GUIDELINES

Fetal monitoring in labour: summary and update of NICE guidance
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What you need to know

• The new guideline on fetal monitoring emphasises that women are the decision makers; clinicians support decision making
• A change in the fetal heart rate pattern indicates a change in the fetal condition
• Fetal heart rate monitoring is only one element of fetal assessment in labour
• Risk assessment should be performed hourly in labour for all women
• When inducing or augmenting labour, monitoring and managing contraction frequency is key to reducing intrapartum hypoxia

What is new in this guidance

• Changed emphasis to “How is the baby?”
• Clarified cardiotocograph (CTG) categorisation
• Changed optimum contraction rate to 3-4 in 10 minutes for all women in labour
• Amended advice about meconium by ceasing to differentiate between significant and non-significant meconium and including the importance of involving women in the discussion about management
• Included new advice about fetal monitoring in the second stage of labour with specific reference to differentiating maternal and fetal heart rates
• Removed recommendations about fetal blood sampling because of limited evidence

The NHS must support high quality, safe care for women and babies, ensuring that the woman or birthing person is empowered to make decisions about their care. However, in recent years multiple reports have highlighted concerns about care in labour1 2 and safety concerns over inconsistent approaches to cardiotocograph (CTG) categorisation, with three different classifications in use.3 4 This article summarises recommendations from the recent update of the National Institute for Health and Care Excellence (NICE) guideline on fetal monitoring in labour.5 The update includes an evidence review for fetal blood sampling and recommendations on fetal monitoring based on the Guideline Committee’s experience and opinion. Simplifying the categorisation of CTGs, with an emphasis on regular assessment and checking on “How is the baby?”, is in line with the work of the Avoiding Brain Injury in Childbirth (ABC) collaboration by the Royal College of Obstetricians and Gynaecologists, Royal College of Midwives, The Healthcare Improvement Studies (THIS) Institute and recent opinion5 (see box 1).

Box 1: Changes in cardiotocograph (CTG) terminology

The Guideline Committee considered it important that CTG terminology was clear and in harmony with the Avoiding Brain Injury in Childbirth initiative6 to ensure nationwide uniformity. The GC advised the following:
• Use the terms white, amber, and red to categorise the features of the CTG rather than reassuring, non-reassuring, and abnormal, as these latter terms are often mistakenly used interchangeably with terms to describe the whole CTG
• Continue to use the terms normal, suspicious, and pathological to categorise the whole CTG
• If decelerations occur with over 50% of contractions describe them as repetitive
• Do not use the terms typical and atypical to describe variable decelerations

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the guideline development group’s experience and opinion of what constitutes good practice. Evidence levels for the recommendations are given in italic in square brackets.

Risk assessment

Risk assessment forms an integral part of intrapartum care, influencing decisions about place of birth, methods of fetal monitoring, and timing and method of birth. The guidance emphasises the need to be vigilant about changes in maternal or fetal condition (such as increase in maternal temperature) with vigilant about changes in maternal or fetal condition (such as increase in maternal temperature) with systematic assessment at least hourly in all settings to ensure that appropriate care is being offered and the holistic question “How is the baby?” is answered.

• Discuss fetal monitoring options with a woman as part of her antenatal care and document the discussions and decisions in her personalised care plan. [Based on the experience and opinion of the Guideline Committee (GC)]
• Perform and document a systematic assessment of the condition of the woman and unborn baby every hour, or more frequently if there are concerns. [Based on the experience and opinion of the GC]
• Carry out a full assessment of the woman and her baby every hour. At each assessment include:
  • Maternal antenatal risk factors for fetal compromise
  • Fetal antenatal risk factors for fetal compromise
  • New or developing intrapartum risk factors
· Progress in labour including characteristics of contractions (frequency, strength and duration)
· Fetal heart rate monitoring, including changes to the fetal heart rate pattern. [Based on the experience and opinion of the GC]

· Discuss with the woman any changes identified since the last review, and the implications of these changes. Include birthing companion(s) in these discussions if appropriate and if that is what the woman wants. [Based on the experience and opinion of the GC]

The committee included two recommendations to highlight:

· Fetal heart rate monitoring is a tool to provide guidance on fetal condition, and not a standalone diagnostic tool. [Based on the experience and opinion of the GC]
· The findings from monitoring need to be looked at together with the developing clinical picture for both woman and baby. [Based on the experience and opinion of the GC]

Limitations of fetal monitoring methods

The advice in this guideline relates to fetal monitoring in labour and should not be used to categorise antenatal CTG traces.

The recommended method of fetal monitoring is based on antenatal and intrapartum risk factors, with continuous CTG recommended for women whose babies are considered at high risk of compromise. The method may influence women’s experiences and place of birth. There is limited quality research on which antenatal and intrapartum conditions warrant continuous CTG and whether CTG or intermittent auscultation is most effective. While CTG monitoring is thought to improve recognition of fetal hypoxia, it has a high false positive rate and increases unnecessary interventions.

· Explain to women that if there are no identified risk factors for fetal compromise, there is a risk of increased interventions with continuous CTG monitoring compared with intermittent auscultation, which may outweigh the benefits. [Based on moderate quality evidence and on the experience and opinion of the GC]
· Explain to women that continuous CTG:
  - May restrict mobility and the option to labour in water
  - A normal CTG trace indicates that the baby is coping well with labour
  - Changes to the baby’s heart rate pattern during labour are common and do not necessarily cause concern. However, they may represent developing fetal compromise, so maintaining continuous CTG monitoring is advised if these occur. [Based on the experience and opinion of the GC]

Differentiating between maternal and fetal heart rate

Failure to differentiate between maternal and fetal heart rates in labour has been reported as a cause of adverse outcomes, especially during the second stage of labour. The updated guideline includes advice on actions to differentiate between the heart rates.

· If there are concerns about whether the maternal heart rate is being heard rather than the fetal heart rate, discuss with the woman the methods available to differentiate and support her decision on which method to use. Options include:
  - Fetal heart rate auscultation with a Pinard stethoscope
  - Bedside ultrasound scanning
  - Continuous maternal heart rate monitoring (using a pulse oximeter or the facility on the CTG equipment)
  - Fetal heart rate detection using a fetal scalp electrode, which is attached to the baby’s head (but be aware this may detect maternal heart rate if there is no fetal heartbeat, so should always be used in conjunction with maternal heart rate monitoring)
  - Simultaneous palpation of the woman’s pulse while listening to the fetal heart rate. [Based on the experience and opinion of the GC]

Rise in baseline fetal heart rate

The guideline emphasises the importance of comparing the fetal heart rate, whether using intermittent auscultation or CTG, with previous rates to identify changes and how they may reflect fetal condition. Ascertaining why a fetal heart rate has increased requires a systematic assessment—including looking for tachysystole, development of meconium or sepsis, progress in labour, and oxytocin use—when deciding whether it is safe to continue with labour.

· Review the previous fetal heart rate monitoring results, including any previous CTG traces, as part of the hourly risk assessment and in conjunction with other antenatal or intrapartum risk factors. [Based on the experience and opinion of the GC]
· Consider as an amber CTG feature an increase in baseline fetal heart rate of 20 beats/min or more from the start of labour or since the last review an hour ago. [Based on the experience and opinion of the GC]

Contractions

The summary of product characteristics for Syntocinon (synthetic oxytocin) recommends a maximum of 3-4 contractions in 10 minutes for women having labour induced or augmented with oxytocin. The Guideline Committee recommended that contraction frequency is included in hourly risk assessment, with action taken to keep contraction frequency at fewer than five in 10 minutes to reduce the risk of fetal hypoxia. Stakeholder comments also supported this added emphasis.

· Consider as an amber CTG feature five or more contractions in 10 minutes leading to reduced resting time between contractions or hypertonus [Based on the experience and opinion of the GC]
· If excessive contraction frequency
  - Reduce contraction frequency by reducing or stopping oxytocin if it is being used
  - Offer a tocolytic drug (a suggested regimen is subcutaneous terbutaline 0.25 mg). [Based on the experience and opinion of the GC]
Short periods of increased fetal heart rate variability

The Guideline Committee recognised that short periods of increased variability may represent worsening fetal condition.

- Increased variability refers to oscillations around the baseline fetal heart rate of more than 25 beats/min, and episodes lasting a few minutes may represent worsening fetal condition. [Based on very low quality evidence and the experience and opinion of the GC]

Assessing the fetal heart rate in the second stage of labour

The second stage of labour presents increased risks to the baby, particularly to one showing signs of fetal compromise or with risk factors such as sepsis or meconium. Furthermore, it is possible to mimic the maternal for the fetal heart rate. These new recommendations highlight areas of concern and recommended actions.

- Take into account that interpretation of CTG traces in the second stage of labour is more challenging than in the first stage of labour. Have a lower threshold for seeking a second opinion or assistance. [Based on the experience and opinion of the GC]
- Ensure the fetal heart rate is differentiated from the maternal heart rate at least once every 5 minutes. [Based on the experience and opinion of the GC]
- If fetal heart rate accelerations are recorded, be aware these are most likely to be maternal pulse. [Based on the experience and opinion of the GC]
- If fetal heart rate decelerations are recorded, look for other signs of hypoxia (for example, a rise in the baseline fetal heart rate or a reduction in variability). [Based on the experience and opinion of the GC]
- Take into account that onset of hypoxia is both more common and more rapid in the active second stage of labour. Take an increase in the baseline fetal heart rate of 20 beats/min or more as a red feature in active second stage labour. [Based on the experience and opinion of the GC]
- If CTG concerns arise in the active second stage of labour, consider discouraging pushing and stopping any oxytocin infusion to allow the baby to recover, unless birth is imminent. [Based on the experience and opinion of the GC]

Character of meconium

Meconium is an intrapartum risk factor. Previously the guideline differentiated between significant and non-significant meconium, but following stakeholder comments this distinction has been removed

- When assessing risk at any time during labour, be aware that the presence of meconium:
  - Can indicate possible fetal compromise, and may lead to complications, such as meconium aspiration syndrome
  - Consider the character of the meconium as part of the overall clinical assessment, in conjunction with other antenatal or intrapartum risk factors, and discuss the option of CTG monitoring with the woman. Recognise that the type of monitoring method used is the woman’s choice and support her decision. [Based on the experience and opinion of the GC]

- Be aware that meconium is more common at later gestations, but should still trigger a full risk assessment and discussion with the woman about the option of CTG monitoring. [Based on the experience and opinion of the GC]

Intravenous fluids

The Guideline Committee were aware of the continuing negative consequences (delayed intervention and maternal hyponatraemia) of the historical recommendation to commence intravenous fluids if the CTG suggested possible fetal compromise and so have strengthened the recommendation.

- Do not offer intravenous fluids to treat fetal heart rate abnormalities unless the woman is hypotensive or has signs of sepsis. [Based on the experience and opinion of the GC]

Fetal blood sampling and fetal scalp stimulation

An updated evidence review found no evidence that CTG monitoring with fetal blood sampling improved outcomes for women and babies when compared with CTG alone and indeed was associated with a reduced 5 minute Apgar score. This may be due to the fetal blood sampling procedure delaying birth. Currently an appropriately powered trial comparing fetal blood sampling and the alternative technique of fetal scalp stimulation is under way. [Based on the experience and opinion of the GC]

- The Guideline Committee were unable to make a recommendation about fetal blood sampling because of limited evidence. [Based on the experience and opinion of the GC]
- If the CTG trace is suspicious with antenatal or intrapartum risk factors for fetal compromise, then consider digital fetal scalp stimulation. If this leads to an acceleration in fetal heart rate and a sustained improvement in the CTG trace, continue to monitor the fetal heart rate and clinical picture. [Based on very low quality evidence and the experience and opinion of the GC]
- Be aware that the absence of an acceleration in response to fetal scalp stimulation is a worrying sign that fetal compromise may be present, and that expediting birth may be necessary. [Based on very low quality evidence and the experience and opinion of the GC]

Implementation

Maternity units that have changed from using NICE guidance for categorising CTGs to other methods will need to provide training on these new NICE guidelines to all staff practising intrapartum care. This is to ensure a national standard methodology, as recommended in high profile safety reports, is used to minimise risk. Another potential barrier to successful implementation is the current national shortage of midwives and doctors.

Guidelines into practice

- Is the care that I provide in labour considering the whole clinical picture?
- Am I consistently assessing the condition of women and babies under my care?
- Am I aware of the advantages and disadvantages of different methods of fetal monitoring?

How patients were involved in the creation of this article.

Committee members involved in this guideline update included three lay members who contributed to the formulation of the recommendations summarised here.
Further information on the guidance

This guidance was developed by the National Guideline Alliance in accordance with NICE guideline methodology (www.nice.org.uk/media/default/about/what-we-do/our-programmes/developing-nice-guidelines-the-manual.pdf). A guideline committee (GC) was established by the National Guideline Alliance that incorporated healthcare and allied healthcare professionals (three obstetricians, two midwives, two anaesthetists, two neonatologists, one general practitioner, one clinical pharmacist) and three lay members. From 1 April 2022 the technical team have transferred from the National Guideline Alliance to NICE and the GC has remained unchanged.

The GC identified relevant review questions and collected and appraised clinical evidence. Quality ratings of the evidence were based on GRADE methodology (www.gradeworkinggroup.org). These relate to the quality of the available evidence for assessed outcomes or themes rather than the quality of the study. The GC agreed recommendations for clinical practice based on the available evidence or, when evidence was not found, based on their experience and opinion using informal consensus methods.

The scope and the draft of the guideline went through a rigorous reviewing process, in which stakeholder organisations were invited to comment. The GC took all comments into consideration when producing the final version of the guideline.

NICE will conduct regular reviews after publication of the guidance, to determine whether the evidence base has progressed significantly enough to alter the current guideline recommendations and require an update.


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