CARDIOTOCOGRAPHY (CTG) - ANTENATAL

1. OPTIMAL OUTCOMES
   • Fetal Heart Rate (FHR) pattern is obtained enabling accurate interpretation and documentation within the clinical context
   • Documentation of FHR pattern using sticker
   • Evidence of consultation and referral where required
   • Woman understands the test, gives her consent and is informed of the findings

2. PATIENT
   • Any pregnant woman > 24 weeks gestation presenting with the following:
     o a complication of pregnancy
     o in the latent phase of labour prior to discharge, or transfer to or from the antenatal ward
     o attending pregnancy day stay that requires fetal monitoring
     o < 37 weeks of gestation with uterine activity

3. STAFF
   • Registered Midwives
   • Medical Staff

4. EQUIPMENT
   • Cardiotocography (CTG) machine and straps
   • Ultrasound gel

5. CLINICAL PRACTICE
   • Performing the FHR pattern:
     o Explain the processes and reasons for the CTG and obtain verbal consent
     o Suggest the woman empties her bladder
     o Ascertain the lie, presentation and position of the fetus
     o Place and secure the fetal heart rate ultrasound transducer over the fetal anterior shoulder
     o Place and secure the toco-transducer on the fundus
     o Position the woman comfortably, either sitting upright or laterally
     o Ensure ultrasound contact is maintained
     o Document on the FHR pattern:
       ♦ date and time
       ♦ addressograph
       ♦ gestation
       ♦ indication for monitoring
       ♦ maternal pulse every 30 minutes
     o Record the FHR pattern at the rate of 1cm/minute
     o Continue recording the FHR pattern until the criteria for a normal pattern has been met
     o Request the Obstetric Registrar or Specialist to review the CTG if:
       ♦ there are any features of a pathological CTG
       ♦ normal criteria have not been met after 60 minutes
     o Discuss findings with woman
CARDIOTOCOGRAPHY (CTG) – ANTENATAL  cont’d

- Interpreting antenatal FHR patterns (see table below)
  Classification of antenatal CTGs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal</th>
<th>Suspicious</th>
<th>Pathological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>110-160 bpm</td>
<td>100-109 bpm 161-180 bpm</td>
<td>&lt;100 bpm &gt;180 bpm</td>
</tr>
<tr>
<td>Variability</td>
<td>5-25 bpm</td>
<td>&lt;5 for ≥ 40 minutes &gt;25 bpm</td>
<td>&lt;5 for ≥90 minutes</td>
</tr>
<tr>
<td>Accelerations</td>
<td>≥2 accelerations of ≥15 bpm lasting 15 seconds in 10 minutes</td>
<td>≤2 accelerations of ≤15 bpm lasting 15 seconds in a 10 minute period, in up to 90 minutes</td>
<td></td>
</tr>
<tr>
<td>Decelerations</td>
<td>None &gt;15 bpm below baseline for &gt;15 secs</td>
<td>Variable</td>
<td>Atypical variable Late decelerations Single prolonged deceleration &gt;3 minutes</td>
</tr>
<tr>
<td>Overall pattern</td>
<td>All features are normal</td>
<td>Only one suspicious feature and the remainder are normal</td>
<td>2 or more suspicious features Sinusoidal pattern &gt;10mins One or more pathological feature</td>
</tr>
<tr>
<td>ACTION</td>
<td>CTG monitoring may cease</td>
<td>Further assessment required by Registrar or Specialist Urgent review by Registrar or Specialist</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from FONT training manual (NSW Health)

- Frequency of Fetal Monitoring
  - On admission, as part of the initial clinical assessment
  - When the clinical condition changes
  - The frequency of FHR monitoring is dependent on the individual clinical scenario
- Sign sticker after review of CTG

6. HAZARDS / SUB-OPTIMAL OUTCOMES
- The FHR pattern is unable to be interpreted
- The FHR pattern is misinterpreted
- The FHR is undocumented
- Failure to consult where required
- The woman has not understood the reason for or results of the test

7. DOCUMENTATION
- Integrated notes
- CTG stickers
- Cardiotocograph trace
8. EDUCATIONAL NOTES

- All obstetricians, obstetric registrars, working in obstetrics, midwives and student midwives are required to:
  - attend the Fetal Welfare Assessment one day of the Fetal welfare, Obstetric
  - emergency, Neonatal resuscitation Training (FONT), once every three years,
  - complete the K2 Medical Systems (K2MS) Fetal Surveillance Training Program once every three years, and
  - complete 5 K2MS case reviews annually
- Fetal heart rate monitoring is only one of the tests used to ascertain the well-being of the fetus and needs to be interpreted taking into consideration the health status of the mother, the clinical scenario and other test results available
- The fetal heart rate pattern can be affected by:
  - The gestation of the fetus
  - Fetal behavioural state
  - Maternal medications
  - Pregnancy complications
- Reduced fetal movements are an indication for an antenatal CTG
- Early Decelerations are defined as “Uniform, repetitive, periodic slowing of the FHR with onset early in the contraction and return to baseline at the end of the contraction (RCOG)”\(^2\)
- Late Decelerations are defined as “Uniform, repetitive, periodic slowing of the FHR with onset mid to end of the contraction and nadir more than 20 seconds after the peak of the contraction and ending after the contraction. In the presence of a non-accelerative trace with baseline variability less than 5 bpm the definition would include decelerations less than 15 bpm (RCOG)”\(^2\)
- Variable Decelerations are defined as “Variable, intermittent periodic slowing of the FHR with rapid onset and recovery. Time relationships with contraction cycle are variable and they may occur in isolation. Sometimes they resemble other types of deceleration patterns in timing and shape (RCOG)”\(^2\)
- Atypical Variable Decelerations are defined as “Variable decelerations with any of the following additional components:
  - loss of primary or secondary rise in baseline rate
  - slow return to baseline FHR after the end of the contraction
  - prolonged secondary rise in baseline rate
  - biphasic deceleration
  - loss of variability during the deceleration
  - continuation of the baseline rate at a lower level (RCOG)”\(^2\)
- Reasons for a suspicious or non reassuring CTG include:
  - Immaturity
  - a sleeping fetus
  - a sedated fetus (e.g. maternal sedatives, opiates or antihypertensives may lead to reduced variability)
  - fetal acidosis / hypoxia
  - unrecognised supine hypotension
  - a small for gestational age fetus
  - sepsis
  - maternal smoking or a fetal anomaly
- Preterm fetuses may also have additional pathology (including hypoxia / acidosis) so caution must be taken into attributing CTG changes in the preterm fetus to prematurity
- Whilst most fetal behavioural states last between 20-40 minutes, a fetal sleep cycle may last up to 60 minutes; a FHR Pattern cannot be said to be “suspicious” on the grounds of reduced variability unless monitoring has occurred for longer than this (60 minutes)
CARDIOTOCOGRAPHY (CTG) – ANTENATAL  cont’d

- The FHR pattern needs to be interpreted after comparing with preceding FHR patterns where available
- The fetal heart ultrasound transducer may need to be adjusted or held by hand in order to record a technically adequate trace
- Tocotransducers are designed to record uterine activity in the term uterus and may not adequately record uterine activity in the preterm fundus or in the presence of obesity
- Manual palpation of the uterus is required to accurately determine uterine activity
- It is mandatory for all appropriately trained and qualified providers of maternity care and relevant students to complete the following:
  - Eight hours of training time to complete K2MS once every three years
  - Two hours every other year to complete five K2MS cases
  - Attendance at one day Fetal Welfare Assessment workshop every three years

9. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE GUIDELINES
- Intrapartum Fetal Heart Rate Monitoring
- NSW Health Maternity – Fetal Heart Rate Monitoring

10. REFERENCES
2 (2001). The Use of Electronic Fetal Monitoring. Evidence Based Guideline Number 8, Clinical Effectiveness Support Unit. RCOG Press
3 Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline No. 197 (Replaces No. 90 and No. 112), JOGC, September 2007