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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. Art. No.: CD005122. DOI: 10.1002/14651858.CD005122.pub5.

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[Intervention Review]

Cardiotocography versus intermittent auscultation of fetal heart on admission to labour ward for assessment of fetal wellbeing

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Editorial group: Cochrane Pregnancy and Childbirth Group. **Publication status and date:** Edited (no change to conclusions), published in Issue 5, 2019.

Citation: 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. Art. No.: CD005122. DOI: 10.1002/14651858.CD005122.pub5.

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ABSTRACT

Background

The admission cardiotocograph (CTG) is a commonly used screening test consisting of a short (usually 20 minutes) recording of the fetal heart rate (FHR) and uterine activity performed on the mother's admission to the labour ward. This is an update of a review published in 2012.

Objectives

To compare the effects of admission cardiotocography with intermittent auscultation of the FHR on maternal and infant outcomes for pregnant women without risk factors on their admission to the labour ward.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register to 30 November 2016 and we planned to review the reference list of retrieved papers.

Selection criteria

All randomised and quasi-randomised trials comparing admission CTG with intermittent auscultation of the FHR for pregnant women between 37 and 42 completed weeks of pregnancy and considered to be at low risk of intrapartum fetal hypoxia and of developing complications during labour.

Data collection and analysis

Two authors independently assessed trial eligibility and quality, and extracted data. Data were checked for accuracy.

Main results

We included no new trials in this update. We included four trials involving more than 13,000 women which were conducted in the UK and Ireland and included women in labour. Three trials were funded by the hospitals where the trials took place and one trial was funded by the Scottish government. No declarations of interest were made in two trials; the remaining two trials did not mention declarations of interest. Overall, the studies were assessed as low risk of bias. Results reported in the 2012 review remain unchanged.

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Although not statistically significant using a strict P < 0.05 criterion, data were consistent with women allocated to admission CTG having, on average, a higher probability of an increase in incidence of caesarean section than women allocated to intermittent auscultation (risk ratio (RR) 1.20, 95% confidence interval (CI) 1.00 to 1.44, 4 trials, 11,338 women, $I^2 = 0\%$, moderate quality evidence). There was no clear difference in the average treatment effect across included trials between women allocated to admission CTG and women allocated to intermittent auscultation in instrumental vaginal birth (RR 1.10, 95% CI 0.95 to 1.27, 4 trials, 11,338 women, $I^2 = 38\%$, low quality evidence) and perinatal mortality rate (RR 1.01, 95% CI 0.30 to 3.47, 4 trials, 11,339 infants, $I^2 = 0\%$, moderate quality evidence).

Women allocated to admission CTG had, on average, higher rates of continuous electronic fetal monitoring during labour (RR 1.30, 95% CI 1.14 to 1.48, 3 trials, 10,753 women, $I^2 = 79\%$, low quality evidence) and fetal blood sampling (RR 1.28, 95% CI 1.13 to 1.45, 3 trials, 10,757 women, $I^2 = 0\%$) than women allocated to intermittent auscultation. There were no differences between groups in other secondary outcome measures including incidence and severity of hypoxic ischaemic encephalopathy (incidence only reported) (RR 1.19, 95% CI 0.37 to 3.90; 2367 infants; 1 trial; very low quality evidence) and incidence of seizures in the neonatal period (RR 0.72, 95% CI 0.32 to 1.61; 8056 infants; 1 trial; low quality evidence). There were no data reported for severe neurodevelopmental disability assessed at greater than, or equal to, 12 months of age.

Authors' conclusions

Contrary to continued use in some clinical areas, we found no evidence of benefit for the use of the admission CTG for low-risk women on admission in labour.

Furthermore, the probability is that admission CTG increases the caesarean section rate by approximately 20%. The data lacked power to detect possible important differences in perinatal mortality. However, it is unlikely that any trial, or meta-analysis, will be adequately powered to detect such differences. The findings of this review support recommendations that the admission CTG not be used for women who are low risk on admission in labour. Women should be informed that admission CTG is likely associated with an increase in the incidence of caesarean section without evidence of benefit.

Evidence quality ranged from moderate to very low, with downgrading decisions based on imprecision, inconsistency and a lack of blinding for participants and personnel. All four included trials were conducted in developed Western European countries. One additional study is ongoing.

The usefulness of the findings of this review for developing countries will depend on FHR monitoring practices. However, an absence of benefit and likely harm associated with admission CTG will have relevance for countries where questions are being asked about the role of the admission CTG.

Future studies evaluating the effects of the admission CTG should consider including women admitted with signs of labour and before a formal diagnosis of labour. This would include a cohort of women currently having admission CTGs and not included in current trials.

PLAIN LANGUAGE SUMMARY

Comparing electronic monitoring of the baby's heartbeat on a woman's admission in labour using cardiotocography (CTG) with intermittent monitoring

What is the issue?

When healthy women with low-risk pregnancies are admitted to labour wards, does a cardiotocograph (CTG) or listening to the fetal heart rate (FHR) for one minute following a contraction lead to better outcomes for mothers and their babies?

Why is this important?

Monitoring of the FHR is one of the most common methods for checking a baby's wellbeing. The two most common ways of monitoring the FHR are by listening to the heart beat using a fetal stethoscope, Pinard (special trumpet shaped device), hand-held Doppler ultrasound device (known as intermittent auscultation) or by an electronic fetal monitoring (EFM) machine that produces a printout of the baby's heart rate and the mother's contractions, called a CTG.

The admission CTG is a commonly used test consisting of a short, usually 20 minute, recording of the FHR and uterine activity that is performed when the woman is admitted to the labour ward with signs of labour. The admission CTG was introduced to try and identify those babies who were at greatest risk of becoming compromised with a lack of oxygen during labour. These babies could be monitored more intensively by continuous EFM, or they may benefit from an immediate intervention such as being delivered by caesarean section.

What evidence did we find?

We compared the admission CTG with intermittent auscultation of the FHR performed on the woman's admission to the labour ward. We searched for evidence to 30 November 2016 but found no new studies for this updated review (previously published in 2012). This review includes four studies and there is one study that is not yet complete. The included studies (carried out in the UK and Ireland) involved

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more than 13,000 women with low-risk pregnancies. Three trials were funded by the hospitals were the trials took place and one trial was funded by the Scottish government.

Women allocated to admission CTG were probably more likely to have a caesarean section than women allocated to intermittent auscultation (moderate quality evidence). There was no difference in the number of instrumental vaginal births (low quality evidence) or in numbers of babies who died during or shortly after labour (moderate quality evidence) between women in the two groups. Admission CTG was associated with an increase in the use of continuous EFM (with an electrode placed on the baby's scalp) (low quality evidence) and fetal blood sampling (a small blood sample taken from a baby's scalp) during labour. There were no differences in other outcomes measured such as artificial rupture of the membranes, augmentation of labour, use of an epidural, damage to the baby's brain due to lack of oxygen (very low quality evidence), or the baby having fits or seizures just after birth (low quality evidence). No studies reported if the babies developed any severe problems in brain or central nervous system growth and development after one year of age.

What does this mean?

Although many hospitals carry out CTGs on women when they are admitted to hospital in labour, we found no evidence that this benefits women with low-risk pregnancies. We found that admission CTGs may increase numbers of women having a caesarean section by about 20%.

The included studies did not include enough women to show if admission CTGs or intermittent auscultation were better at keeping babies safe. However, studies to show which is better at keeping babies safe would have to be very large. Based on this review, low-risk pregnant women who have an admission CTG could be more likely to have a caesarean section. The benefits to these women of having an admission CTG are not certain.

All of the included studies took place in developed Western European countries. The review findings might not be useful to people in very different countries or where different ways of FHR monitoring are used. However, countries that use admission CTGs should start to question why, because there are not clear benefits to using admission CTGs, and they could be causing women harm by making them more likely to have a caesarean section.