



Monitoring the Baby's Heart Rate in Labour

For centuries, birth attendants have listened to the baby's heartbeat during pregnancy and labour. In the 19th century, a small trumpet-shaped stethoscope was invented that made it possible to listen to the baby's heartbeat during pregnancy with greater accuracy. This device, named after its inventor Dr Pinard, is still used in many areas of the world.

During labour, the doctor or midwife can listen to the baby's heartbeat at regular intervals ('intermittent auscultation'). In the early stages of labour, this may be carried out every 15 to 30 minutes. In the later stages of labour, when the mother has started to push, intermittent auscultation is performed more frequently, perhaps every five minutes or after every contraction. Intermittent auscultation is an appropriate method of monitoring the baby's heartbeat for women without risk factors.

It is possible to create a continuous record of the unborn baby's heartbeat using Doppler ultrasound. The woman wears two plastic discs containing sensors on her abdomen, held by a belt around her waist. One sensor picks up the baby's heartbeat and the other detects contractions. The continuous, combined recording of the baby's heartbeat and contractions is called the 'cardiotocograph' (CTG).

The use of CTG in labour

The aim of CTG monitoring in labour is to record the baby's heartbeat pattern to assess wellbeing.

During a contraction, there is normally some reduction in blood flow through the placenta, resulting in less oxygen reaching the baby. In a normal, healthy pregnancy, the baby copes well with this natural 'stress' of labour. Some slowing of the baby's heartbeat may occur during a contraction, but the heart rate should recover quickly.

If a baby is not coping well with labour, the slowing of the baby's heartbeat may be more pronounced and may continue after the contraction is finished. These warning signs, along with other changes in the baby's heart rate pattern, are more readily detected by CTG than by intermittent auscultation. The doctor and/or midwife must interpret the CTG and decide whether the baby is coping with labour. If the baby is not coping with the stress of labour, they may recommend simple measures such as slowing down the contractions or changing the mother's position.

Sometimes though, hastening the birth by caesarean section, forceps or vacuum assistance is required, depending on the stage of labour, and the condition of the woman and the baby.

Fetal Scalp Electrode

Sometimes, it may not be possible to get a continuous and reliable recording of the baby's heartbeat in labour by using the external device placed on the abdomen. In this situation, the baby's heartbeat may be measured more accurately using a fetal scalp electrode (called a clip).

This is a tiny device that is attached to the baby's scalp directly by vaginal examination. The fetal scalp electrode is very safe for the mother and baby, but applying the scalp electrode requires the waters to be broken and the cervix to be several centimetres dilated. Use of the scalp electrode is usually avoided if there is any risk of a pre-existing maternal infection (such as hepatitis B) passing from the mother to the baby during birth.



Options for monitoring in labour?

Intermittent auscultation is an appropriate option when there are no risk factors, since the benefit of continuous CTG is likely to be small.

Continuous CTG is recommended when maternal or fetal risk factors for labour complications are present. These include maternal risk factors such as high blood pressure or vaginal bleeding, fetal risk factors such as growth problems or prematurity, and factors to do with the labour itself, such as induction of labour or the use of epidural pain relief.

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Are there any disadvantages of CTG?

Any method of listening to the baby's heartbeat, even intermittent auscultation, presents some inconvenience to the woman.

Intermittent monitoring may temporarily restrict the woman's movement or position in order to obtain a signal from the baby's heart. The doctor/midwife may need to listen to the baby's heartbeat at the very time when a woman is least able to move - namely, at the end of a uterine contraction.

Continuous CTG monitoring is more restrictive than intermittent monitoring because the woman remains connected to the machine throughout labour. The device may need to be removed and re-applied if the woman wishes to have a shower or to use the toilet. Mobility can be improved with use of a wireless 'telemetry' device that avoids the need for connecting leads to a machine.



Does use of the CTG increase caesarean sections?

It is controversial whether routine continuous CTG monitoring increases caesarean sections because of 'false alarms' caused by the baby's heart rate pattern. The risk of caesarean section may be reduced by the use of a blood sample from the baby's scalp to confirm the baby's condition (the 'scalp lactate' or 'scalp pH'), rather than relying on the CTG alone.

Studies looking at the routine use of CTG in all women in labour have not been big enough to prove that it does prevent serious, but rare, complications for the baby. In low risk situations, the benefit of continuous CTG is likely to be small.

The admission CTG

Some centres will perform a CTG when the woman first arrives in labour, and then discontinue the CTG if the heartbeat is normal and there are no current risk factors. This is a 'compromise' position between continuous CTG and intermittent auscultation for low risk women. Like continuous CTG, studies have not been large enough to determine whether the 'routine' use of the admission CTG at the start of labour reduces the incidence of adverse outcomes.

It is important to remember that even though a woman and her unborn baby may have been perfectly well throughout pregnancy, new risk factors may appear during labour. These include a maternal fever, prolonged labour, bleeding, or an abnormal fetal heart rate on intermittent auscultation.

Any of these situations, and others, may lead to a recommendation for continuous CTG monitoring in labour. Maternity carers should always explain the reason for CTG monitoring if performed, and respect the woman's wishes and preferences for her care in labour.

For further detailed clinical practice recommendations on fetal surveillance, please see Intrapartum Fetal Surveillance Clinical Guidelines - Fourth Edition