AIMS For a better birth...

Monitoring your baby's heartbeat in labour

Why is a baby's heartbeat monitored?

Monitoring a baby's heartbeat during labour aims to help to assess the baby's well-being and to see how well she or he is coping with labour.

For a healthy woman with a normal pregnancy the outcomes for the baby are generally very good. Monitoring is therefore aimed at trying to identify the rare baby who is not coping with labour and needs help.

A baby will struggle if his or her oxygen supply is insufficient for his or her needs and this can happen with the contractions in labour for a small number of apparently healthy babies. Where there is a major problem identified, these babies can benefit from a caesarean or instrumental birth (with forceps or ventouse). However, when the signs are unclear, a caesarean or instrumental birth may provide no benefit for the baby yet potentially have a negative effect on the mother's physical and emotional well-being, cause injury to the baby, and possibly put future pregnancies at risk. For this reason, it is important that monitoring is used appropriately.[1]

This article aims to explain the methods that are available and the pros and cons of each. Some women find being monitored reassuring, others will find it intrusive. As with any medical procedure, it is up to the mother whether she agrees to any form of monitoring, and she can change her mind about this at any time.

What does heartbeat monitoring show?

All forms of heartbeat monitoring in labour are looking for changes in the baby's pattern of heartbeats that suggest he or she is not coping well with the contractions.

It is normal for a baby's heart-rate and beat pattern to vary during labour. When someone runs up a flight of stairs, their heart-rate will become faster and this is not a sign of problems but rather a sign of a healthy response to a stimulus. Similarly, some of the changes in a baby's heartbeat during labour are a normal response to labour contractions. It is important to distinguish between the normal heartbeat patterns for a healthy baby going through labour, and responding appropriately to the contractions from those which suggest that the baby is struggling. Sometimes these differences are clear, but often they are not, and research over the years has shown that the link between a baby's heartbeat patterns in labour and a baby's well-being is not straightforward, and the heartbeat patterns can be difficult to interpret, despite all the research in this area over the years[2].

The following information explains, briefly, the types of monitoring available, what the research evidence tells us and how you might use this information to make informed decisions about monitoring your baby's heartbeat in labour.

What is being looked for with the monitoring?

When interpreting the baby's heartbeat in labour, caregivers look at four features: Baseline rate (how fast the heart is beating between contractions); baseline variation (the ups and downs in the baseline rate); accelerations (an increase in the heart-rate in response to a contraction - generally a sign of a healthy baby) and the presence or absence of decelerations (a slowing of the heart-rate during or after a contraction). NICE recommends[1,3] categorising these measurements as either reassuring (meaning there is no cause for concern); non-reassuring (meaning there is possibly a cause for concern) or abnormal (which can be subdivided into those cases that need further tests or those that need urgent intervention).

A non-reassuring heartbeat can sometimes be corrected by something as simple as the mother changing position, especially to some kind of upright position. It may also be worth checking whether the mother is well hydrated, or extremely anxious, as these might affect her blood pressure and therefore the baby's well-being.

How can a baby's heartbeat be monitored?

There are several ways of monitoring a baby's heart-rate. When choosing a place for birth, it is helpful to discuss monitoring with a midwife as some forms of monitoring are not available in all birth settings. Also, some monitoring might interfere with your freedom of movement and the types of coping strategies you want to use in labour.

- Pinard or fetal stethoscope: This is a small device (a bit like an old-fashioned ear-trumpet) which is held against the mother's abdomen by the midwife, who listens to the baby's heartbeat for a minute or so at regular intervals. It is one form of what is called intermittent auscultation (IA).
- Sonicaid - (or hand-held Doppler): This is an ultrasound device, held against the mother's

abdomen, allowing both midwife and parents to hear the baby's heartbeat. Like a Pinard, it is used intermittently.

- Cardiotocography (CTG) is a form of electronic fetal monitoring (EFM) which is usually used continuously. When continuously monitoring it provides a paper trace using Doppler ultrasound to record the baby's heartbeat and a pressure transducer to record the mother's contractions. The most common form (called external CTG) is where two separate probes to measure the heartbeat and the contractions are applied to the mother's abdomen and held in place by belts. In internal CTG a single probe to measure both heartbeat and contractions is attached directly to the baby's head (or bottom if the baby is breech.) For either external or internal CTG the probes are usually attached to the recorder by long wires.
- Telemetry CTG (without wires) is sometimes available and with this cordless form of CTG it is easier for the mother to move and adopt positions she finds comfortable. It can also be used in a birth pool. NICE recommends telemetry if continuous monitoring is used[3,4] but it isn't always available. You may want to check the availability in your local hospitals.
- If there is concern about the baby's heartbeat in labour sometimes the doctor might suggest taking a fetal blood sample (FBS) to test for acidosis (whether the baby's blood is too acidic), which can indicate a shortage of oxygen. This is done by taking a tiny blood sample from a small scratch on the baby's head (or bottom). This is quite an invasive procedure but is recommended by NICE in certain situations [3,4] although the evidence to support its use is not conclusive[5].

What are the pros and cons of intermittent monitoring?

Intermittent monitoring (sometimes called intermittent auscultation, or IA) enables the mother to move freely in labour and to adopt the positions she finds most helpful, and can also be used in a birth pool.

Research suggests that for women and babies at low risk of complications, intermittent monitoring is as effective as continuous monitoring at identifying babies who need help, but results in fewer caesarean or instrumental births. Data from a large-scale summary of many trials comparing intermittent and continuous monitoring showed that no differences were identified in the number of babies who died, developed cerebral palsy or other disabilities nor in the number with evidence of having actually been distressed in labour. Slightly more babies who had intermittent monitoring experienced fits in the new-born period compared to the continuous monitoring group, but there is no evidence that these fits had any long-term consequences, and the risk of fits was very low in both groups (1 in a 1000 with CTG versus 3 in a 1000 with intermittent monitoring[6].

As a result of these findings NICE recommends[1,3,4]:

- that IA (intermittent monitoring) is offered to women at low risk of complications in in all birth settings;
- that IA is undertaken immediately after a contraction listening for at least one minute and repeating at least every 15 minutes.

- CTG is not used in women at low risk of complications.

What are the pros and cons of continuous monitoring?

Continuous monitoring allows a midwife or doctor to track how the baby's heart is responding at all times, and also to look back at the history of how it has changed through labour in response to the mother's contractions. This information is often used to make decisions about when to intervene in the labour. However, as described above, evidence from multiple trials showed that continuous CTG compared to intermittent monitoring increased the incidence of caesarean births and the use of forceps or ventouse, but there was no difference identified in the number of babies who died nor in the number with cord blood acidosis (a sign of the baby not coping)[6].

For some women, having continuous monitoring will be reassuring as it enables them to hear their baby's heartbeat, and mothers have the right to ask for this even if there are no risk factors.

External CTG may restrict the mother's movements in labour as the probe needs to be kept over the baby's heart. Some midwives therefore prefer a mother to lie down when using external CTG, but in fact this is not necessary. There is evidence that being able to use upright positions is helpful in labour[7] so if the mother wants to do this, she or someone else can hold the probes in place, or they can be readjusted if they slip. Unless telemetry is used, the mother's movements will also be somewhat restricted by the leads.

Internal CTG does not restrict women's movements as much as external CTG (although movement is only possible as far as the length of leads), and there's less chance of the electrode coming off. However, it does require the waters to have broken (or been broken artificially) and a scalp electrode to be attached to the baby's presenting part – either the head or the bottom by means of a hook. This is painful for the baby, sometimes leaves a scar and potentially carries a risk of infection, though the evidence for this is not clear[8]. Women who are HIV positive should not have internal CTG as it creates an open wound on the baby.

Once either external or internal CTG monitoring has been started, it is usually used continuously through labour, although the mother can decide to discontinue it. Unless telemetry CTG is available it will not be possible for the mother to be monitored continuously in a birthing pool. Also, continuous CTG is not available at homebirths and probably not in most midwifery-led units (MLUs) so if a mother in one of these settings agrees to having continuous CTG then she will usually need to transfer to a hospital obstetric unit.

What about women and babies at increased risk of complications?

Continuous CTG is recommended by NICE if certain risk factors are identified[1,3,4]. These include having an epidural and/or an oxytocin drip to speed labour up; if thick or lumpy meconium is seen; if the mother has high blood pressure; high pulse rate or high temperature; starts bleeding; or her labour is considered to be too slow. There is no clear research to support this recommendation, but this is considered by the

NICE guideline development group to be “best practice”.

If continuous CTG is suggested, then it is important that caregivers explain why, and if they say there is an increased risk for the baby, you might want to ask how much the risk is increased, what the specific level of risk is, and how CTG will reduce that risk, before you make your decision as to whether or not to have CTG.

Continuous CTG might also be suggested if there are concerns about the baby’s heartrate, but in this case NICE recommends that the first step is more frequent intermittent monitoring of the baby’s heartbeat and a review of the whole clinical situation, including things like whether the mother is well-hydrated.[1,3] Changing position might be all that is required, especially if the mother is lying on her back. Only if concerns continue, NICE advises that CTG be suggested. In this situation caregivers must explain the reasons why they think it is needed and respect the mother’s decision whether or not to have continuous monitoring. NICE also recommends that if the CTG trace is normal after 20 minutes then intermittent monitoring should be resumed, unless the mother chooses to remain on the CTG[1’3’4]

What about monitoring on admission to the hospital?

It used to be common practice for women arriving at hospital in labour to be monitored continuously for 15-20 minutes, in the hope that this would identify babies who were at risk, and this may still be the practice in some units. However, for women and babies at low risk of complication, the evidence shows that this practice probably increases the number of caesarean births but with no differences identified in outcomes for the baby when compared with using a Pinard or hand-held Doppler for a minute or so[9]. Using CTG on admission also increased the use of continuous CTG and Fetal Blood Sampling in labour. NICE therefore recommends listening to the baby’s heart with a Pinard or hand-held Doppler for at least one minute at first contact between the woman and her midwife, whether at home for a homebirth, or on admission to a MLU or obstetric unit.[1’3’4].

NICE states that continuous CTG should not be offered to women at low risk of complications in established labour. If an admission CTG is suggested your caregivers should explain the reasons for this, and it will be your decision whether to accept it.

In summary

Intermittent monitoring is recommended by NICE for women and babies at low risk of complications, both on admission and during labour. NICE also provides guidance on risk factors when continuous monitoring should be offered, however there is no clear evidence as to whether it is beneficial in these circumstances.

If continuous monitoring is suggested you may want to ask your caregivers for a clear explanation of the reasons, potential benefits and potential repercussions of having it in your particular circumstances, before deciding whether or not to agree. You can decide to start or discontinue any form of monitoring at

any time.

References

1. NICE "Intrapartum: Care for healthy women and their babies during childbirth" CG190, Full guideline - update 2017. https://www.nice.org.uk/guidance/cg190/evidence/full-guideline-pdf-248734770

2. Devane D and Lalor J "Midwives' visual interpretation of intrapartum cardiotocographs: intra- and inter-observer agreement." J Adv Nurs 2005 Oct 52 (2) 133-141 https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2648.2005.03575.x

3. NICE IPC CG190 Recommendations – update 2017 https://www.nice.org.uk/guidance/cg190/chapter/Recommendations

4. NICE "Intrapartum care for healthy women and babies – Information for the Public" – update 2017 https://www.nice.org.uk/guidance/cg190/ifp/chapter/Care-of-women-and-their-babies-during-labour-and-birth

5. East CE et al. "Intrapartum fetal scalp lactate sampling for fetal assessment in the presence of a non-reassuring fetal heart rate trace." Cochrane Database of Systematic Reviews 2015, Issue 5 http://www.cochrane.org/CD006174/PREG_use-of-fetal-scalp-blood-lactate-for-assessing-fetal-well-being-during-labour

6. Alfirevic et al: "Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour." Cochrane Database of Systematic Reviews 2017 http://www.cochrane.org/CD006066/PREG_continuous-cardiotocography-ctg-form-electronic-fetal-monitoring-efm-fetal-assessment-during-labour

7. Lawrence et al. "Maternal positions and mobility during first stage labour." Cochrane Database of Systematic Reviews 2013, *Issue* 8. http://www.cochrane.org/CD003934/PREG_mothers-position-during-the-first-stage-of-labour

8. Harper et al Cahill AG "The Risks and Benefits of Internal Monitors in Laboring Patients"Am J Obstet Gynecol. 2013 Jul 209 (1) 38e1 -b38 e6 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3760973/

9. Devane D, Lalor JG, Daly S, McGuire W, Cuthbert A, Smith V. "Cardiotocography versus intermittent auscultation of fetal heart on admission to labour ward for assessment of fetal wellbeing". Cochrane Database of Systematic Reviews 2017, *Issue*1 http://www.cochrane.org/CD005122/PREG_comparing-electronic-monitoring-babys-heartbeat-womans-admission-labour-using-cardiotocography-ctg