Cochrane Library

Cochrane Database of Systematic Reviews

Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour (Review)

Alfirevic Z, Devane D, Gyte GML

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

www.cochranelibrary.com

WILEY

[Intervention Review]

Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour

Zarko Alfirevic[1], Declan Devane[2], Gillian ML Gyte[3]

[1]Department of Women's and Children's Health, The University of Liverpool, Liverpool, UK. [2]School of Nursing and Midwifery, National University of Ireland Galway, Galway, Ireland. [3]Cochrane Pregnancy and Childbirth Group, Department of Women's and Children's Health, The University of Liverpool, Liverpool, UK

Contact address: Zarko Alfirevic, Department of Women's and Children's Health, The University of Liverpool, First Floor, Liverpool Women's NHS Foundation Trust, Crown Street, Liverpool, L8 7SS, UK. zarko@liverpool.ac.uk.

Editorial group: Cochrane Pregnancy and Childbirth Group.
Publication status and date: Edited (no change to conclusions), comment added to review, published in Issue 11, 2013.

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

ABSTRACT

Background

Cardiotocography (known also as electronic fetal monitoring), records changes in the fetal heart rate and their temporal relationship to uterine contractions. The aim is to identify babies who may be short of oxygen (hypoxic), so additional assessments of fetal well-being may be used, or the baby delivered by caesarean section or instrumental vaginal birth.

Objectives

To evaluate the effectiveness of continuous cardiotocography during labour.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group Trials Register (31 December 2012) and reference lists of retrieved studies.

Selection criteria

Randomised and quasi-randomised controlled trials involving a comparison of continuous cardiotocography (with and without fetal blood sampling) with (a) no fetal monitoring, (b) intermittent auscultation (c) intermittent cardiotocography.

Data collection and analysis

Two review authors independently assessed study eligibility, quality and extracted data from included studies.

Main results

Thirteen trials were included with over 37,000 women; only two were judged to be of high quality.

Compared with intermittent auscultation, continuous cardiotocography showed no significant improvement in overall perinatal death rate (risk ratio (RR) 0.86, 95% confidence interval (CI) 0.59 to 1.23, n = 33,513, 11 trials), but was associated with a halving of neonatal seizures (RR 0.50, 95% CI 0.31 to 0.80, n = 32,386, nine trials). There was no significant difference in cerebral palsy rates (RR 1.75, 95% CI 0.84 to 3.63, n = 13,252, two trials). There was a significant increase in caesarean sections associated with continuous cardiotocography (RR 1.63, 95% CI 1.29 to 2.07, n = 18,861, 11 trials). Women were also more likely to have an instrumental vaginal birth (RR 1.15, 95% CI 1.01 to 1.33, n = 18,615, 10 trials).

Data for subgroups of low-risk, high-risk, preterm pregnancies and high-quality trials were consistent with overall results. Access to fetal blood sampling did not appear to influence the difference in neonatal seizures nor any other prespecified outcome.

Authors' conclusions

Continuous cardiotocography during labour is associated with a reduction in neonatal seizures, but no significant differences in cerebral palsy, infant mortality or other standard measures of neonatal well-being. However, continuous cardiotocography was associated with an increase in caesarean sections and instrumental vaginal births. The challenge is how best to convey these results to women to enable them to make an informed choice without compromising the normality of labour.

PLAIN LANGUAGE SUMMARY

Comparing continuous electronic fetal monitoring in labour (cardiotocography, CTG) with intermittent listening (intermittent auscultation, IA)

Monitoring the baby's heartbeat is one way of checking babies' well-being in labour. By listening to, or recording the baby's heartbeat, it is hoped to identify babies who are becoming short of oxygen (hypoxic) and who may benefit from caesarean section or instrumental vaginal birth. A baby's heartbeat can be monitored intermittently by using a fetal Pinard stethoscope (special trumpet shaped device), or by a hand-held Doppler device. The heartbeat can also be checked continuously by using a CTG machine. This continuous CTG method is also called electronic fetal monitoring (EFM). It produces a paper recording of the baby's heart rate and mother's labour contractions. Whilst a continuous CTG gives a written record, it prevents women from moving during labour. This means that women may be unable to change positions freely or use a bath to help with comfort and control during labour. It also means that some resources tend to be focused on the needs to constantly interpret the CTG and not on the needs of a woman in labour.

This review included 13 trials involving over 37,000 women that compared continuous CTG monitoring with intermittent auscultation (listening). Most studies were not of high quality and the review is dominated by one large, well-conducted trial of almost 13,000 women who received one-to-one care throughout labour. In this trial, the membranes were ruptured artificially (amniotomy) as early as possible and oxytocin stimulation of contractions was used in about a quarter of the women.

Overall, there was no difference in the number of babies who died during or shortly after labour (about one in 300). Fits (neonatal seizures) in babies were rare (about one in 500 births), but they occurred significantly less often when continuous CTG was used to monitor the fetal heart rate. There was no difference in the incidence of cerebral palsy, however, other possible long-term effects have not been fully assessed and need further study. Continuous monitoring was associated with a significant increase in caesarean section and instrumental vaginal births. Both procedures are known to carry the risks for mothers although the specific adverse outcomes were not assessed in the included studies.