CLINICAL PRACTICE GUIDELINE

Fetal heart rate monitoring

This document should be read in conjunction with the Disclaimer

This guideline must be read in conjunction with the Department of Health WA Mandatory Policy: MP 0076/18: Cardiotocography Monitoring Policy. The following Clinical Guideline complies with the Cardiotocography Monitoring Standard.

Contents

General requirements

Indications for performing a cardiotocograph (CTG) [1]

There is no evidence to support the use of routine antenatal or intrapartum CTG in women with uncomplicated pregnancies.

Antenatal	Intrapartum (IP)
• Abnormal antenatal CTG • Abnormal Doppler umbilical artery velocimetry • Suspected or confirmed IUGR • Oligohydramnios (AFI < 5) • Polyhydramnios (AFI > 25) • Prolonged pregnancy > 41 weeks • Multiple pregnancy • Breech presentation • Antepartum haemorrhage • Prolonged rupture of membranes ≥ 24 hours • Known fetal abnormality which requires monitoring • Uterine scar • Essential hypertension or pre-eclampsia • Diabetes where medication is indicated or poorly controlled, or with fetal macrosomia • Other current or previous obstetric or medical conditions which constitute a significant risk of fetal compromise (e.g. cholestasis, isoimmunisation, substance abuse) • Fetal movements (FM) reduced (within the week preceding labour) • Morbid obesity (BMI ≥ 40) • Maternal age > 40 • Abnormalities of maternal serum screening associated with an increased risk of poor perinatal outcome • Prior to and following an attempted /successful external cephalic version	• Induction of labour with prostaglandin / oxytocin • Abnormal auscultation or CTG • Oxytocin augmentation • Regional analgesia • Abnormal vaginal bleeding in labour • Maternal pyrexia >38°C • Meconium or blood stained liquor • Absent liquor following amniotomy • Active first stage of labour >12hours (i.e. regular uterine activity, cervix 4cm dilated) • Active second stage of labour (i.e. pushing) > one hour where birth is not imminent • Pre-term labour less than 37 completed weeks • Tachysystole • Uterine hypertonus • Uterine hyperstimulation
Conditions where IP CTG is not indicated when the condition occurs in isolation, but if multiple conditions are present, IP CTG should be considered.	
• Gestational hypertension • Gestational diabetes mellitus without complicating factors • Obesity (BMI 30-40)	• Maternal pyrexia ≥ 37.8 and < 38 degrees

Review, interpretation and signing of traces

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

- two (2)midwives who have passed an ‘Advanced Fetal Assessment Course’

  OR

- An Obstetric resident and midwife who have passed an ‘Advanced Fetal Assessment Course’

  OR

- An Obstetric registrar who has passed an ‘Advanced Fetal Assessment Course’

  OR

- A Consultant Obstetrician

Storage [2]

If performed in MFAU and/or LBS the CTG is stored electronically. If the CTG electronic storage process should fail at any time, revert to the paper CTG process.

If performed on the wards the CTG should be stored in the woman’s clinical notes.

Education

Medical and midwifery staff must meet the requirements determined by King Edward Memorial Hospital, Department of Nursing and Midwifery Education and Research (DNAMER) procedure: Cardiotocography (CTG) Monitoring: Mandatory education requirements for staff.

Antenatal fetal heart rate (FHR) monitoring

Key points

1. Antenatal CTG is commonly used in conjunction with ultrasound assessment of fetal and placental Doppler in high risk pregnancy. [3]
2. Antenatal CTG from 24+0 weeks gestation should be commenced if:
    - Risk factors develop throughout the pregnancy.
    - There is a change in the maternal condition.
    - There is any suspicion of in utero fetal compromise.
3. CTG may be considered at gestations below 24+0 weeks following a multidisciplinary discussion with the woman regarding birth and neonatal management.
4. The following have NOT been shown to reduce the incidence of a non-reactive (NR) CTG: [4, 5]
    - Manual fetal manipulation.
    - Maternal glucose administration.
    - Icy drinks.
5. Best practice is that all CTG's are assessed at Point of Care.

Prior to procedure

1. Explain the procedure to the woman, gain verbal consent, and ensure privacy.
2. Encourage the woman to empty her bladder.
3. Perform abdominal palpation to identify fetal position unless contra-indicated e.g. TPL, APH, abruption.
4. Ensure the woman is well supported in an upright or left lateral position.
5. Place elastic belts around the abdomen securing the transducers.
6. Position the 'pressure transducer' on the maternal abdomen over the fundus and set the uterine resting tone baseline.
7. Apply the coupling gel to the ultrasound (cardiac) transducer and place on the maternal abdomen over the location of the fetal heart.
8. Paper speed of 1cm per minute.
9. Validate date and time settings.
10. Each CTG recording is labelled with mothers name and UMRN.
11. Record:
    - Maternal pulse and blood pressure.
    - Gestation, gravity and parity.
    - Indication for CTG.

Procedure

1. The duration of the recording need only be 10 minutes the features for a normal CTG have been met.
2. 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.
3. If the maternal condition is stable and there has been one period of acceleration of 15bpm lasting 15 seconds in 30 minutes, continue to monitor for another 20 minutes after this acceleration.
4. If a fetal bradycardia occurs the maternal pulse should be simultaneously recorded on the CTG trace.
5. In the event of the maternal pulse being more than 100bpm, additional means should be used to confirm that the heart rate trace is fetal and not maternal.

Documentation

1. Record indication for CTG.
2. Record on the trace any events that may influence the FHR or UA:
   - maternal medications.
   - maternal movement / changes in position / discomfort.
   - FMs (recorded by the mother).
   - administration of drugs, including social use of nicotine.
3. Following interpretation the CTG Reporting sticker should be completed and signed by both persons completing the review. Location of the sticker is as follows:
   - Inpatient - MR 250 Progress Notes.
   - Women in MFAU - MR 225 Maternal Fetal Assessment Admission Form.
   - Women in outpatient area - MR226 Maternal Fetal Assessment Oupatient.

Escalation of care

	Baseline	Variability	Accelerations	Decelerations	Action plan
Normal	110 - 160	6-25bpm	15bpm for 15 seconds, x 2 within 20 minutes	Absent	Medical obstetric team determines the frequency or necessity of performing a repeat CTG according to maternal and fetal condition.
Abnormal (Any of these features)	<110bpm >160bpm	3-5bpm for >45 mins <3bpm	Absent	Present	See “abnormal CTG” below.

Abnormal CTG

- Notify doctor and Triage Midwife/Midwife Coordinator.
- Review clinical picture.
- Treat reversible causes.
- Repeat CTG within 4 hours if clinical picture allows.

If woman has ≥ 2 non-reassuring CTGs ultrasound assessment of fetal wellbeing should be considered including:

- biophysical profile.
- amniotic fluid index.
- umbilical artery and Doppler studies.

A Kleihauer should be performed if a credentialed health professional, performing an ultrasound, has any concerns regarding the level of fetal activity.

All abnormal CTG traces are to be reviewed as follows:

During the day:

- The LBS traces are to be reviewed by the LBS Obstetric Consultant/ Senior Registrar as appropriate
- The MFAU traces are to be reviewed by the Team Obstetric Consultant/Senior Registrar or the LBS Obstetric Consultant/ Senior Registrar as appropriate.
- Ward traces are to be reviewed by the Team Obstetric Consultant/ Senior Registrar.

After-hours (regardless of the department) are to be reviewed by the most senior obstetric doctor (Consultant, Senior Registrar or Registrar) present in the hospital.

Intrapartum FHR monitoring

Key points

1. Intermittent auscultation (IA) is an appropriate method of intrapartum fetal monitoring in women with no indications for performing:
   - Each auscultation episode should commence toward the end of contraction and be continued for at least 30-60 seconds after the contractions has finished.
   - Auscultation should be undertaken and documented:
     - Every 15 minutes in the active phase of the first stage of labour
     - After each contraction or at least every 5 minutes in the active second stage of labour.
2. If the intrapartum CTG has been started because of concerns arising from IA, but the trace is normal after 20 minutes, you may after consultation with medical team return to IA unless the woman asks to stay on continuous CTG.
3. Offer telemetry, when available, to women who need continuous CTG in labour.

Prior to procedure

1. Explain the procedure to the woman, gain verbal consent.
2. Place two elastic belts around the abdomen securing the transducers.
3. Position the 'pressure transducer' firmly on the maternal abdomen over the fundus.
4. Set the toco transducer at a uterine resting tone baseline level of 10 to 20 mm of mercury.
5. Apply the coupling gel to the ultrasound (cardiac) transducer and place on the maternal abdomen over the location of the fetal heart.
6. Paper speed of 1cm per minute.
7. Validate date and time settings.
8. Each CTG recording is labelled with mothers name and UMRN.
9. Record:
   - Maternal pulse and blood pressure.
   - Gestation, gravity and parity.
   - Indication for CTG

Procedure

In the event of the maternal pulse being more than 100bpm, additional means should be used to confirm that the heart rate trace is fetal and not maternal.

If a fetal bradycardia occurs, maternal pulse should be simultaneously recorded on the CTG trace.

Documentation

1. Record indication for CTG.
2. Record on the trace any events that may influence the FHR or UA such as:
   - maternal medications.
   - maternal movement / changes in position.
   - epidural insertion.
   - transfer to theatre.
3. 30 minutely - CTG interpretation should be documented by the primary clinician, this may be more frequent if clinically indicated.
4. 2 hourly – CTG interpretation by two clinicians.

Escalation of care

	Baseline	Variability	Decelerations	Action plan
Normal	110 - 160	6-25bpm	Absent	Nil
Abnormal • Any of these features • In isolation unlikely to be associated with compromise	100-109		Early Variable	Notify doctor and midwife co-ordinator • Continue CTG • Review clinical picture • Treat reversible causes • +/- scalp stimulation or FBS • Review in 30 minutes
Abnormal • Any of these features • May be associated with compromise	>160 Rising baseline	3-5bpm OR >25bpm for 30 minutes	Complicated variables Late Prolonged	Notify doctor and midwife co-ordinator • Continue CTG • Review clinical picture • Treat reversible causes • scalp stimulation +/- FBS • VE to assess progress • Review management – birth may be indicated
Abnormal • Very likely to be associated with compromise	Bradycardia (<100bpm for > 5 minutes)	<3bpm Sinusoidal		Notify doctor and midwife co-ordinator • As above • Consider tocolysis • Early assisted birth • Reduce second stage or Category 1 (urgent) CS

Fetal scalp electrode (FSE) application

Key points

1. Application of the FSE should be used when clearly identified 'risk factors' are present, and signal quality from external monitoring is poor.
2. Repeated application of the FSE should be avoided.

Contraindications

- Fetus less than 34 weeks gestation.
- Placenta praevia.
- Maternal carrier of haemophilia with affected fetus or with unknown status.
- Maternal clotting disorders or thrombocytopenia.
- Fetal bleeding disorders.
- If the fetal presenting part is unable to be identified.
- Face presentation.
- In the presence of: [6, 7]
    - active herpes lesions.
    - Hepatitis C.
    - Hepatitis B.
    - HIV.

Note: In event of any maternal infections, the FSE should not be applied without Consultant approval. This may include discussion with the Microbiology Consultant

Equipment

- Sterile FSE (KEMH currently uses the Copeland and Spiral FSE).
- Sterile gloves.
- Sterile water based lubricant.
- Cardiotocograph monitor.
- Fetal scalp electrode monitor lead and leg adaptor for selected FSE.

Procedure

Prior to procedure

1. Obtain verbal consent from the woman.
2. Ensure the woman's bladder is empty prior to examination.
3. Establish the membranes are ruptured prior to application of the FSE.
    - Membranes should be ruptured and ideally cervix dilated 2-3cm prior to application.
4. Establish there are no risk factors prior to application.

Procedure

1. Perform a vaginal examination (VE).
   - confirm membranes are ruptured.
   - identify presenting part.
   - do not place FSE over the fontanelles, face or genitalia.
2. Choose FSE (Fetal Spiral or Copeland FSE) and refer to manufacturer's instructions for application.

Following procedure

1. Document commencement of FSE.
2. Inform the paediatric staff of any abnormalities of the insertion site e.g. lacerations or infections.

References

1. Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Intrapartum Fetal Surveillance Clinical Guideline – Third Edition (2014). Melbourne, Victoria: RANZCOG
2. Government of Western Australia, Department of Health, CTG Monitoring Standard. 2017.
3. Grivell RM, Alfirevic Z, Gyte GML, Devane D. Antenatal cardiotocography for fetal assessment. Cochrane Database of Systematic Reviews 2012, Issue 12. Art. No.: CD007863. DOI: 10.1002/14651858.CD007863.pub3. (Level I). Available from URL:
4. Tan KH, Sabapathy A. Fetal manipulation for facilitating tests of fetal wellbeing. The Cochrane Database of Systematic reviews. 2012(8).
5. Tan KH, Sabapathy A. Maternal glucose administration for facilitating tests of fetal wellbeing. The Cochrane Database of Systematic reviews. 2012(9).
6. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. C-Gen 4 Hepatitis C. RANZCOG College statement. 2009.
7. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. C-Gen 3 Hepatitis B. RANZCOG College statement. 2009.

Related policies

Department of Health WA Mandatory Policy: MP 0076/18: Cardiotocography Monitoring Policy.

Related WNHS policies, procedures and guidelines

KEMH: DNAMER: CTG Mandatory Education Requirements for Staff [procedure]

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