Fetal electrocardiogram (ECG) for fetal monitoring during labour

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Plain language summary

Monitoring the baby's heart using electrocardiography (ECG) plus cardiotocography (CTG) during labour helps mothers and babies when continuous monitoring is needed Electronic heart monitoring may be suggested if doctors think the baby is not getting enough oxygen during labour. Two methods may be used. CTG measures the baby's heart rate. ECG measures the heart's electrical activity and the pattern of the heart beats. ECG uses an electrode, passed through the woman's cervix, and attached to the baby's head. The review of trials found that using ECG plus CTG results in fewer blood samples taken from the baby's scalp, less surgical assistance and better oxygen levels at birth than CTG alone.

Abstract

Background

Hypoxaemia during labour can alter the shape of the fetal electrocardiogram (ECG) waveform, notably the relation of the PR to RR intervals, and elevation or depression of the ST segment. Technical systems have therefore been developed to monitor the fetal ECG during labour as an adjunct to continuous electronic fetal heart rate monitoring with the aim of improving fetal outcome and minimising unnecessary obstetric interference.

Objectives

To compare the effects of analysis of fetal ECG waveforms during labour with alternative methods of fetal monitoring.

Search strategy

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (April 2006).

Selection criteria

Randomised trials comparing fetal ECG waveform analysis with alternative methods of fetal monitoring during labour.

Data collection and analysis

Trial quality assessment and data extraction were performed by the review author, without blinding.

Main results

Four trials including a total of 9829 women were included. In comparison to continuous electronic fetal heart rate monitoring alone, the use of adjunctive ST waveform analysis (three trials, 8872 women) was associated with fewer babies with severe metabolic acidosis at birth (cord pH less than 7.05 and base deficit greater than 12 mmol/L) (relative risk (RR) 0.64, 95%

confidence interval (CI) 0.41 to 1.00, data from 8108 babies), fewer babies with neonatal encephalopathy (three trials, RR 0.33, 95% CI 0.11 to 0.95) although the absolute number of babies with encephalopathy was low (n =17), fewer fetal scalp samples during labour (three trials, RR 0.76, 95% CI 0.67 to 0.86) and fewer operative vaginal deliveries (three trials, RR 0.87, 95% CI 0.78 to 0.96). There was no statistically significant difference in caesarean section (three trials, RR 0.97, 95% CI 0.84 to 1.11), Apgar score less than seven at five minutes (three trials, RR 0.80, 95% CI 0.56 to 1.14), or admissions to special care unit (three trials, RR 0.90, 95% CI 0.75 to 1.08). Apart from a trend towards fewer operative deliveries (one trial, RR 0.87, 95% CI 0.76 to 1.01), there was little evidence that monitoring by PR interval analysis conveyed any benefit.

Authors' conclusions

These findings provide some support for the use of fetal ST waveform analysis when a decision has been made to undertake continuous electronic fetal heart rate monitoring during labour. However, the advantages need to be considered along with the