 3 weeks gestation)^4
- Intrauterine growth restriction^4
- Poor obstetric history e.g. stillbirth
- Decreased fetal movements
- Antepartum haemorrhage^4 (APH)
- Abdominal trauma e.g. motor vehicle accident, falls
- Severe maternal disease e.g. systemic lupus erythematosus, cyanotic heart disease, pulmonary disease, severe anaemia, vascular disease, renal disease, hyperthyroid, cholestasis.
- Multiple pregnancy^4
- Rhesus isoimmunisation
- abruption^5
- undiagnosed abdominal pain
- threatened premature labour (TPL)
- fetal heart rate abnormality noted on auscultation i.e. 110-160 bpm.
- maternal anxiety – a relative indication that should be managed on its merits
- pre term rupture of membranes (more than 24 hours)^6
- suspected or confirmed oligohydramnios/polyhydramnios^4
- abnormal Doppler umbilical artery velocimetry^4
- known fetal abnormality which requires monitoring^4
- Morbid obesity
- Maternal age >40
- Maternal age <16
# Performing a CTG

## Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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</table>
| 1 | **Preparation**  
   - Explain the procedure to the woman, gain verbal consent, and ensure privacy.  
   - Encourage the woman to empty her bladder.  
   - Determine the position of the fetus by **gentle** palpation unless contra-indicated e.g. TPL, APH, abruption.  
   - Ensure the woman is well supported in an upright or left lateral position.  
   - Place two elastic belts around the abdomen securing the transducers.  
   - Position the ‘pressure transducer’ firmly on the maternal abdomen over the fundus.  
   - Set the tocotransducer at a uterine resting tone baseline level of 10 to 20 mm of mercury.  
   - Apply the coupling gel to the ultrasound (cardiac) transducer. Attach firmly on the maternal abdomen over the location of the fetal heart.  
   - Check the paper speed is set a recording time of 3cm per minute. |
| 1.1 | To determine the fetal presentation and position and therefore locate the site where the fetal heart rate is heard at maximum intensity.  
| 1.2 | Supine or recumbent maternal positioning reduces uterine blood flow and placental perfusion through compression of the vena cava and aorta. This compression produces hypoxic changes to the fetus, which are reflected in alterations to the fetal heart rate. Correct maternal positioning excludes this as a cause of hypoxia and abnormal traces.  
| 1.3 | Prevents displacement of transducers and allows continued transmission of the clearest signals.  
| 1.4 | The fundus is the area of greatest contractility.  
| 1.5 | This level varies with the CTG machine being used:  
   - Corometrics 10mm Hg  
   - Hewlett Packard 20mm Hg  
   - Phillips 20mm Hg  
| 1.6 | 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.  
| 1.7 | There is no evidence that any particular paper speed is preferable. Currently KEMH traces antenatally are run at 3cm per minute and intrapartum run the paper at 1cm per minute.  

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*DPMS Ref: 5277*

All guidelines should be read in conjunction with the Disclaimer at the beginning of this manual Page 3 of 8
### PROCEDURE

<table>
<thead>
<tr>
<th>1.8</th>
<th>Place an addressograph label on the trace and record the woman's:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Current pulse and blood pressure</td>
</tr>
<tr>
<td></td>
<td>• Clinic / obstetrician</td>
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<tr>
<td></td>
<td>• Gestation, gravity and parity</td>
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<tr>
<td></td>
<td>• Date and time of the CTG (check to validate the correct time and date is correct on the machine)</td>
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<tr>
<td></td>
<td>• Person requesting the CTG</td>
</tr>
<tr>
<td></td>
<td>• Reason for the CTG</td>
</tr>
<tr>
<td></td>
<td>• Person performing the CTG</td>
</tr>
</tbody>
</table>

Maternal pulse should be palpated simultaneously with FHR auscultation in order to differentiate between maternal and FHR, although the new Corometric machines record the same.

In the event of the maternal pulse being more than 100 beats per minute, additional means should be used to confirm that the trace is fetal and not maternal. Consider pulse Oximetry on beds in MFAU, most of which will record maternal pulse rate (except Room 5 in MFAU).

### ADDITIONAL INFORMATION

<table>
<thead>
<tr>
<th>2</th>
<th>Procedure</th>
<th>Criteria for a reactive CTG include:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Record on the trace anything which may influence the fetal heart rate or uterine activity:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• maternal medications</td>
<td></td>
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<td></td>
<td>• maternal movement / changes in position</td>
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<tr>
<td></td>
<td>• fetal movements (recorded by the mother)</td>
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<tr>
<td></td>
<td>• contractions / Braxton Hicks contractions</td>
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<tr>
<td></td>
<td>• use of FAS</td>
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</tbody>
</table>

|      | Administration of glucose to antenatal women has not been shown to reduce non-reactive CTG. There is no evidence that suggest icy drinks will lead to fetal activity. |
|      | Fetuses are known to have sleep cycles lasting 20 to 40 minutes in which there is reduced fetal heart variability and reactivity. |

2.1 If after monitoring for 10 minutes the fetus is not active, an attempt to stimulate the fetus may be made by changing the maternal position.

2.2 If the maternal condition is stable and there has been one period of acceleration of 15bpm lasting 15 seconds within 30 minutes, continue to monitor for another 20 minutes after this acceleration.

Consider the use of FAS.

2.3 Discontinue the trace and notify the medical officer if the criteria for a reactive CTG is not met after 30 minutes.

A non-reactive CTG is the absence of two accelerations in 20 minutes.

2.4 Record the maternal pulse and BP at the completion of the trace.

If a fetal bradycardia occurs the maternal pulse should be simultaneously recorded on the CTG trace.
3 Fetal Acoustic Stimulation (FAS)

The FAS is a battery operated hand device that produces a vibratory sound effect at 74 decibels. The FAS is used to interrupt the fetal sleep cycle. It reduces testing time and the incidence of non-reactive CTGs secondary to sleep cycles.

3.1 Contra-indications

These include:
- Major placenta preavia
- APH within 7 days
- baseline FHR of >160 before FAS use
- minimal / nil liquor (i.e. amniotic fluid volume <3
- during a contraction or tightening

3.2 Using the FAS

- The FAS should be placed on the maternal thigh and depressed for 3½ seconds (it will automatically cut out after this time).
- Document the use of the FAS on the CTG trace.
- A maximum of 3 applications only with at least a one-minute interval between each application.
- Following a FAS response of 15bpm for a period of 15 seconds, a spontaneous acceleration of 15bpm for a period of 15 seconds must be obtained before the CTG trace can be classified as reactive.
- A spontaneous acceleration prior to the use of FAS may also be considered as one of the accelerations which deem a CTG reactive.
- Continue monitoring until pre FAS FHR is achieved
- 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.

4 Review of the CTG trace
## PROCEDURE

CTGs may only be interpreted by the categories of staff outlined on page 7 of this guideline.

### 4.1 Reactive CTGs

Where a CTG is interpreted as reactive by the clinicians reviewing the trace they shall:

- record the result of 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.

Following a reactive CTG the woman’s medical obstetric team determines the frequency or necessity of performing a repeat CTG according to maternal and fetal condition.

### 4.2 Non-Reactive CTG

All non-reactive CTG traces are to be reviewed by an Obstetric Consultant / Senior Registrar (SR) as follows:

Traces performed during the day:

- 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, SR or registrar) present in the hospital.

Reasons for a non-reactive CTG include:

- immaturity when the fetus is less than 30 weeks gestation
- a sleeping fetus
- a sedated fetus e.g. when the mother is taking medications such as 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 e.g. if the mother is monitored on her back.
- Small for gestational age
- mother who is a tobacco smoker
- suspicion of a fetal anomaly
- sepsis

### 4.3 Management of a non reactive CTG

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.

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

The significance of a non-reactive CTG should be further evaluated because the CTG has a high false positive rate.10

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PROCEDURE

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.

ADDITIONAL INFORMATION

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.10

REVIEW, INTERPRETATION, AND SIGNING OF TRACES

Antenatal CTG traces 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 at KEMH
- an Obstetric registrar who has passed the ‘Advanced Fetal Assessment Course’ recognised at KEMH
- an Obstetric resident and midwife who has passed the ‘Advanced Fetal Assessment Course’ recognised at KEMH
- a Consultant Obstetrician

Note: all private patients or overseas visitors must have their CTG interpreted and signed by the Consultant Obstetrician.

DOCUMENTATION

If performing the CTG on the antenatal ward, complete the ‘Inpatient CTG Reporting’ sticker and place in patient’s notes MR 250.
REFERENCES (STANDARDS)

Tan KH, Sabapathy A. Fetal manipulation for facilitating tests of fetal wellbeing. The Cochrane Database of Systematic reviews. 2012(8).


