IMOET National Meeting
Tuesday 30th September 2014
Dublin Castle

Standardisation of multidisciplinary obstetric emergency training nationally.

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

IMOET
Irish Multidisciplinary
Obstetric Emergency Training

Intrapartum fetal monitoring

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Feidhmeannacht na Seirbhíse Sláinte
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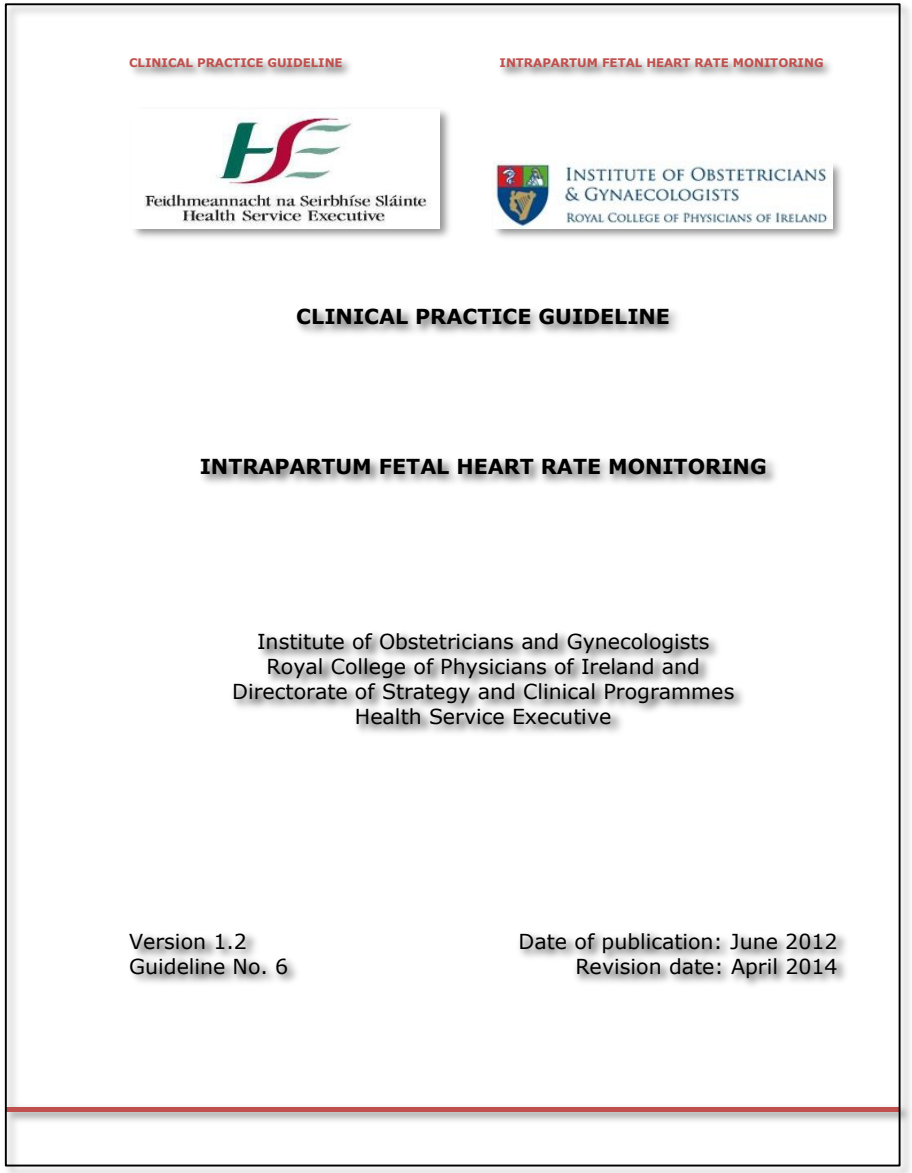
IMOET
Irish Multidisciplinary
Obstetric Emergency Training

Aim

- This session is for practitioners who want to update their knowledge on the fundamental concepts related to fetal monitoring in labour. It is designed for:
  1. Practitioners new to the provision of intrapartum care
  2. Practitioners with clinical experience who have not attended a programme recently, and
  3. Experienced practitioners and those responsible for teaching others who want a resource for sharing with others.

Clinical practice guideline

Institute of Obstetricians and Gynaecologists,
Intrapartum Fetal Heart Rate Monitoring, June 2012



Evidence (low-risk women)

- Continuous cardiotocography (CTG) versus intermittent auscultation
  - Women with continuous CTG are more likely to have:
    - A caesarean for abnormal fetal heart rate pattern (RR 2.31 [95%CI 1.49 to 3.59])
    - Instrumental vaginal birth (RR 1.29 [95%CI 1.02 to 1.62])
    - Babies admitted to neonatal units (RR 1.37 [95%CI 1.01 to 1.87])
  - Women with continuous CTG are less likely to have:
    - Babies with neonatal seizures (RR 0.36 [95%CI 0.16 to 0.81])
    - No evidence of difference in perinatal mortality (RR 1.02 [95%CI 0.31 to 3.31]).
      - (Alfrevic, Devane & Gyte 2013)

Evidence (low-risk women)

- Recommendations
  - *'For a woman who is healthy and has an uncomplicated pregnancy (low risk), intermittent auscultation should be offered and recommended in labour using either a Doppler ultrasound or a Pinard stethoscope.'*
    - (Institute of Obstetricians and Gynaecologists, Intrapartum Fetal Heart Rate Monitoring, June 2012:5)

Evidence (women with risk factors)

- Continuous cardiotocography (CTG) versus intermittent auscultation
  - Women with continuous CTG are more likely to have:
    - Have a caesarean for abnormal fetal heart rate pattern (RR 2.46 [95%CI 1.69 to 3.59])
    - Not achieve spontaneous vaginal birth (RR 1.33 [95%CI 1.11 to 1.59])
    - An increase in cerebral palsy in the continuous CTG group (RR 2.54 [95%CI 1.10 to 5.86])
      - Data on cerebral palsy are heavily influenced by one small trial
  - No evidence of difference in perinatal mortality (RR 1.02 [95%CI 0.31 to 3.31]) or neonatal seizures (RR 0.66 [95%CI 0.36 to 1.22)
    - (Alfrevic, Devane & Gyte 2013)

Evidence (women with risk factors)

- Recommendations
  - *'Intermittent auscultation may be used for low risk women and electronic fetal monitoring (EFM) for women when an increase in risk has been identified.'*
    - (Institute of Obstetricians and Gynaecologists, Intrapartum Fetal Heart Rate Monitoring, June 2012)

Admission CTG

- Evidence
  - Women with an admission CTG were more likely to have
    - caesarean section (RR 1.20, 95%CI 1.00 to 1.44)
    - continuous electronic fetal monitoring during labour (RR 1.30, 95% CI 1.14 to 1.48)
    - fetal blood sampling (RR 1.28, 95% CI 1.13 to 1.45)
  - No evidence of differences in
    - instrumental vaginal birth (RR 1.10, 95% CI 0.95 to 1.27)
    - fetal and neonatal deaths (RR 1.01, 95% CI 0.30 to 3.47)
    - or other secondary outcome measures.
      - (Devane et al 2012)

Admission CTG

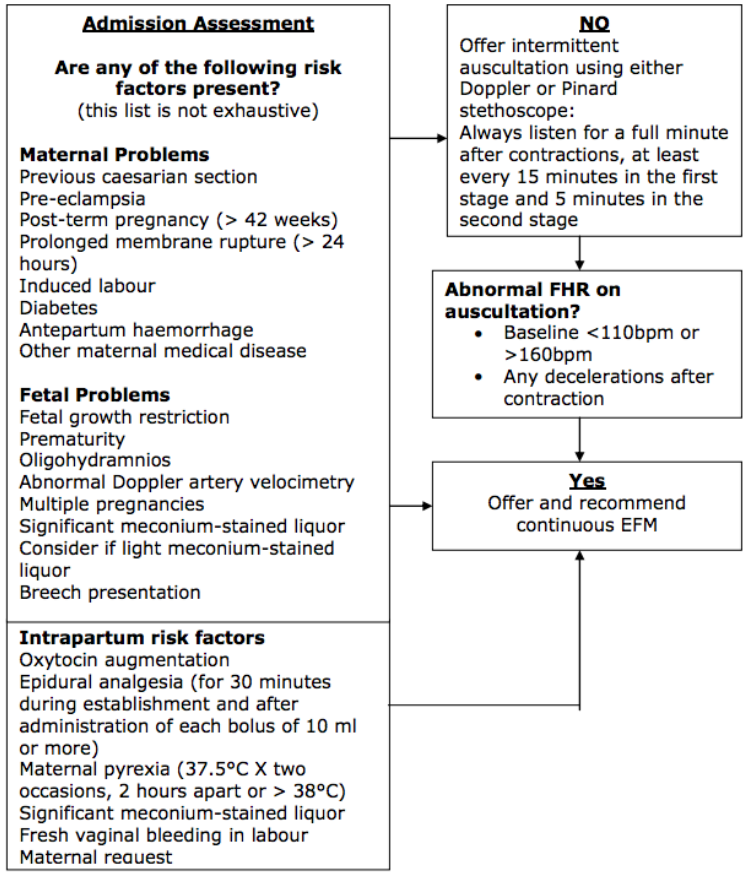
- Recommendations
  - *'The current evidence base does not support the use of the admission CTG in low risk pregnancies and is, therefore, not recommended as a routine.'*
    - (Institute of Obstetricians and Gynaecologists, Intrapartum Fetal Heart Rate Monitoring, June 2012:9)

When to use continuous cardiotocography

Appendices

Appendix 1

Risk factors requiring Electronic Fetal Monitoring (EFM)



Note: Individual units may choose to adapt these indications for EFM
Appendix 1: Adapted from Admission assessment and options for fetal monitoring in labour (based on NICE guidelines 2001 – 2007)

Institute of Obstetricians and Gynaecologists, Intrapartum Fetal Heart Rate Monitoring, June 2012

Intermittent auscultation

- Frequency of auscultation
  - At *least* for one full minute immediately *after* a contraction
  - At *least* every 15 mins in first stage of labour
  - At *least* every 5 mins in the second stage of labour

  - Record maternal heart rate hourly

The Cardiotocograph

- Systematic Interpretation
  - Baseline Rate
  - Baseline Variability
  - Accelerations
  - Decelerations
  - Uterine activity
  - Plan of care

- Systematic assessment should be undertaken and documented every hour

Baseline rate

- Mean level of the Fetal Heart Rate (FHR) when stable excluding accelerations and decelerations
- Determined over 5-10 minutes
- Expressed in beats per minute (bpm)
  - 110-160 bpm = Reassuring
  - 100-109 bpm = Non-reassuring
  - 161-180 bpm = Non-reassuring
  - < 100 or >180 = Abnormal

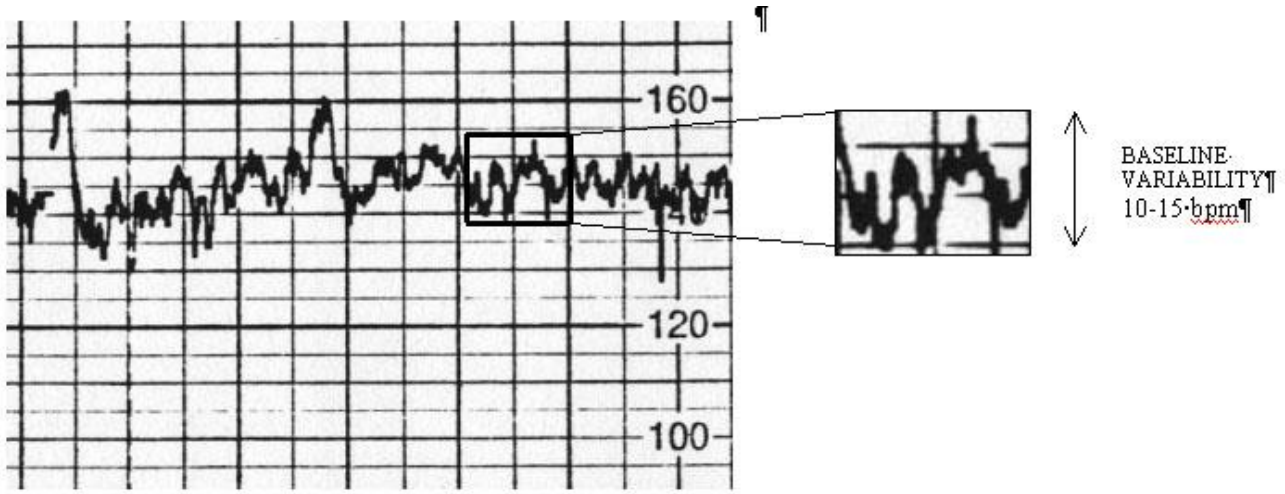
Baseline variability

- Variability is the degree to which the baseline varies within a one minute period excluding accelerations and decelerations;

- Measured by analysing a 1 minute portion of a CTG and assessing the amplitude of change in the heart rate during this period (i.e., the difference in the number of bpm between the highest and lowest rate)

  - 5 or more bpm = Reassuring
  - <5 bpm for 40 to 90mins = Non-reassuring
  - < 5 bpm for 90mins or more = Abnormal

Baseline variability



Accelerations

- Transient increase in the FHR of 15 bpm or more lasting for 15 seconds or more;
- Recording of two or more accelerations in a 20 minute period is termed ‘reactive’;
- Excellent indicator of fetal well-being;
- If repeated accelerations are present with reduced variability, the FHR trace should be regarded as reassuring;

- For classification:
  - Present = reassuring
  - None for 40mins = Non-reassuring
  - Absence of accelerations on an otherwise abnormal trace is of unknown significance

Decelerations

- Transient decrease in the FHR of 15 bpm or more lasting for 15 seconds or more

- Classified into four types
  - Early decelerations
  - Late decelerations
  - Variable decelerations
  - Prolonged decelerations

Early Decelerations

- Gradual decrease and return to baseline
- The onset of the deceleration is at the onset of the contraction;
- FHR reaches lowest point at peak of contraction
- Recovery of FHR to baseline by end of contraction;
- Most commonly due to head compression;
- Appear in late 1st stage, 2nd stage and on vaginal examination;
- True, uniform early decelerations are rare;
- Not associated with fetal hypoxia, acidosis or low Apgar score;
- If persistent, pattern should be reassessed frequently;
- Classified as ‘non-reassuring’.

Late Decelerations

- Gradual decrease and return to baseline
- Late decelerations begin late in the contraction
- Onset at or after the peak of contraction
- Recovery occurs after the contraction has subsided
- Usually proportional to contractions
- Usually pathological when repetitive
- Persistent late decelerations of any magnitude are ominous

- Classification: Abnormal

Variable Decelerations

- Sudden decrease and rapid return to baseline
- Occur anytime during the contraction phase
- Vary in intensity and duration
- Most decelerations in labour are variable
- Associated with umbilical cord compression
- Typical variable decelerations for less than 90 minutes should be regarded as reassuring
- Baseline and variability between the decelerations should also be assessed

Atypical variable decelerations

- Atypical variable decelerations may indicate that the fetus is less able to cope with the cord compression;
- If atypical variable decelerations occur with more than 50% of contractions for over 30 minutes, they should be defined as abnormal indicating that further action is required.
- …..room for confusion here and criticism of dichotomizing variable decelerations

Prolonged decelerations

- Deceleration duration of at least 2 minutes;
- Abrupt onset;
- Usually drops at least 30 bpm from baseline;
- Variable in relation to contractions;
- Gradual recovery to baseline;

- If lasts for less than 3mins = non-reassuring;
- If lasts for more than 3mi = abnormal.

Tachycardia

- Baseline FHR >160bpm
- Cause should be identified
  - prematurity
  - fetal movement
  - maternal infection and/or pyrexia
  - fetal hypoxia
  - Dehydration
- Elevation in FHR by 20bpm above baseline, even if still normal, plus other non-reassuring features should raise concern.

- Uncomplicated tachycardia is reassuring

Bradycardia

- Baseline FHR < 110 bpm
- In association with loss of variability and decelerations a bradycardia is an ominous sign
- With variability > 5 bpm and no decelerations may be benign e.g., post term

Contraction assessment

- 4 Essential Characteristics
  - Frequency
  - Duration
  - Intensity
  - Resting Tone

Categorisation of fetal heart rate traces

Feature	Baseline (bpm)	Variability (bpm)	Decelerations	Accelerations
Reassuring	110-160	= >5	None	Present
Non-reassuring	100-109 161-180	< 5 for = >40 but less than 90 minutes	Early deceleration Variable deceleration Single prolonged deceleration up to 3 minutes	The absence of accelerations with an otherwise normal cardiotocograph is of uncertain significance
Abnormal	< 100 > 180 Sinusoidal significance pattern = >10 minutes	< 5 for = >90 minutes	Atypical variable decelerations Late decelerations Single prolonged deceleration > 3 minutes	

Categorisation of fetal heart rate traces

Category	Definition
Normal	A cardiotocograph where all four features fall into the reassuring category
Suspicious	A cardiotocograph whose features fall into one of the non-reassuring categories and the remainder of the features are reassuring
Pathological	A cardiotocograph whose features fall into two or more non-reassuring categories or one or more abnormal categories

Classification

- 4 Essential Characteristics
  - Frequency
  - Duration
  - Intensity
  - Resting Tone

Summary

- Intermittent auscultation for low-risk women;
- Continuous cardiotocography for women with risk factors ***;
- Admission CTG not recommended as routine;
- Frequency of intermittent auscultation;
- Systematic interpretation of CTG;
- Classification of tracings is a blunt instrument;
- Documented plan of care.

Looking forward

- If you do only one thing when you return to your unit
- …..adopt a genuine multidisciplinary approach to fetal monitoring education;
- ….ok, two things…..cardiotocography is not innocuous; consider carefully its benefits and harms and inform women.

References

- Alfirevic Z, Devane D, Gyte GML. (2013) Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour. Cochrane Database of Systematic Reviews, Issue 5. Art. No.: CD006066. DOI: 10.1002/14651858.CD006066.pub2.

- Devane D, Lalor JG, Daly S, McGuire W, Smith V. (2012) Cardiotocography versus intermittent auscultation of fetal heart on admission to labour ward for assessment of fetal wellbeing. Cochrane Database of Systematic Reviews, Issue 2. Art. No.: CD005122

- Institute of Obstetricians and Gynecologists, Royal College of Physicians of Ireland and Directorate of Strategy and Clinical Programmes Health Service Executive (2012) Intrapartum Fetal Heart Rate Monitoring: Clinical Practice Guideline. IOG, RCPI & HSE: Dublin, Ireland.

This tracing is from a 28 year old gravida 2, para 1. No relevant past history. Normal antenatal period. Admitted at 41 weeks gestation for induction of labour. 06:00hrs, Cervical os 4-5cm dilates, cephalic presentation -1 to ischial spines, clear liquor, syntocinon infusing. 06.40hrs, CTG as below.